SYLLABUS
OUTCOME-BASED EDUCATION

BASED ON

REVISED BLOOM'S TAXONOMY
(Under Choice Based Credit System)

DEPARTMENT OF NUTRITION AND DIETETICS
BISHOP HEBER COLLEGE (AUTONOMOUS)
TIRUCHIRAPPALLI-17

2019-2020

Department of Nutrition and Dietetics

VISION

- The department seeks to function with mutual love and social commitment to educate and engage students in research and extension activities to serve the community.

MISSION

- Provide opportunity to students to realize their potential in the broad and diverse domains of Nutrition and Dietetics through teaching, innovation, training, research& mentorship on how nutrients impact human health and disease
- Provide opportunities to students to master communication Skills that prepares students for supervised practice through internships and extension activities leading to be a professional dietitians in providing service to professional, governmental and local community
- Propagate student curiosity and inquiry about the theory and practice of dietetics that will lead to discovery and application of new ideas and knowledge

On Successful Completion of B.Sc Nutrition and Dietetics program, the Graduates will be able to

KNOWLEDGE

PO1: Recognize the composition of different foods and their physical, chemical and biological changes that occur during cooking/processing of foods and their effect on human beings.

PO2: Extend nutrition services ***as public health nutritionist, dietician nutritionist, clinical nutritionist or sports nutritionist*** to a diverse community.

PO3: Provide nutrition education to individuals, groups, and communities throughout the lifespan using a variety of communication strategies including ICT

Attitude

PO4: Engage in self-directed continuous learning aimed at global competency, Which will promote professional and personal growth.

Skills

PO5: Apply knowledge of public health, diseases, technical skills, clinical judgment and decision-making to make appropriate lifestyle and food choices.

PO6: Implement strategies with reference to food access, procurement, Preparation, and safety

PO7: Analyze, interpret, evaluate and use professional literature to make Evidence based decisions facilitating professional collaborations in the field of Nutrition and Dietetics

PO8: Evaluate, adopt and apply the best practices relating to health, safety, Quality and client satisfaction in the field of Nutrition and Dietetics.

Ethical & Social Responsibility

PO9: Develop management skills and entrepreneurial skills, by harnessing core Competencies tempered by values and ethics

<u>Programme Specific Outcomes – B.Sc. Nutrition & Dietetics</u>

On successful completion of B. Sc., Nutrition and Dietetics program, the Graduate will be able to

Intellectual Skills

PSO1: Identify the components of foods and apply the concepts learned to provide professional nutrition services in a wide variety of settings including academic, hospital, government, corporate, military, sports and community-based organization.

Practical Skills

PSO2:Exhibit skill and confidence to cater to the nutritional needs of diversePopulation

PSO3: Apply knowledge of food, nutrition and dietetics to develop practical skills of management of dietary departments of the various organizations

Transferable Skills

PSO4: Apply the principles of food science to produce commercial products for the benefit ofthe society honing the entrepreneur skills in students

Programme Articulation matrix

Course Name	Course code	Correlation with Programme Outcomes and Programme Specific Outcomes												
		PO 1	PO 2	PO3	PO 4	PO 5	PO6	PO 7	PO 8	PO 9	PSO1	PSO2	PSO3	PSO4
Food Science	U17ND 101	H	-	L	M	L	M	-	M	L	H	-	H	H
Food Science Lab	U17ND 1P1	H	-	L	M	L	M	-	M	L	H	-	H	H
Food Microbiology	U17ND 1Y1	M	-	L	L	-	L	-	L	-	M	-	L	L
Food Microbiology & Food chemistry Practical	U17ND YP1	M	-	L	L	-	L	-	L	-	M	-	L	L
Human Physiology	U17ND 202	H	H	H	M	H	L	L	L	H	H	H	H	L
Human Physiology Practical	U17ND 2P2	H	H	H	M	H	L	L	L	H	H	H	H	L
Food Chemistry	U17ND 2Y2	H	-	L	M	L	M	-	M	L	H	-	H	H
Food Microbiology & Food chemistry Practical	U17ND YP1	H	M	M	L	L	M	-	M	L	H	-	H	H
Food Packaging	U17ND 2S1	M	L	L	-	-	L	-	M	-	M	-	M	M
Principles of Nutrition	U17ND 303	H	H	H	H	H	L	M	L	H	H	H	H	L
Principles of Nutrition Practical	U17ND 3P3	H	H	H	H	H	L	M	L	H	H	H	H	L
Food Standard and Quality Control	U17ND 3Y3	H	-	-	H	H	M	-	H	-	H	-	H	H
Food Standard and Quality Control & Nutritional Biochemistry Practical	U17ND YP2	H	-	-	H	H	M	-	H	-	H	-	H	H
NMEC-I Basics in Nutrition	U17ND 4E1	H	H	-	H	-	M	H	H	H	H	H	H	L

Nutrition Through Life Cycle	U17ND 404	**H**	**H**	**H**	**H**	**H**	**H**	**H**	**H**	**H**	**H**	**H**	**H**	**L**
Nutrition Through Life Cycle Practical	U17ND 4P4	**H**	**H**	**H**	**H**	**H**	**H**	**H**	**H**	**H**	**H**	**H**	**H**	**L**
Nutritional Biochemistry	U17ND 4Y4	**M**	**H**	**H**	**M**	**M**	**-**	**M**	**-**	**M**	**H**	**H**	**M**	**-**
Food Standard and Quality Control & Nutritional Biochemistry Practical	U17ND YP2	**H**	**-**	**-**	**H**	**H**	**M**	**-**	**H**	**-**	**H**	**-**	**H**	**H**
NMEC-II Diet in Health and Diseases	U17ND 4E2	**-**	**M**	**L**	**M**	**M**	**M**	**M**	**-**	**-**	**H**	**H**	**M**	**L**
Dietetics –I	U17ND 505	**M**	**H**	**H**	**H**	**H**	**H**	**H**	**H**	**H**	**H**	**H**	**H**	**M**
Community Nutrition	U17ND 506	**-**	**M**	**M**	**-**	**M**	**H**	**H**	**H**	**H**	**H**	**H**	**H**	**L**
Dietetics –I Practical	U17ND 5P5	**M**	**H**	**H**	**H**	**H**	**H**	**H**	**H**	**H**	**H**	**H**	**H**	**M**
Food Preservation/ Functional Foods	U17ND 5:1/ U17ND 5:2	**H**	**-**	**-L**	**M**	**L**	**M**	**L**	**M**	**H**	**H**	**H**	**H**	**H**
Principles of Human Resource Management and Interior Design/Food Sanitation and Hygiene	U17ND 5:3/ U17ND 5:4	**-**	**-**	**L**	**-**	**-**	**-**	**-**	**M**	**-**	**-**	**-**	**-**	**H**
Nutrition in special conditions	U17ND 5S2	**-**	**H**	**H**	**H**	**H**	**H**	**H**	**L**	**M**	**H**	**H**	**H**	**L**
Bakery and Confectionery	U17ND 5S3	**H**	**-**	**L**	**-**	**-L**	**-**	**L**	**-**	**L**	**L**	**L**	**L**	**H**
Dietetics –II	U17ND 607	**L**	**H**	**H**	**H**	**H**	**H**	**H**	**H**	**H**	**H**	**H**	**H**	**H**
Nutrition and Fitness	U17ND 608	**L**	**M**	**M**	**M**	**M**	**L**	**L**	**H**	**H**	**L**	**M**	**M**	**L**
Institutional Food Service management	U17ND 609	**-**	**L**	**-**	**H**	**M**	**L**	**H**	**H**	**H**	**H**	**-**	**L**	**H**
Dietetics –II Practical& Dietary Internship	U17ND 6P6	**L**	**H**	**H**	**H**	**H**	**H**	**H**	**H**	**H**	**H**	**H**	**H**	**H**
Food product development and marketing	U17ND 6:1	**H**	**M**	**L**	**H**	**L**	**H**	**L**	**L**	**M**	**L**	**M**	**L**	**H**

strategy														
Project	U17ND 6:2													

B.Sc., Nutrition and Dietetics – Programme structure

Sem	Course	Course Title	Course Code	Hrs/ week	Pre requisites	Credits	Marks		
							CIA	ESE	Total
I	Tamil I	Tamil	U15TM1L1	6		3	25	75	100
	English I	English for communication Skills -I	U16EGPL1	6		3	25	75	100
	Core I	Food Science	U17ND101	4		5	25	75	100
	Core Prac. I	Food Science Lab	U17ND1P1	3		3	40	60	100
	Allied I	Food Microbiology	U17ND1Y1	4		4	25	75	100
	Allied Prac.	Food Microbiology & Food chemistry Practical	U17NDYP1	3*			40	60	100
	Env. Stud	Environmental studies	U16EST11	2		2	25	75	100
	Value Education	Value EducationRI/MI	U15VL1:1 /U15UL1: 2	2		2	25	75	100
II	Tamil II	Tamil	U15TM2L2	6		3	25	75	100
	English II	English for communication Skills -II	U16EGPL2	6		3	25	75	100
	Core II	Human Physiology	U17ND202	6		5	25	75	100
	Core Prac. I	Human Physiology Practical	U17ND2P2	3		3)	40	60	100
	Allied II	Food Chemistry	U17ND2Y2	4	U17ND101	4	25	75	100
	Allied Prac.	Food Microbiology & Food chemistry Practical	U17NDYP1	3*		2	40	60	100
	SBEC I	Food Packaging	U17ND2S 1	2		2	40	60	100
III	Tamil III	Tamil	U15TM3L3	6		3	25	75	100
	English III	English for Competitive Examination Business Communication in English	U16EGPL3 / U17EGCL 3	6		3	25	75	100
	Core III	Principles of Nutrition	U17ND303	6		5	25	75	100
	Core Prac. II	Principles of Nutrition Practical	U17ND3P3	3		3	40	60	100
	Allied III	Food Standard and Quality Control	U17ND3Y3	40		4	25	75	100
	Allied Prac.	Food Standard and Quality Control & Nutritional Biochemistry Practical	U17NDYP2	3*		-	--	--	--
	NMEC –I	To be selected from the courses offered by other		2		2	25	75	100

		departments							
IV	Tamil IV	Tamil	U15TM4L4	6		3	25	75	100
	English IV	English through Literature	U16EGNL4	6		3	25	75	100
	Core IV	Nutrition Through Life Cycle	U17ND404	6		5	25	75	100
	Core Prac. II	Nutrition Through Life Cycle Practical	U17ND4P4	3		3	40	60	100
	Allied IV	Nutritional Biochemistry	U17ND4Y4	4		4	25	75	100
	Allied Prac.	Food Standard and Quality Control & Nutritional Biochemistry Practical	U17NDYP2	3*		2	40	60	100
	NMEC-II	To be selected from the courses offered by other departments		2		2	25	75	100
	Soft Skills	Life skills	U16LFS41	2		1			100
	Extension activities	NSS, NCC, Rotract, Leo Club, Etc.	U16ETA41			1			
V	Core V	Dietetics –I	U17ND505	6		5	25	75	100
	Core VI	Community Nutrition	U17ND506	6		5	25	75	100
	Core Prac. III	Dietetics –I Practical	U17ND5P5	3		3	40	60	100
	Elective I	Food Preservation /Functional Foods	U17ND5:1 / U17ND5:2	5		4	25	75	100
	Elective II	Principles of Human Resource Management and Interior Design /Food Sanitation and Hygiene	U17ND5:3 / U17ND5:4	5		4	25	75	100
	SBEC – II	Nutrition in special conditions	U17ND5S2	2	U17ND2S1	2	40	60	100
	SBEC –III	Bakery and Confectionery	U17ND5S3	2		2	40	60	100
VI	Core VII	Dietetics –II	U17ND607	6	U17ND505	5	25	75	100
	Core VIII	Nutrition and Fitness	U17ND608	6		5	25	75	100
	Core IX	Institutional Food Service management	U17ND609	6		5	40	60	100
	Core Prac. IV	Dietetics –II Practical & Dietary Internship	U17ND6P6	3		3	40	60	100
	Elective III	Food product development and marketing strategy	U17ND6:1	4		3	25	75	100
	Core Project	Project	U17ND6PJ	4		3			100
	Gender studies	Gender studies	U16GSD61			2 1			

SBEC – Skill Based Elective Courses; NMEC – Non Major Elective Courses;

Total credits 140

*Other Languages	Hindi	Sanskrit	French		Hindi	Sanskrit	French
Semester I				Semester III			
Semester II				Semester IV			

Part I : 4 Core theory :9 Core Practical's : 6 SBEC:3
Environmental studies:1 Extension Studies : 1

Part II :4 Allied theory :4 Allied Practical's :2 NMEC: 2
Elective : 3 Value Education : 1 Gender Studies : 1 Project : 1

Total courses : 41

NMEC offered by the department:
1. Basics of Nutrition
2. Diet in health and disease

CORE I: FOOD SCIENCE

Semester: I **Code: U17ND101**
Credits: 4 **Hours/Week: 6**

1.Course Outcomes:

After the completion of this course the students will be able to:

CO. No	Course Outcomes	Level	Unit
CO1	Identify, Define and classify different food groups, nutrients, and evaluate various pre- preparation and cooking techniques in order to adopt best practices for health and safety	K2	I
CO2	Compare the composition and nutritive value of various nutrients present in cereals and pulse and also the effect of cooking and processing on cereals and pulses	K4	II
CO3	Elaborate the importance of fruits and vegetables in health and disease with special reference to the changes taking place on their nutritive value, palatability and texture during cooking and processing	K5	III
CO4	Evaluate the role of protein rich foods such as milk, egg, meat and fish and assess their perishability in order to formulate techniques to control the perishability of these foods.		IV
CO5	Analyze the role of Indian herbs as anti-oxidants and also assess the importance of various beverages, artificial sweeteners, sugar, fats and oils in health and disease.	K4	V
CO6	Develop various sustainable food practices like energy and nutrient. conservation and food product development.	K5	I, II, III, IV, V

2. A. SYLLABUS

UNIT-I **-15 Hours**

Introduction to Food science

a) Definition -Food Science, Food, Nutrients, Nutritional status, Mal – nutrition-under nutrition over nutrition, Hunger- Hollow Hunger, Appetite Satiety and Health.

b)Food groups - Basic five food groups, Nutritional classification of foods - energy yielding, body building and protective foods.

c)Methods of cooking - Moist, dry and combination heat methods of cooking, Merits and demerits. Microwave cooking- principle, Merits & demerits.

UNIT-II **10 Hours**

Cereals &Pulses

a) **Cereals:**Structure and nutritive value of rice and wheat, Gelatinization, Process of milling and malting -wheat, Rice, Gluten formation , Nutritive value of millets - ragi, bajra.

b) **Pulses:** Germination process, factors affecting cooking quality of pulses, composition, nutritive value, and its advantages in cookery.

UNIT-III **10 hours**

Vegetables and Fruits

a) **Vegetables** – Selection of vegetables, Nutritive value , Changes in nutritive value before and after cooking,, Effect of cooking on the vegetable pigments.- chlorophyll, carotenoids, anthocyanin, anthoxanthin.

b) **Fruits**- Classification, nutritive value, ripening of fruits, Effect of browning andits prevention , Storage of fruits.

UNIT-IV **15 Hours**

Milk and meat products

a) **Milk and Milk Products:** Types of milk , pasteurization of milk , composition and nutritive value, milk products – cheese, paneer and khoa

b) **Egg:**Structure, composition and nutritive value,Qualitative determination of egg and its role in cookery .

c) **Meat:**Structure, composition and nutritive value of meat, cutting process of meat, cooking changes in meat, and tenderness of meat.

d) **Poultry-**classification,Nutritive value, Selection and cooking methods poultry.

e) **Fish** -selection of fish,Structure, composition and nutritive value.

UNIT-V **10 Hours**

Fats, Sugar, Beverages and Spices

a) **Fats and Oils-** composition of common fats and oils, smoking temperature, rancidity and role of fats and oils in cookery.

b) **Sugar** – Nutritive value, sugar related products, stages of sugar cookery, Crystallization, Factors affecting crystallization.

c) **Beverages:** classification, nutritive value - coffee, tea, cocoa, milk based beverages, fruit juices and aerated beverages.

d) **Spices and condiments** – Types and use in Indian cookery, Medicinal value.

B. Topics for self-study

Sl. No.	Topics	Reference

1	Antioxidants in vegetables – Definition of antioxidants – relationship between free radicals and antioxidants - their role in boosting immunity.	https://www.nccih.nih.gov/health/antioxidants-in-depth
2	Refining cooking oils – Process – advantages and disadvantages of refining oils – conventional oils vs refined oils.	https://www.salonioil.com/refined-cooking-oil-their-dangerous-effects-on-health/
3	Comparison between sugar, jiggery and unrefined sugars.	https://thewholetruthfoods.com/blog/sugar-honey-jaggery-which-is-healthier/
4	Genetically modified vegetables – advantages and disadvantages.	https://www.gktoday.in/gk/advantages-and-disadvantages-of-genetically-modified-crops/

C. TEXT BOOK

1. Srilakshmi, B., "Food science" ,7th edition, New Age International Pvt. Ltd., New Delhi., 2018.

2. Potter, N.N. and Hotchkiss, H.J., "Food Science", 5th edition, CBS Publishers and Distributors, New Delhi, 2007.

D. REFERENCE BOOKS

1. Mudambi, R.S. and Rao. S. "Food Science", 2ndEdition,Wiley Eastern limited.New Delhi. 2007,

2. Mudambi, R.S. and Rajagopal, M.Y.,"Fundamentals of Food, Nutrition and Diet Therapy" 5th Edition, Wiley Eastern Limited. New Delhi.,2010

3. Manay. N.S., "Foods – facts and principles", 3rd Edition, New age International Pvt. Ltd. Publishers, New delhi, 1996.

4. Swaminathan, M. "Food Science and Experimental Foods",Ganesh and Co., Chennai, 1988.

E. WEB LINKS

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3. SPECIFIC LEARNING OUTCOMES (SLO)

Unit	Course Content	Learning Outcomes	Bloom Toxonomic Level K1,K2,K3,K4,K5,K6
I.1	**Introduction – Definition**– Food Science, Food , Nutrients, Nutritional status, Mal – nutrition- under nutrition over nutrition, Hunger- Hollow Hunger , Appetite Satiety and Health	Define the various components of food science and nutrition	**K2**
		Explain different types of malnutrition	**K2**
		Classify the difference types of malnutrition	**K4**
		Differentiate between hunger and hallow hunger	**K4**
		Analyze the appetite, health and satiety value of food.	**K4**
1.2	**Food groups -** Basic five food groups, Nutritional classification of foods - energy yielding, body building and protective foods.	List out the nutritional classification of foods.	**k2**
		Outline the basic five food groups	**K4**
		Interpret the differences between the different components of food.	**K4**
		Explain the functions of food	**K2**
	Methods of cooking - Moist, dry and combination heat methods of cooking, Merits and demerits. Microwave cooking- principle, Merits & demerits	Define the concepts behind different cooking methods.	**K2**

		Interpret the importance various cooking methods in terms of nutritive value of foods.	**K3**
		Apply the importance of various cooking of foods.	**K3**
		Apply the importance of various cooking methods in day-to-day life.	**K3**
		Compare the different cooking methods and understand their merits and demerits	**K5**
II	**Course Content in Unit -2**		
2.1	**Cereals:** Structure and nutritive value of rice and wheat.	List out various cereals and recall their nutritive value.	**K3**
		Compare the structure of cereals with reference to rice and wheat	**K4**
2.2	Gelatinization,	Define the concept of gelatinization.	**K2**
		Explain the concept of gelatinization.	**K2**
		Application of the concept with regards to cooking of rice, its nutritive value and digestibility	**K3**
2.3	Process of milling and malting - wheat, Rice	List out the importance of milling and malting.	**K3**
		Compare and contrast the advantages of milling and malting	**K4**
		Analyze the effect of milling and malting on the nutritive value of rice and wheat.	**K4**

2.4	Gluten formation	Remember the concept of gluten formation.	K2
		Demonstrate the formation of gluten and separate it from wheat flour.	K3
		Apply its importance in dough making	K4
2.5	Nutritive value of millets - ragi, bajra	Relate the importance of millets.	K2
		Compare the nutritive value with special reference to ragi and bajra.	K4
2.6	**Pulses:** Germination process, and its advantages.	List out various pulses.	K2
		Compare the nutritive value of pulses,	K4
		Apply germination techniques and compare its nutritive value.	K3
2.7	Factors affecting cooking quality of pulses, Composition, nutritive value and advantages of cookery.	Define the various methods of cooking pulses.	K2
		Compare the various methods of cooking on different pulses on its nutritive value and digestibility. •	K4
		Experiment various cooking methods to get a better clarity.	K4
III	**Course Content in Unit -3**		
3.1	Selection of vegetables, nutritive value, changes in nutritive value before and after cooking	Select the vegetables and classify according to their types.	K2
		Explain the nutritive value of various vegetables.	K2

		Experiment with the effect of various cooking methods in the nutritive value of vegetables.	K4
		Compare the nutritive value of vegetables before and after cooking.	K4
		Assess the effect of cooking on vegetables.	K5
		Create methods in which loss of nutrients can be prevented.	K5
3.2	Effect of cooking on the vegetable pigments.- chlorophyll, carotenoids, anthocyanin, anthoxanthin	Identify the relationship between the colour of the vegetable and its nutritive value.	K2
		Summarize the various pigments present in vegetables.	K5
3.3	**Fruits**- Classification, nutritive value.	Compare and Label various fruits according to season.	K2
		Classify fruits according to nutritive value. •	K4
3.4	Ripening of fruits, effect of browning and its prevention, storage of fruits.	Discuss how fruits ripen.	K2
		Summarize the process of ripening of fruits.	K2
		Identify the methods of storage of fruits.	K2
		Analyze the effect of ripening on nutritive value and keeping quality.	K4
IV	Course content Unit IV		
4.1	**Milk and Milk Products:** Types	Comparethe various milk products and	K4

	of milk , pasteurization of milk , composition and nutritive value, milk products – cheese, paneer and khoa	experimentally improve its quality. .	
		Analyze the milk products for its benefits and demerits and overcome the demerits.	K4
		Assess the nutritive value of the milk products and list out their utility.	K5
		Create new products with improved quality and shelf-life	K5
4.2	**Egg:** Structure, composition and nutritive value, Qualitative determination of egg and its role in cookery	Identify the quality of egg through various techniques.	K2
		Determine the role of egg in various food products.	K2
		Analyze the various cooking methods for taste and texture of egg.	K4
		Formulate various techniques to improve the keeping quality of egg.	K5
4.3	**Meat:** Structure, composition and nutritive value of meat, cutting process of meat, cooking changes in meat, and tenderness of meat.	Classify the nutritive value of different type of meat.	K3
		Analyze the cutting of meat and develop techniques through with nutrient loss can be prevented.	K4
		Compare the cooking quality of various meat products and analyze their palatability and nutritive value on cooking.	K4

		Evaluate the cooking changes in meat and its effects on digestibility.	K5
		Combine various cooking methods and create new innovative products with improved taste and increased	K4
4.4	**Poultry**-classification, Nutritive value, Selection and cooking methods poultry	List out the various types of poultry.	K3
		Compare the nutritive value of the types of poultry.	K4
		Apply the various cooking methods of poultry with regards to its digestibility and nutritive value.	K3
4.5	**Fish** - selection of fish, Structure, composition and nutritive value.	Define the types of fish.	K2
		Explain the structure and composition of fish.	K3
		Compare the nutritive value to the health benefit	K3
V	**Course Content in unit -5**		
5.1	**Fats and Oils** - composition of common fats and oils, smoking temperature, rancidity and role of fats and oils in cookery.	List out the various fats depending upon their classification.	K2
		Compare the fats based on their fatty acid composition. Utilize beneficial fats in place of conventional fats.	K3
		Analyze the fatty acid composition of various fats with respect to their smoking point and nutritive value.	K4
		Assess the fatty acid content of fat before and	K4

		after heating.	
		Discuss the effect of reheating on fatty acid composition.	K2
5.2	**Sugar** – Nutritive value, sugar related products, stages of sugar cookery, Crystallization, Factors affecting crystallization.	List out the various sugars.	K2
		Experiment various stages of sugar cookery and their use in daily life.	K3
		Compare the nutritive value of different sweeteners.	K3
		Compare the effects of sugar cookery on confectionary.	K3
5.3	**Beverages:** classification, nutritive value - coffee, tea, cocoa, milk-based beverages, fruit juices and aerated beverages.	Define beverages and classify them according to the nutritive value and health.	K2
		Compare the health benefits of various beverages	K3
5.4	**Spices and condiments** – Types and use in Indian cookery, Medicinal value	Define spices and condiments and list out their uses in day-to-day life.	K2
		Compare the medicinal value of various herbs.	K3

4. <u>Mapping Scheme for the PO, PSOs and COs</u>

Mapping	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PSO1**	**PSO2**	**PSO3**	**PSO4**
CO1	H	L	L	L	-	-	-	-	-	H	-	H	H
CO2	H	-	-	-	-	-	-	L	-	H	-	L	-
CO3	H		-	-	M		-	L	-	H		H	H
CO4	M		-	-	-	M		-	M	L	-	M	H

CO5	H		-	-	M	L				H	-	H	
CO6	H	-	-	-	-	-	-	H	-	L	-	H	H

L-Low M-Moderate H- High

5. Course assessment methods

Direct

1. **Continuous Internal Assessment I ,II**
2. **Group discussion, Presentation, Assignment, Poster presentation**
3. **End Semester Examination**

Indirect

NAME OF THE COURSE COORDINATOR: MRS. K. MEERA

CORE I LAB : FOOD SCIENCE LAB

Semester: I **Code: U17ND1P1**
Credits: 3 **Hours/Week: 6**

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1. Course Outcomes:

CO. No	Course Outcomes	Level	Unit
CO1	Analyze the structure of starches microscopically and the changes that take place during cooking of cereals and pulses.	K4	II
CO2	Evaluate the changes taking place in vegetable pigments during the application of heat, acid, and alkali.	K5	IV
CO3	Compare enzymatic and non-enzymatic browning and analyze the changes taking place in both critically.	K5	IV
CO4	Interpret the effect of cooking on proteins with special attention to milk, meat and egg.	K3	V, VI
CO5	Explain the various stages of sugar cookery and their role in food industry and the effect of heat on fats and oils.	K2	VII
CO6	Formulate new food products, keeping the knowledge obtained through the study of food science.	K6	II,III,IV

2.A. Syllabus

1. INTRODUCTION TO LABORATORY

Laboratory rules
Familiarizing with laboratory equipment, procedure, and learn to weigh food ingredients.

2. CEREALS **5 Hours**

Microscopic examination of various starches.
Preparation of modified starch and their application.
Estimation of Gluten formation.

Preparation of cereal products using rice, wheat, ragi based on steaming, absorption, pressure cooking and straining methods.

3. PULSES: 5 Hours

Determination of Factors affecting cooking quality of pulses- use of hard water, soft water, sodium bi carbonate, vinegar; soaking and pressure cooking.
Preparation of few pulse recipes.

4. VEGETABLES AND FRUITS: 5 Hours

Effect of heat and pH on vegetable pigments like: chlorophyll, carotenoids, anthocyanin, anthoxanthin.
Effect of cooking on flavouring compounds of vegetables.
Brow3ning reaction and its prevention.
Preparation of vegetable recipes by using the above experiment.

5. MILK COOKERY 5 Hours

Preparation of cheese, Paneer, Phirneeand Butter milk

6. EGG

Preparation of boiled egg, Scrambled egg, Poached egg, Omelette.

7. SUGAR 5 Hours

Enumeration in Stages of sugar cookery

8. FATS AND OILS: 5 Hours

Estimation of Smoking temperature of different fats and oils.
Preparation of few deep fat food products.

9. BEVERAGES: 5 Hours

Preparation and taste evaluation
Coffee
Tea
Soup and Few nourishing beverages (fruit and milk based).

B. References :

1. Connie M.Weaver and James.,"A Manual for Experimental Foods, Dietetics", 2nd Edition, CRC press, Newyork, 2005.
2. SuzanneNielsen.S., "Food Analysis laboratory Manual", 2ndEdition,Springer,2015.
Potter,N.N. and Hotchkiss, J.H., "Food Science",5thEdition,CBSPublication,Wadsworth, 2007

3. SPECIFIC LEARNING OUTCOMES (SLO)

UNIT	Course content	Learning outcomes	Blooms Taxonomic levels of Transaction
1.	**INTRODUCTION TO LABORATORY** Laboratory rules Familiarizing with laboratory equipment, procedure, and learn to weigh food ingredients.	List out rules and regulations to be followed in lab. .	K2
		Apply safety techniques by using proper protective gears such as apron, hair net etc	K3
	CEREALS Micrscopic examination of various starches. Preparation of modified starch and their application.	Analyze the structure of starch microscopically and compare the structure.	. K3
	Estimation of Gluten formation.	Formulate the gluten from wheat and analyze its structure.	K5
	Preparation of cereal products using rice, wheat, ragi based on steaming, absorption, pressure cooking and straining methods.	Develop food products using cereals by following different cooking methods.	K5
	PULSES: Determination of Factors affecting cooking quality of pulses- use of hard water, soft water, sodium bi carbonate, vinegar; soaking and pressure cooking.	Analyzethe various factors involved in cooking pulses.	K4
	Preparation of few pulse recipes. .	Develop new food products using pulses.	K5
	VEGETABLES AND FRUITS: Effect of heat and pH on vegetable pigments like: chlorophyll,	Experiment the effect of various chemicals on pigments.	

	carotenoids, anthocyanin, anthoxanthin. Effect of cooking on flavouring compounds of vegetables		
	Browning reaction and its prevention.	Analyze enzymatic browning.	K4
	Preparation of vegetable recipes by using the above experiment.	Formulate recipes using vegetables.	K5
	MILK COOKERY Preparation of cheese, Paneer, Phirneeand Butter milk	Develop various milk products and analyze the chemical processes involved in its preparation.	K5
	EGG Preparation of boiled egg, Scrambled egg, Poached egg, Omelette.	Develop various egg-based recipes and analyze the effect of the processes involved.	K5
	SUGAR Enumeration in Stages of sugar cookery	Analyze the various stages of sugar cookery.	K4
	FATS AND OIL Estimation of Smoking temperature of different fats and oils.	Compare the smoking temperature of different oils and its effect on cooking.	K4
	Preparation of few deep fat food products.	Evaluate deep fried foods using the concept.	K5
	BEVERAGES: Preparation and taste evaluation Coffee Tea Soup and Few nourishing beverages (fruit and milk based).	Evaluate the prepared beverages	K5

4, **Mapping Scheme for the PO, PSOs and COs**

Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4
CO1	M	-	-	-	-	L	-	L	-	-	-	L	M
CO2	L	-	-	-	-	L	-	L	-	-	-	-	H
CO3	M	-	-	M	-	M	-	H	M	M	M	M	H
CO4	M	-	-	-	-	M	-	H	-	L	-	-	H
CO5	M	-	-	L	-	M	-	H	M	M	M	M	H
CO6	L	-	-	L	-	H	-	M	-	L	L	M	M

L-Low M-Moderate H- High

5.Course assessment methods

Direct	
	1. Continuous Internal Assessment I ,II 2. **Group discussion, Result Discussion, experiments, laboratory practices** **3. End Semester examination**
Indirect	

NAME OF THE COURSE COORDINATOR: MRS. K. MEERA

ALLIED I : FOOD MICROBIOLOGY

Semester: I **Code: U17ND1Y1**
Credits: 4 **Hours/Week: 60**

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1. Course Outcomes:

After the completion of this course the students will be able to

CO. No	Course Outcomes	Level	Unit
CO1	Apply the concept of microbiology and use of microscope in identifying the microbes in foods.	K4	I
CO2	Assess the different types of microorganism involved in food spoilage and the conditions under which they will grow.	K5	II
CO3	Analyze the characteristics of foodborne, waterborne and spoilage microorganisms, and methods for their isolation, detection and identification.	K4	III
CO4	Evaluate the role of microorganisms in fermentation and assess the benefits and adverse effects of fermentation.	K5	IV
CO5	Determine the role and significance of microbial inactivation, adaptation and environmental factors on growth and response of microorganisms in various environments.	K5	V
CO6	Develop the knowledge on the effects of microorganisms in health and disease.	K5	III, V

2.A. Syllabus

UNIT- I **10 Hours**

Introduction to Food Microbiology

History and Development of Food Microbiology, Light and Electron microscopy, Definition and Scope of food microbiology ,Inter-relationship of microbiology with other sciences

UNIT- II **15 Hours**

Characteristics of Microorganisms in Food

Types of microorganisms associated with food, - Bacteria, Virus, Fungi, Protozoan and Algae their morphology and structure, Growth and multiplication- growth curve, definition of batch and continuous culture. Factors influencing the growth- intrinsic factors, nutrient content, pH,redox potential, anti -microbial barrier and water activity. Significance of spores in food microbiology

UNIT- III

Microbial Food Spoilage **10 Hours**

Sources of Microorganisms in foods, Types of food spoilage microorganisms
Spoilage of specific food groups- Milk and dairy products, Meat, poultry and sea foods, Cereal and cereal products, Fruits and vegetables and canned products .

UNIT- IV **15 Hours**
Food Fermentations
Fermentation –definition and types, Microorganisms used in food fermentations

Dairy Fermentations-starter cultures and their types, concept of probiotics, types of fermented foods, methods and preparation for vinegar, sauerkraut, soya sauce.

UNIT- V **15 Hours**

Soil – Role of microorganism in nitrogen cycle.
Water – bacteriological examination of water, water borne disease and their control.
Sewage – Types of sewage, method of sewage disposal
Air – principles of air borne disease and their control

B. Topic for Self Study

Sl. No.	Topics	Reference
1	Probiotics and prebiotics – difference - role of probiotics and prebiotics in gut health – natural and artificial probiotics	.https://www.prebiotin.com/prebiotin-academy/what-are-prebiotics/prebiotics-vs-probiotics/
2	Flavour changes in cheese due to the fermentation through various moluds	https://www.cheesescience.org/microbes.html
3	Canning – principle behind canning – puffing of can – maintenance of headspace in can – botulism and botulinum poisoning in canned foods	https://ir.library.oregonstate.edu/downloads/ft848t80r

C. Text Books:

1) Adams, M.R., and Mosses, M.O., "Food Microbiology", 5th Edition, New age International (P) Ltd.,New Delhi, 20155.
2) VijayaRamesh,K, "Food Microbiology", MJP Publishers, Chennai,2007.

D. REFERENCES

1) Frazier William. C., and Westhoff, Dennis C.,"Food Microbiology", TMH, New Delhi, 2004
2) Jay, James M. "Modern Food Microbiology", CBS Publication, New Delhi, 2000
3) Garbutt, J.,"Essentials of Food Microbiology", Arnold, London, 1997.
4) Banwart.G.J.,"Basic Food Microbiology", Chapman and Hall, NewYork,1991.

3.SPECIFIC LEARNING OUTCOMES (SLO)

3. SPECIFIC LEARNING OUTCOMES (SLO)

UNIT	Course Content	Learning Outcomes	Blooms Taxonomic levels of Transaction
	UNIT- I Introduction to Food Microbiology		
I	History- Development of food microbiology-	Explain the history of microbiology and the development.	K2
		Analyze the different microbiologist name and their responsibilities in microbiology field	K4
	Light and electron Microscope	Apply of light and electron microscope to visualize the microbes	K3
		Classify the different types of microscope	K3
		Explain the role of Electron microscope	K2
		Distinguish between light and electron microscope	K5
	Definition and scope of food microbiology- Inter relationship of microbiology with other science	Explain the definition and scope of food microbiology.	K2
		Analyze the inter relationship of microbiology with other sciences.	K4
		Compare the list of food microbiologist in food industry	K4
	UNIT- IICharacteristics of Microorganisms in Food		
II	Types of microorganism associated with food.	Classify microbes associated with different foods.	K2
		Explain the factors for the growth of microbes.	K2

	morphology- structure- significance in food microbiology	Identify the structure of microorganisms using microscope.	K3
		Identify gram positive and gram negative bacteria using staining techniques.	K3
		List the role of microorganisms in food.	K4
	UNIT- IIIMicrobial Food Spoilage		
III	**Microbial Food Spoilage** – Source of microorganism in food- types of food spoilage microorganism-	Identify the sources of food spoilage.	K3
		List the types of food spoilage microorganism and their effect.	K4
		Explain the factors associated with food spoilage.	K2
	spoilage of specific food groups – milk and dairy products- meat-poultry-sea foods- cereal- cereal products- fruits- vegetables- canned products	Distinguish the microbes that spoils various foods. eg. Meat/poultry/seafoods/cereals /cereal products/ fruits/ vegetables/ canned products.	K4
		Interpret the effect of microorganisms in specific food groups.	K2
	UNIT- IVFood Fermentations		
IV	Food Fermentation **–** Definition and types, Microorganism used in food fermentation.	Explain types of microorganism used in food fermentation.	K2
		List the uses of fermented products.	K4
	Dairy fermentation – starter- culture- types – concept of probiotics- types of fermented food- method – preparation for vinegar- sauerkraut- soya sauce	Experiment with starter culture in development of fermented dairy products.	K3
		Summarize the concept of probiotics and their	K2

		effects in health.	
		Develop fermented food products.	K3
	UNIT- V		
V	Soil – Role of microorganism in nitrogen cycle	Outline nitrogen cycle	K2
		Examine the role of microbes in nitrogen cycle	K4
		Classify the different types fertilizer	K4
	Water – bacteriological examination of water – water borne disease – their control	Analyze the water for microbes.	K3
		List the water borne diseases	K4
		Plan sanitary methods to control water borne diseases	K5
		Explain the symptoms of water borne disease.	K4
	Sewage- types of sewage – method of sewage disposal	Classify the types of sewage.	K2
		List the pathogens found in sewage and their effects in health.	K4
		Plan proper way of sewage disposal.	K6
	Air- Principle of air borne disease – their control	List the air borne disease and the factors associated with it.	K4
		Plan methods to control the air born disease	K6

		Explain the impact of air borne disease	K2

3. Mapping scheme for the POs PSOs and COs

Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4
CO1	L	-	L	-	-	L	-	-	-	L	-	L	-
CO2	H	-	L	-	-	H	L	M	-	H	L	M	-
CO3	H	-	L	M	M	H	M	M	M	L	-	M	-
CO4	H	-	-	-	-	M	-	-	L	M	-	M	H
CO5	L	-	M	-	-	M	-	L	-	-	-	-	-
CO6	H	L	L	-	-	H	-	M	-	L	-	L	-

L-Low M-Medium H-High

5.Course assessment methods

Direct

1.Continuous Internal Assessment I ,II

2. **Group discussion, Presentation, Assignment**
3. **End Semester Examination**

Indirect

NAME OF THE COURSE COORDINATOR: DR .P. VASANTHAKUMARI

ALLIED I LAB : FOOD MICROBIOLOGY AND FOOD CHEMISTRY

Semester: I **Code: U17NDYP1**
Credits: 2 **Hours/Week: 45**

1.Course Outcomes:
After completion of this course the students will be able to

CO. No	Course Outcomes	Level	Unit
CO1	Analyze the various staining methods to identify the microbes in foods.	K4	I
CO2	Assess the role of microorganisms in fermentation.	K5	I
CO3	construct the role of microorganisms in food spoilage and their effects.	K5	I
CO4	Evaluate the role of heat in cereals and structure and shape of various starch.	K5	II
CO5	: Explain the changes taking place in fats and oils on heating	K2	II
CO6	Demonstrate the changes taking place in starch cookery and the structure of microorganisms in syneresis.	K5	II

4. A. Syllabus:

1.FOOD MICROBIOLOGY: 20 Hours

1. Instrumentation in microbiology laboratory and their function. (Microscope, autoclave& hot air oven)
2. Preparation of culture media.
3. Preparation of Pure culture techniques (Spread plate, Streak plate, pour plate methods)
4. Estimation of Staining technique - simple and differential.
5. Preparation of Microbiological evaluation of milk and milk products.
6. Isolation of spoilage organism from different food commodities.
7. Estimation of Microbiological analysis of water and air.

2. FOOD CHEMISTRY 25 Hours

Chemistry of Starch and Sugars:

Gelatinization of starch,

Microscopic examination of uncooked and gelatinized starch

Estimation of Retro gradation and syneresis

Preparation of Gluten formation

Identification of Stages of sugar cookery

Preparation of fondant, Fudge, and Toffee

Preparation of Scum formation in milk.

Chemistry of Proteins:

Effect of Soaking, germination and fermentation of pulses

Preparation of coagulation in egg white and egg yolk.

Preparation of Boiled egg, poached egg, omelet's, Custards, Cake and Mayonnaise.

Preparation of Coagulation and precipitation of milk proteins.

Preparation of cooking Meat, Fish and Poultry,

Testing the tenderness of meat by food thermometers

Chemistry of fat and Oils:

Estimation of Smoking temperature in different Fats.

Analysis of Factor affecting absorption of fat.

Effect of acids, alkali and heat on water soluble and fat-soluble pigments, Enzymatic browning and methods of prevention.

B. References:

1.Bennion M. and Hughes D., "Introductory foods", Macmillan Publishing Co.Inc, New York, 1975

2.Brich, C.G., Spencer .M and Cancerron A.G. "Food Science", Pergamon Press, New York, 1977.

3. Dennis D Miller., "Food Chemistry", WileyInter Science Edition,1998.

4. Gopalan.C, Ramasastri.P.N.,Balasuramanian S.C. "Nutritive value of Indian Foods", National Institute of Nutrition, Hyderabad, 1977.

5. SPECIFIC LEARNING OUTCOMES (SLO)

COURSE CONTENT	LEARNING OUTCOMES	Blooms Taxonomic levels of Transaction
FOOD MICROBIOLOGY		
1. Instrumentation in microbiology laboratory and their function. (microscope, autoclave& hot air oven)	Demonstrate the functions of microscope, autoclave and hot air oven.	K2
2. Preparation of culture media.	Develop culture media for various microorganisms.	K6

3. Estimation of Pure culture techniques (Spread plate, Streak plate, pour plate methods)	Estimation of Pure culture techniques (Spread plate, Streak plate, pour plate methods)	K5
4. Preparation of staining technique simple and differential method.	Identify the positive and negative bacteria using staining technique.	K3
5.Estimation of Microbiological evaluation of milk and milk products.	Estimate the Direct Microscopic Count (DMC)	K5
	Estimate the Standard Plate Count Method (SPC)	K5
6.Isolation of spoilage organism from different food commodities.	Estimate and isolate the spoilage organism from different foods.	K6
FOOD CHEMISTRY		
Chemistry of Starch and Sugars: Estimation of Gelatinization of starch	Illustrate the gelatinization of starch.	K2
Microscopic examination of uncooked and gelatinized starch	Examine the structures of uncooked and gelatinized starch.	K4
Determination of Retro gradation and syneresis	Distinguish retrogradation and syneresis	K4
Preparation of Gluten formation,	Explain the gluten formation in flours and factors affecting the formation.	K2
Estimation of Stages of sugar cookery,	Analyse the stages of sugar cookery and enumerate the temperature.	K4
Preparation of fondant, Fudge, and Toffee, Scum formation in milk.	Develop fondant, fudge and toffee using stages of sugar.	K6
Chemistry of Proteins:: Effect of Soaking, germination and fermentation of pulses	Analyse the effect of soaking, germination and fermentation of pulses.	K4
Determination of coagulation of egg white and egg yolk.	Determine the coagulation temperature of egg white and egg yolk.	K5
Preparation of Boiled egg,	Inspect boiled egg, poached egg,	K4

poached egg, omelettes, Custards, Cake and Mayonnaise.	omlette, custards, cake and mayonnaise.	
Preparation of Coagulation and precipitation of milk proteins.	Make use of the methods to precipitate milk proteins.	K3
Changes observed in cooking Meat, Fish and Poultry, Testing the tenderness of meat.	Assess the changes observed while cooking of meat, fish and poultry.	K5
Chemistry of fat and Oils: Estimation of Smoking temperature of different Fats, Factors affecting absorption of fats .	Estimate the smoking temperature of fats and factors affecting absorption.	K5
Chemistry of plant pigments Effect of acids, alkali and heat on water soluble and fat soluble pigments	Analyse the effect of acids, alkali and heat on plant pigments.	K4
Enzymatic browning and methods of prevention.	Explain enzymatic browning and its method of prevention.	K2

4.Mapping scheme for the POs PSOs and COs

Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4
CO1	L	-	L	M	-	L	-	-	-	-	-	-	-
CO2	M	-	L	L	-	M	-	M	L	M	L	L	L
CO3	H	-	M	H	-	H	-	M	M	H	M	-	M
CO4	-	-	-	-	-	H	-	-	M	M	M	M	-
CO5	-	-	M	L	-	H	-	M	H	H	M	H	L
CO6	-	-	-	-	-	L	-	-	-	M	-	L	M

L-LOW M-MEDIUM H-HIGH

5.Course assessment methods

Direct

1. **Continuous Internal Assessment I ,II**
2. **Group discussion, Presentation, Assignment, Poster presentation, Case study, Preparation of questionnaire, Assessment of Anthropometry**
3) **End Semester Examination**

Indirect

NAME OF THE COURSE COORDINATOR: DR .P. VASANTHAKUMARI

CORE II : HUMAN PHYSIOLOGY

Semester: II **Code: U17ND202**
Credits: 5 **Hours/Week: 90**

1.Course Outcomes:
After completion of this course the students will be able to

CO. No	Course Outcomes	Level	Unit
CO1	Recollect the functions of basic units of the human system -cell.	K3	I
CO2	Explain the role of circulatory system in carrying the nutrients throughout the body and crucial role of heart and lungs in maintaining bodily functions.	K2	I,II, III
CO3	Correlate the importance of various hormones present in the body and the deficiency and excess of each hormone	K5	IV
CO4	Analyze the role of digestive, excretory and nervous system in regulating the smooth functioning of the body.	K4	III
CO5	Evaluate the role of sense organs and nervous, voluntary and involuntary control of various functions.	K5	V
CO6	Develop competency in analyzing the correlation between health, disease and physiology.	K5	I,II,IIII,IV,V

2.A.Syllabus

UNIT – I **20 Hours**

Blood, Heart and Circulation

a) Blood : Composition, functions, RBC – Structure, functions, erythropoiesis, Haemoglobin, WBC – Structure, functions, Classification.

Blood Platelets: Structure, functions, Reticulo endothelia system, Blood groups –Rh factor. Blood coagulation, spleen –Structure and functions, Lymph – Lymphatic system.

b) Heart and Circulation: Heart – Anatomy and physiology, Blood vessels –Structure of artery, vein, capillaries, Cardiac output, Arterial Blood pressure, clinical measurement of blood pressure, properties of cordite muscle, origin and conduction of heart beat, cardiac cycle, Regulation of the Heart's action.

UNIT – II **18 Hours**

Respiratory and Excretory System

a) Respiratory System: Structure of respiratory organs, Mechanics of respiration, subdivisions of lung air, Chemistry of respiration. Artificial respiration, control of respiration.

b) Excretory System - Physiology of kidney – nephron, formation of urine, voiding of urine. Skin – Structure and functions, Regulations of body temperature.

UNIT – III **15 Hours**

Digestive System-

a) General anatomy of digestive system – Digestive in the mouth, stomach and intestines, Movements of small intestine, Role of pancreas, Liver – Structure and function.

UNIT – IV **20 Hours**

Endocrine and Reproductive system:

a) Endocrinology - Structure and functions of thyroid, pituitary, parathyroid, adrenals, islets of langerhansofpancreas, sex glands.

b) Reproductive System - General anatomy – Female and male reproductive system. Testis – Spermatogenesis, male sex hormones, ovaries – genesis, Female sex hormones, menstrual cycle. Phases and endocrine control. Mammary glands – Structure, lactation and process of reproduction, fertilization, development of embryo, pregnancy and parturition..

UNIT – V **17 Hours**

Nervous System and Special Senses

Nervous System:

Spinal cord – Structure and functions. Ascending and descending tracts, reflex action.

Brain – Structure and functions of cerebrum, optic thalamus, midbrain, Pons medulla oblongata, Hypo thalamus, cerebellum.

Autonomic nervous system, sympathetic and parasympathetic.

Special Senses.

Physiology of vision, Structure of eye, dark and light adaptation, accommodation of the eye, visual fields, common due to abnormalities – presbyopia, cataract, Astigmatism, Blindness.

Ear – Structure and Physiology of hearing.

B. Topic for Self Study:

Sl. No.	Topics	Reference
1	Immunity – innate and acquired immunity.	https://www.creative-diagnostics.com/innate-and-adaptive-immunity.
2	Heart lung machine.	https://www.youtube.com/watch?v=RmwMzw_YTNU
3	Renal failure –Kidney transplantation and artificial kidney dialysis and home remedies of detoxification diet,.	https://www.healthline.com/health/dialysis#risks
4	Neurotransmitters – dopamine, serotonin, endorphins, oxytocin.	https://www.healthline.com/health/happy-hormone#food

C. Text

1.Guyton A.C., "Human Physiology and Mechanism and Disease", 13thEdition,Elseivier., 2015 .
2. Sembulingam, K., "Essentials of Medical Physiology",6th Edition, Jaypee Brothers Medical Publishers (P) Ltd., New Delhi, 2012.

D. Reference

1. Best and Taylor, "The Physiological Basis of Medical Practice", 13th Edition,Saunders Company, (2011)
2. Chaudhri, K.,"Concise Medical Physiology", 7th Edition, New Central Book Agency (Parentral) Ltd., Calcutta, (2016).
3. Chatterjee C.C., "Human Physiology, Volume I & II", 11th Edition, CBS Publishers, 2017.

3. SPECIFIC LEARNING OUTCOMES (SLO)

Unit	Course Content	Learning outcomes	Blooms taxonomy
I	**Course content in unit I**		
1.1	**Blood :** Composition, functions	Define blood.	K2
		Describe the composition of blood.	K4
		Discuss the functions of blood.	K2
1.2	RBC – Structure, functions, erythropoiesis, Haemoglobin	Define the structure of RBC.	K2
		Apply the functions of RBC.	K3
		Explain the process of erythropoiesis.	K4
		Discuss the importance of hemoglobin	K2
1.3	WBC –Structure, functions, Classification.	Describe the structure of WBC	K2
		Analyze the functions of WBC.	K4
		Explain the classification of WBC	K2
1.4	Blood Platelets: Structure, functions, Reticulo endothelial system	Define the structure and	K2

		functions of platelets.	
		Analyze the role of reticuloendothelial system.	K4
1.5	Blood groups –Rh factor. Blood coagulation , spleen – Structure and functions, Lymph – Lymphatic system.	Differentiate various blood groups.	K4
		Comprehend the structure and function of spleen and lymphatics.	K4
		Explain the functions of the lymph and Lymphatic system.	K2
1.6	**Heart and Circulation:** Heart – Anatomy and physiology, Blood vessels –Structure of artery, vein, capillaries,	Explain the anatomy of heart.	K4
		Interpret the difference between artery, vein and capillaries	K4
1.7	Cardiac output, Arterial Blood pressure, clinical measurement of blood pressure, properties of cordite muscle, origin and conduction of heart beat, cardiac cycle, Regulation of the Heart's action.	Apply the concept of cardiac output.	K3
		Analyze the arterial blood pressure and heart rate.	K4
		Discuss the importance of cardiac cycle and regulation of heart action.	K5
		Classify the difference types of blood pressure	K4
II	**Course content in unit II**		

2.1	**Respiratory System:** Structure of respiratory organs, Mechanics of respiration, subdivisions of lung air.	Explain the structure of respiratory organs.	K2
		Demonstrate the importance of the mechanics of respiration	K5
2.2	Chemistry of respiration. Artificial respiration, control of respiration.	Describe the chemistry of respiration.	K5
		Summarize the role of artificial respiration.	K5
2.3	**Excretory System -** Physiology of kidney – nephron.	Discuss the structure of kidney	K2
		Analyze the role of nephron.	K4
2.4	Formation of urine, voiding of urine.	Reiterate the formation and voiding of urine.	K4
		Distinguish the stages of urine formation	K4
2.5	Skin – Structure and functions, Regulations of body temperature.	Explain the structure and function of skin.	K4
		Interpret regulation of body temperature.	K3
		Discuss the difference types of skin in human being.	
	Course content in unit III		

3.1	**Digestive System-** General anatomy of digestive system,	Discuss the anatomy of digestive system.	K4
		Classify the different parts involved in human digestive function.	K4
3.2	Digestive in the mouth, stomach and intestines, Movements of small intestine,	Compare the process of digestion in mouth, stomach and small intestines.	K5
		Compare the mechanical and chemical digestion.	
3.2	Role of pancreas, Liver – Structure and function.	Interpret the role of liver and pancreas with relevance to the function.	K2
		Explain the role of bile in digestion	K2
		Importance of pancreas involved in human digestion.	K4
		Explain the role of liver in human digestion	K4
IV	**Course content in unit IV**		
4.1	**Endocrine and Reproductive system:** **Endocrinology** - Structure and functions of thyroid, pituitary.	Analyzethe structure and functions of various glands.	K4
		Explain the functions of thyroid and pituitary gland.	K3
4.2	Parathyroid, adrenals, islets of langerhans of pancreas, sex glands.	Compare the functions of various glands of adrenals.	K3

		Discuss the role of islet of Langerhans in control of blood sugar.	K2
		Explain the functions islets of langerhans of pancreas,	K2
4.3	**Reproductive System -** General anatomy – Female and male reproductive system.	Classify the basic anatomy of male and female reproductive system.	K3
		Explain the male reproduction	K4
		Discuss the female reproduction system.	K4
4.2	Testis – Spermatogenesis , male sex hormones,	Define testis.	K2
		Explain the process of spermatogenesis.	K4
		Compare the importance of male sex hormones.	K4
4.3	Ovaries – genesis, Female sex hormones, menstrual cycle. Phases and endocrine control .	Describe the structure of female sex organ.	K4
		Interpret the importance of female sex hormones.	K3
4.4	Mammary glands – Structure, lactation and process of reproduction, fertilization, development of embryo, pregnancy and parturition.	Differentiate the physical and hormonal changes taking place in female reproductive system .	K4
		Discuss the different types of hormonal (Estrogen and progesterone) involved in menstruation	K5
		Analyse various stages of pregnancy and lactation.	K4

V	**Course content in unit V**		
5.1	**Nervous System:** Spinal cord – Structure and functions. Ascending and descending tracts, reflex action.	Explain the structure and function of spinal cord.	K2
		Differentiate the role of ascending and descending tract and reflex action.	K4
5.2	Brain – Structure and functions of cerebrum, optic thalamus, midbrain, Pons medulla oblongata, Hypo thalamus, cerebellum.	List out the various parts of brain and their functions.	K2
		Classify the different parts of brain	K4
		Discuss the role of cerebrum, optic thalamus, midbrain, Pons medulla oblongata, Hypo thalamus, cerebellum. , in human	K2
5.3	Autonomic nervous system, sympathetic and parasympathetic.	Differentiate between autonomous and sympathetic nervous system.	K4
		Classify the various part of nervous system	K4
5.4	**Special Sense** Physiology of vision, Structure of eye, dark and light adaptation, accommodation of the eye, visual fields, common due to abnormalities – presbyopia, cataract, Astigmatism, Blindness.	Explain in detail, the structure and function of eye.	K2
		Interpret the various characteristics of eye.	K3
		Differentiate between myopia, presbyopia, cataract, astigmatism and blindness.	K4
5.3	Ear – Structure and Physiology of hearing.	Explain the structure and function of ear.	K2

		Analyze the mechanism of hearing.	K4
		Identify the parts of human ear.	K2

4. Mapping Scheme for the PO, PSOs and COs

L-Low M-Moderate H- High

Mapping	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PSO1**	**PSO2**	**PSO3**	**PSO4**
CO1	M	M	L	-	-	M	-	-	-	H	M	-	L
CO2	-	M	-	-	H	M	-	H	-	-	L	-	-
CO3	-	H	-	-	-	M	-	-	-	M	M	-	-
CO4	M	L	-	-	-	M	L	-	M	-	M	M	-
CO5	M	M	-	-	M	H	L	M	M	H	M	-	-
CO6	-	M	-	M	L	-	M	L	-	L	-	L	M

5.Course assessment methods

Direct

1Continuous Internal Assessment I ,II

2. **Group discussion, Presentation, Assignment, Poster presentation**
3. **End Semester Examination**

Indirect

NAME OF THE COURSE COORDINATOR: MRS. K. MEERA

CORE II LAB : HUMAN PHYSIOLOGY LAB

Semester: II **Code: U17ND2P2**
Credits: 2 **Hours/Week: 45**

1.Course Outcomes:
After completion of this course the students will be able to

CO. No	Course Outcomes	Level	Unit
CO1	Identify the structure of various tissues microscopically.	K2	I
CO2	Analyze blood groups and differentiate the various blood groups.	K4	VI
CO3	Apply the various instrument like stethoscope and sphygmomanometer.	K3	IX
CO4	Estimate the amount of hemoglobin in blood.	K4	IV
CO5	Correlate the use of various equipment in the evaluation of normal body functions	.K5	IX
CO6	compare the various organs and it's functions	K5	X

4. A. Syllabus:

HUMAN PHYSIOLOGY

1 Histology of the epithelial, muscular, connective tissue.
2. Microscopic structure of bone and cartilage.
3. Microscopic structure of nerve.
4. Estimation of Haemoglobin, RBC and WBC count Demonstration.
5. Identification of different types of white blood cells – Demonstration.
6. Determination of blood groups.
7. Recording of normal heart beat of frog.
8. Effect of temperature on heart beat – demonstration.
9. Arterial blood pressure and pulse rate, effect of exercise.
10. Histology of artery, vein, trachea and lung.

Related Experiences
1. Visit to blood bank.
2. Observation of blood transfusion.

B. Reference
1.Clark Patrica., "Human Physiology Lab Manuel Study Guide",Second Edition, Pat Clark., India.
2.Best and Taylor ,"The Physiology Basis For Medical Practice", Saunders Company, 1992.

3. SPECIFIC LEARNING OUTCOMES (SLO)

COURSE CONTENT	LEARNING OUTCOMES	Blooms Taxonomic levels of Transaction R, U, Ap, An E, C
Histology of the epithelial, muscular, connective tissue.	Apply microscope independently.	K3
	Analyze the structure of epithelial, muscular and connective tissue and differentiate them.	K4
Course content in unit II		
2. Microscopic structure of bone and cartilage.	Distinguish between bone and cartilage.	**K5**
Course content in unit III		
3. Microscopic structure of nerve.	Apply the structure of nerve microscopically.	**K3**
	Develop new food products using pulses.	**K5**
Course content in unit IV		
4. Estimation of Haemoglobin. RBC and WBC count Demonstration.	Estimate haemoglobin using Shaly's method.	**K5**
	Demonstrate the estimation of RBC and WBC.	**K5**
Course content in unit V		
5. Identification of different types of white blood cells – Demonstration.	Demonstration the method of identifying the different types of WBCs based on their structures.	**K5**
Course content unit VI		
Determination of blood groups.	Identify the different blood groups. .	**K2**
	Differentiate and analyze the different blood groups.	**K4**
	Determine RH factor	**K5**
Course content unit VII		
Recording of normal heart beat of frog. 8. Effect of temperature on heart beat – demonstration.	**Compare the normal and abnormal heartbeat.** **Demonstrate the temperature on heartbeat.**	**K4**
Course content unit VIII		
9. Arterial blood pressure and pulse rate, effect of exercise.	Apply Sphygmomanometer to measure arterial blood pressure.	**K3**

	Analyze the effect of exercise on blood pressure and pulse rate.	**K4**
Course content unit IX		
10. Histology of artery, vein, trachea and lung.	Differentiate the structure of artery and vein.	**K5**
	Analyze the structure of lung and trachea.	**K4**

4.Mapping Scheme for the PO, PSOs and COs

L-Low M-Moderate H- High

Mapping	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PSO1**	**PSO2**	**PSO3**	**PSO4**
CO1	M	-	-	L	-	L	L	L	-	H	M	-	H
CO2	H	M	L	-	H	M	-	H	M	-	L	-	L
CO3	-	H	L	-	-	M	-	-	-	H	L	-	-
CO4	M	L	M	-	-	M	L	-	M	-	M	M	-
CO5	M	M	L	-	M	H	L	M	M	H	L	-	-
CO6	L	M	M	M	L	-	M	L	-	L	-	H	L

5.Course assessment methods

Direct

1. **Continuous Internal Assessment I ,II**
2. **Group discussion, Presentation, Assignment, Poster presentation, Case study**
3. **End Semester Examination**

Indirect

NAME OF THE COURSE COORDINATOR: MRS. K. MEERA

ALLIED II : FOOD CHEMISTRY

Semester: II **Code: U17ND2Y2**
Credits: 4 **Hours/Week: 60**

1.Course Outcomes:
After completion of this course the students will be able to

CO. No	Course Outcomes	Level	Unit
CO1	Discuss sugar cookery and the role of sugar cookery in the making of traditional Indian sweets.	K2	II
CO2	Explain the chemical changes taking place in starches.	K2	II
CO3	Acquire knowledge on the concept of cooking of fats and absorption of fats in deep fried foods.	K4	IV
CO4	Analyze the effect of soaking and germination of pulses and its advantages to our body.	K4	III
CO5	Interpret the changes taking place in meat while cooking.	K4	III
CO6	Analyze the plant pigments and its estimation methods.	K4	V

2.A. Syllabus:

UNIT – I **10 Hours**

Chemical properties of food

Moisture in food,Hydrogen Bonding, Bound water, Water activity foods, Determination of moisture content in food.

True solution dispersion, Sols, Gels, Foams, Colloids and Emulsions

UNIT- II **10 Hours**

Chemistry of sugar and starch.

Components of starch, Swelling of starch granules,Gel formation, Retro gradation, Syneresis.

Stages of sugar, Acid, Alkali, Fat and surface Active agents of starch.
Chemistry of Milk Sugar, Non Enzymatic Browning.

UNIT- III **20 Hours**

Chemistry of Proteins

Components of wheat protein, Structure, Gluten Formation
Effect of soaking, Fermentation and Germination on Pulse proteins
properties of Egg Protein, Chemistry of Milk Protein, Changes in milk, Egg and Meat protein during Heating action of heat, Acid, Alkalis on Vegetables Proteins and Animal Proteins.

UNIT- IV **10 Hours**

Chemistry of Fat and oils

physical and chemical properties of fat and oils.

Rancidity , Hydrogenation, Winterization, Decomposition of Triglycerides,

Shortening power of fats, Changes in fats and oils during Heating, Factors affecting fat absorption in foods.

UNIT- V **10 Hours**

Plant Pigments

Pectins, Phenolic Components, Enzymatic browning in Fruits and vegetables.

Volatile compounds from cooked vegetables,

Estimation of different types of plant pigments – Water and fat soluble pigments Such as Chlorophylls,

B. Topic for Self Study:

Sl. No.	Topics	Reference
1	Relationship between moisture content of food and microbial spoilage.	https://www.fda.gov/inspections-compliance-enforcement-and-criminal-investigations/inspection-technical-guides/water-activity-aw-foods
2	Postharvest changes and storage of fruits and vegetables.	http://www.fao.org/3/y4358e/y4358e05.htm
3	Prevention of rancidity in oils – addition of antioxidants.	https://en.wikipedia.org/wiki/Rancidification#:~:text=Antioxidants%20are%20often%20used%20as,and%20tocopherols%20(vitamin%20E)
4	Role of non-enzymatic browning in food industry.	https://en.wikipedia.org/wiki/Food_browning

C. Text Books:

1. Shakuntala Manay, Shadaksharaswamy, M. " Foods, Facts and Principles", 2nd Edition, New Age International Pvt Ltd Publishers, (2017) .

2. Chandrasekhar, U. "Food Science and applications in Indian Cookery", Phoenix Publishing House, New Delhi

3. Swaminathan, M. Food Science, "Chemistry and Experimental Foods", Bappco Publishers, Bangalore, (2015).

4. Reference Books:

1. Meyer, L.H, "Food Chemistry", (2004) CBS Publishers and Distributors, 4th edition

2. Paul, P.C. and Palmer, H.H. "Food Theory and Applications", JohnWiley and Sons, New York, (Revised Edition) (2002)

3. Chopra H.K, Panesar, P.S, "Food Chemistry",Narosa Publishing House, New Delhi, (2010).

5. SPECIFIC LEARNING OUTCOMES (SLO)

UNIT	Course content	Learning outcomes	Blooms Taxonomic levels of Transaction
I	**UNIT – IChemical properties of food**		
	Moisture in food, Hydrogen Bonding, Bound water	Categorize the foods based on the moisture content.	K4
		Classify types of water in food	K2
		Explain hydrogen bonding.	K2
		Importance of hydrogen bonding in foods.	K5
		Relate water activity and the invasion of microbes in foods.	K2
		Determine moisture content in food.	K5
	Water activity foods, Determination of moisture content in food.	Identify water activity of foods.	K3
	True solution dispersion, Sols, Gels, Foams, Colloids and Emulsions	Assess the various colloidal systems. Analyze the properties of various colloidal systems. Relate colloidal systems with food products.	K5 K4 K2
	UNIT- II Chemistry of sugar and starch.		
II	Components of starch, Swelling of starch granules, Gel formation, Retro gradation, Syneresis.	Distinguish the components of starches and their properties. Demonstrate the swelling of starch granules, gel formation, retrogradation and syneresis. Utilize food thermometer to identify the temperature at each stage. Evaluate percent sag	K4 K2 K3 K5

	Stages of sugar, Acid, Alkali, Fat and surface Active agents of starch.	Demonstrate stages of sugar. Identify the temperature for various stages of sugar. Apply the stages of sugar in making various types of sweets, candies etc., Study the influence of acid, alkali, fat and surface active agents of starch	K2 K3 K3 K5
	Chemistry of Milk Sugar, Non Enzymatic Browning.	Interpret the milk sugar, their composition and properties.	K5
		Explain the non- enzymatic browning reaction.	K2
		Distinguish enzymatic browning and non enzymatic browning reaction	K3
		Choose methods to prevent the undesirable browning reaction.	K2
	UNIT- III Chemistry of Proteins		
III	Components of wheat protein, Structure, Gluten Formation	Organize the components of wheat protein based on their composition.	K3
		Summarize the properties of wheat protein.	K2
		Explain the structures of protein.	K2
		Demonstrate gluten formation.	K2
		Inspect the factors that influence gluten formation.	K4
	Effect of soaking, Fermentation and Germination on Pulse proteins	Discover the changes takes place in soaking, fermentation and germination of pulses. List the advantages of soaking, fermentation and germination.	K4 K4
	properties of EggProtein, Chemistry of Milk Protein,	Explain the properties of egg, meat and milk protein.	K2

	Changes in milk, Egg and Meat protein during Heating action of heat, Acid, Alkalis on Vegetables Proteins and Animal Proteins.	Dissect and examine the egg, meat and milk protein after heating.	K4
		Study the influence of acid, alkali and heat on animal proteins.	K5
		Study the influence of acid, alkali and heat on vegetable proteins	K5
	UNIT- IV Chemistry of Fat and oils		
IV	physical and chemical properties of fat and oils.	Explain the physical and chemical properties of fats and oils.	K2
		Categorization of fats and oils based on the properties	K4
	Rancidity , Hydrogenation, Winterization, Decomposition of Triglycerides,	Summarize rancidity, hydrogenation, winterization, decomposition of triglycerides.	K2
		Compare and contrast the properties of fats and oils.	K4
		Make use of the precautions to be taken to avoid undesirable changes in fats and oils.	K3
	Shortening power of fats, Changes in fats and oils during Heating,	Demonstrate the chemical and physical changes in fats and oils.	K2
		Identify the temperature of fats and oils at which the changes occur.	K3
		Explain the shortening power of fats.	K4
	Factors affecting fat absorption in foods.	Identify the factors that affects absorption of fat in foods.	K3
	UNIT- V Plant Pigments		
V	Pectin’s, Phenolic Components, Enzymatic browning in Fruits and vegetables.	Explain the browning reaction in fruits and vegetables.	K2
		List the differences between browning and non enzymatic browning reactions.	K4

		Examine the factors responsible for the browning reaction in fruits and vegetables.	K4
	Volatile compounds from cooked vegetables,	Experiment with the cooked vegetables and interpret the volatile compounds.	K3
		List the volatile compounds	K4
	Estimation of different types of plant pigments – Water and fat soluble pigments Such as Chlorophylls	Classify types of plant pigments	K2
		Estimate the different types of plant pigments.	K5
		Analyze the uses of plant pigments.	K4

4.Mapping scheme for the POs PSOs and COs

Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4
CO1	L	-	-	-	-	M	-	M	-	H	-	M	H
CO2	H	L	-	L	-	-	-	L	-	M	-	M	H
CO3	M	M	H	M	M	L	-	L	L	H	-	H	H
CO4	H	-	M	-	-	M	-	L	L	M	H	M	H
CO5	H	-	L	M	-	L	-	-	-	M	-	L	H
CO6	H	L	M	L	M	L	-	L	M	H	H	H	H

5.Course assessment methods

Direct

1. **Continuous Internal Assessment I ,II**
2. **Group discussion, Presentation, Assignment**
3. **End Semester Examination**

Indirect

NAME OF THE COURSE COORDINATOR: MS. K. MAHESWARI

ALLIED I & II : FOOD MICROBIOLOGY AND FOOD CHEMISTRY PRACTICAL

Semester: II **Code: U17NDYP1**
Credits: 2 **Hours/Week: 45**

1.Course Outcomes:
After completion of this course the students will be able to

CO. No	Course Outcomes	Level	Unit
CO1	Classify the various staining methods to identify the microbes in foods.	K3	I
CO2	Assess the role of microorganisms in fermentation.	K4	I
CO3	Explain the role of microorganisms in food spoilage and their effects.	K4	I
CO4	Evaluate the role of heat in cereals and structure and shape of various starch.	K5	II
CO5	Demonstrate the changes taking place in fats and oils on heating.	K5	II
CO6	Compare the changes in sugar during various temperatures.	K5	II

2. A. Syllabus

1. Instrumentation in microbiology laboratory and their function. (microscope, autoclave& hot air oven)
2. Preparation of culture media.
3. Estimation of Pure culture techniques (Spread plate, Streak plate, pour plate methods)
4. Preparation of staining technique simple and differential method.
5. Estimation of Microbiological evaluation of milk and milk products.
6. Isolation of spoilage organism from different food commodities.

FOOD CHEMISTRY

I. Chemistry of Starch and Sugars:

Estimation of Gelatinization of starch

Microscopic examination of uncooked and gelatinized starch

Determination of Retro gradation and syneresis ,

Preparation of Gluten formation,

Estimation of Stages of sugar cookery ,

Preparation of fondant, Fudge,and Toffee, Scum formation in milk.

II. Chemistry of Proteins::

Effect of Soaking,germination and fermentation of pulses

Determination ofcoagulation of egg white and egg yolk.

Preparation of Boiled egg, poached egg, omelettes, Custards, Cake and Mayonnaise.

Preparation of Coagulation and precipitation of milk proteins.

Changes observed in cooking Meat, Fish and Poultry, Testing the tenderness of meat.

III. Chemistry of fat and Oils:

Estimation of Smoking temperature of different Fats, Factors affecting absorption of fats .

IV. Chemistry of plant pigments

Effect of acids, alkali and heat on water soluble and fat soluble pigments Enzymatic browning and methods of prevention.

B. References :

1. Denis D Miller., "Food chemistry a laboratory Manual", John wileyNasher, Newyork.

2. James G. Cappuccino and Natalie Shermen, "Microbiology- A laboratory Manual", Pearson Education Publishers,USA, 2008.

3. Fennema,Owen.R., "Food Chemistry", 3rd Edition, Marcell Dekker,Newyork,1996.

3. SPECIFIC LEARNING OUTCOMES (SLO)

COURSE CONTENT	LEARNING OUTCOMES	Blooms Taxonomic levels of Transaction
FOOD MICROBIOLOGY		
1. Instrumentation in microbiology laboratory and their function. (microscope, autoclave& hot air oven)	Demonstrate the functions of microscope, autoclave and hot air oven.	K2
2. Preparation of culture media.	Develop culture media for various microorganisms.	K6
3. Estimation of Pure culture techniques (Spread plate, Streak plate, pour plate methods)	Estimation of Pure culture techniques (Spread plate, Streak plate, pour plate methods)	K5
4. Preparation of staining technique simple and differential method.	Identify the positive and negative bacteria using staining technique.	K3

5. Estimation of Microbiological evaluation of milk and milk products.	Estimate the microbial load in milk and milk products.	K5
6. Isolation of spoilage organism from different food commodities.	Test and isolate the spoilage organism from different foods.	K6
FOOD CHEMISTRY		
Chemistry of Starch and Sugars: Estimation of Gelatinization of starch	Illustrate the gelatinization of starch.	K2
Microscopic examination of uncooked and gelatinized starch	Examine the structures of uncooked and gelatinized starch.	K4
Determination of Retro gradation and syneresis	Distinguish retrogradation and syneresis	K4
Preparation of Gluten formation,	Explain the gluten formation in flours and factors affecting the formation.	K2
Estimation of Stages of sugar cookery,	Analyse the stages of sugar cookery and enumerate the temperature.	K4
Preparation of fondant, Fudge, and Toffee, Scum formation in milk.	Develop fondant, fudge and toffee using stages of sugar.	K6
Chemistry of Proteins:: Effect of Soaking, germination and fermentation of pulses	Analyse the effect of soaking, germination and fermentation of pulses.	K4
Determination of coagulation of egg white and egg yolk.	Determine the coagulation temperature of egg white and egg yolk.	K5
Preparation of Boiled egg, poached egg, omelettes, Custards, Cake and Mayonnaise.	Inspect boiled egg, poached egg, omlette, custards, cake and mayonnaise.	K4
Preparation of Coagulation and precipitation of milk proteins.	Classify the different types of the methods to precipitate milk proteins.	K3
Changes observed in cooking Meat, Fish and Poultry, Testing the tenderness of meat.	Assess the changes observed while cooking of meat, fish and poultry.	K5
Chemistry of fat and		

Oils: Estimation of Smoking temperature of different Fats, Factors affecting absorption of fats .	Estimate the smoking temperature of fats and factors affecting absorption.	K5
Chemistry of plant pigments Effect of acids, alkali and heat on water soluble and fat soluble pigments	Analyse the effect of acids, alkali and heat on plant pigments.	K4
Enzymatic browning and methods of prevention.	Explain enzymatic browning and its method of prevention.	K2

4.Mapping scheme for the POs PSOs and COs

Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4
CO1	L	-	L	M	-	L	-	-	-	-	-	-	-
CO2	M	-	L	L	-	M	-	M	L	M	L	L	L
CO3	H	-	M	H	-	H	-	M	M	H	M	-	M
CO4	-	-	-	-	-	H	-	-	M	M	M	M	-
CO5	-	-	M	L	-	H	-	M	H	H	M	H	L
CO6	-	-	-	-	-	L	-	-	-	M	-	L	M

L- LOW M-MEDIUM H-HIGH

5.Course assessment methods

Direct

1. **Continuous Internal Assessment I ,II**
2. **Group discussion, Presentation, Assignment**
3. **End Semester Examination**

Indirect

NAME OF THE COURSE COORDINATOR: MS. K. MAHESWARI

SBEC I : FOOD PACKAGING

Semester: II **Code: U17ND2S1**
Credits: 2 **Hours/Week: 30**

1.Course Outcomes:
After completion of this course the students will be able to

CO. No	Course Outcomes	Level	Unit
CO1	Obtain an in-depth understanding of the role of packaging in the food industry.	K2	I
CO2	Compare the advantages and disadvantages of various packaging material.	K5	II
CO3	Evaluate the types of packaging and their usage in packing various foods.	K5	III
CO4	Analyze the differences in packing fresh and processed foods.	K4	IV
CO5	Interpret the packaging designs and environmental issues in various packing techniques.	K5	V
CO6	Construct the various laws relating to packaging industry.	K5	V

2.A.Syllabus:

UNIT I **10 Hours**
PACKAGING

Concepts, definition, significance, classification. Development, unit/Retail. Fresh and processed, general characteristics and food preservation.

UNIT II
PRIMARY PACKAGING MEDIA **15 Hours**

Properties and applications.
Paper boards, metals, plastics, wood and plywood, glass, flexible, etc.
Labels, caps and closures, waxes, adhesives, inks and lacquers, cushioning materials.

UNIT III **15 Hours**
FOOD PRODUCTSPACKAGING SYSTEMS AND METHODS
General classification and packaging types.

Vacuum packaging, gas flush Packaging, CAP and MAP, aseptic and retort packing bagin-boxete.

UNIT IV **10 Hours**
STORAGE, HANDLING AND DISTRIBUTION OF PACKAGES (FOODS)

Palletization and containerization. Marketing - barcoding and marketing.

UNIT V **10 Hours**

PACKAGING LAWS AND REGULATIONS

FDA, FPO, packaging commodity.Rules, Weight and Measures Act.Meat Food Products Order (MFPO),Agricultural Grading & Marking (AGMARK) Rules,Edible Oil Packaging (Regulation) Order, 1998

The Standards of Weights & Measures Act (SWMA),Other Packaging Requirements under PFA

B. Topics for self-study

Sl. No.	Topics	Reference
1	History of food packaging.	https://en.wikipedia.org/wiki/Food_packaging
2	Marketing strategies involved in food packages.	https://www.pkgbranding.com/blog/why-food-packaging-design-matters-to-your-overall-marketing-strategy
3	Edible food wraps.	https://www.ecolotec.com/do-eat/home-use.html

C. Reference Books

1. Bhatia, S.C., “Canning and Preservations of Fruits and Vegetables” – New Delhi, Inc. 2010. 2. Darry, R. Blackie. T. “Principles of Applications of MAP”, Academic Professions, 1996

3. Multon, J.K. Food packaging Technology, (Vol.1 and 2) VCH – Publishers, Inc. New York,1986

5. Robertson, G.L., Food Packaging – Marcell, Dekker, Inc, New York.

6. Sacharow&Griffini, Food Packing, AVI Publications, 1987

3. SPECIFIC LEARNING OUTCOMES (SLO)

Syllabus	Learning outcomes	Blooms txaonomy
UNIT I PACKAGING		
Concepts, definition, significance	Explain the importance packaging of foods.	K2
classification.Development	Classify various food packaging techniques	K4
unit/Retail.	Differentiate unit and bulk packing.	K5
Fresh and processed, general characteristics and food preservation.	Discuss about the types of packaging materials used for fresh foods and processed foods.	K2
UNIT II PRIMARY PACKAGING MEDIA		
Properties and applications. Paper boards, metals, plastics, wood and plywood, glass, flexible, etc.	Compare and classify the various packaging materials and discuss its advantages and disadvantages.	K4
	Classify the primary and secondary materials used for methods of packaging.	K4
Labels, caps and closures, waxes, adhesives, inks and lacquers, cushioning materials.	Assess the importance of various accessories used in packing such as labels, caps and closures, lacquers etc.	K5
	Explain the role of waxes and closures used for packaging products.	K2
General classification and packaging types. .	Explain the general classification of packaging types.	K2
PACKAGING SYSTEMS AND METHODS	Classify various packaging techniques.	K4
Vacuum packaging, gas flush Packaging, CAP and MAP, aseptic and retort packing bagin-boxete.	Evaluate the advantages and disadvantages of the different packaging techniques.K5	K5

UNIT IV STORAGE, HANDLING AND DISTRIBUTION OF PACKAGES (FOODS)		
Palletisationand containerization.	Define palletization and containerization.	K2
	Compare the concept of palletization and containerization.	K4
Marketing - barcoding and marketing.	Explain the importance of barcoding in food industry.	K2
UNIT V PACKAGING LAWS AND REGULATIONS		
FDA, FPO, packaging commodity.Rules, Weight and Measures Act.	Explain the significance of various laws of packaging and its application.	K2
	List out the importance of packaging ethic's.	K3

4.Mapping Scheme for the PO, PSOs and COs

Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4
CO1	L	-	-	-	-	M	-	L	-	-	-	-	M
CO2	L	-	-	L	-	H	-	M	L	-	-	M	M
CO3	-	-	-	L	-	H	-	L	-	-	-	L	M
CO4	-	-	-	M	-	H	-	L	-	-	-	L	M
CO5	L	-	-	M	-	H	-	M	L	-	-	-	M
CO6	-	-	-	M	-	H	-	-	-	-	-	-	M

L- LOW M-MEDIUM H-HIGH

5.Course assessment methods

Direct

1. **Continuous Internal Assessment I ,II**
2. **Group discussion, Presentation, Assignment, Poster presentation**
3. **End Semester Examination**

Indirect

NAME OF THE COURSE COORDINATOR: MS. K. MAHESWARI

CORE III : PRINCIPLES OF NUTRITION

Semester: III **Code: U17NDY303**
Credits: 5 **Hours/Week: 90**

1.Course Outcomes:
After completion of this course the students will be able to

CO. No	Course Outcomes	Level	Unit
CO1	Identify macro and micronutrient and learn to critically evaluate the methodology and derivation of requirements for specific macro and micro nutrients.	K2	IV, VI
CO2	Explain the recommended dietary allowances in different age groups.	K2	I, II
CO3	Discuss the various components of foods with regards to carbohydrates, proteins and fats.	K4	I
CO4	Compare and correlate various diseases caused due to the excess and deficiency of nutrients.	K5	III, IV, V
CO5	: Perceive with clarity, the role of micro nutrients including various vitamins and minerals in the normal functioning of the body and identify the deficiency diseases.	K5	IV, V
CO6	Evaluate the best nutrition based services for students and ultimately the entire society.	K5	II

2.A. Syllabus

UNIT I **20 Hours**

a) Recommended dietary allowances – Definition, General principles of deriving RDA, Factors affecting RDA, Methods used for deriving RDA.

b) Carbohydrates – Definition, Nutritional classification, Functions, Digestion and absorption, Requirements and Sources.

c) Disorders- Diabetes mellitus – causes, symptoms, types of diabetes, principles of diet, preventing measures of diabetes mellitus, hormones involved in diabetes mellitus.

d) Dietary Fibre – Definition, Classification, Sources and Role of Fibre in human Nutrition.

UNIT II **20 Hours**

a) Energy – Definitions, units of Energy, Determination of energy value of foods ,Bomp Calorimeter, Types of calorimeter- Direct and Indirect calorimeter and Thermal effect of food.

b) BMR – Definitions, Determinations, Factors affecting the BMR, Specific dynamic action, Energy requirement and sources.

UNIT III **20 Hours**

a) Proteins – Definition, Nutritional classification of protein , Functions of Proteins ,Digestion and absorption Sources and Requirements. Deficiency Disorder- PEM, Amino acids- Essential and non-essential Evaluation of Protein quality – PER, BV, NPU and chemical score.

b) Lipids – Definition, Nutritional classification, Functions, Digestion and absorption, Sources and requirements, Deficiency disorder – diseases related to heart

UNIT IV **15 Hours**

a) Vitamins – Classification, functions and Deficiency,
Fat Soluble Vitamins – Vitamin A, D, E and K – Functions, Requirements, Sources and Effect of deficiency.

b) Water soluble vitamins – Thiamine, Riboflavin, Niacin, Ascorbic acid, Folic acid, Vitamin B6 and B12 – Functions, Requirements, Sources and Effects of deficiency

UNIT V **15 Hours**

a) Minerals – Classification and General Functions. (B) Macro minerals – Calcium, Phosphorus, Magnesium, Sodium and Potassium – Functions, Requirements, Sources, Effects of Deficiency, Effect of imbalance of Sodium and Potassium.

b) Micro Minerals – Iron, Iodine, Copper, Fluorine and Zinc – Functions, Requirements, Sources and Effect of Deficiency..

B. Topics for self-study

Sl. No.	Topics	Reference
1	Fiber present in fenugreek and flaxeed – effect of flaxseed and fenugreek in reducing blood sugar and	https://www.healthline.com/health/type-2-diabetes/fenugreek-blood-sugar#potential-risks. https://www.healthline.com/nutrition/flaxseed-for-

	cholesterol level.	diabetes
2	Vitamin C and vitamin D as immunity boosters.	https://medicaldialogues.in/diet-nutrition/news/vitamin-c-vitamin-d-supplements-may-boost-immune-system-to-fight-covid-19-65125
3	Effect of potassium rich foods in prevention of hypertension.	https://www.cdc.gov/salt/potassium.htm

C. Text books

1. Swaminathan, M., "Essentials of food and Nutrition", Vol I & II, Bappco Publishers, Madras 2000.
2. Srilakshmi. B., "Nutrition Science", New age International (p) ltd, publishers, 2004.

D. Reference

1. Frances sizer and Ellie whitney, "Nutrition Concepts and Controversies", Thomson wadsworth Publisher, New York, 2006.
2. MangaleKango, "Normal Nutrition, Curing Diseases through Diet", 1st Edition, CBS publication, 2005.
3. Bonnie, Worthington – Roberts and Sue Rodwell Williams, "Nutrition throughout the lifecycle", 3rd edition, WCB/MC Graw Hill Publisher, New York, 1996.
4. Paul. S., "Text of Bio Nutrition Fundamental and Management", RBSA Publishers, 2003

3. SPECIFIC LEARNING OUTCOMES (SLO)

Content	**Learning outcomes**	**Blooms taxonomy K1,k2,k3,k4,k5,& k6**
Unit- I	RDA and Carbohydrates	
Recommended dietary allowances – Definition, General principles of deriving RDA, Factors affecting RDA, Methods used for deriving RDA.	Explain RDA	**K2**
	Discuss the general principles involved in recommended dietary allowances	**K2**
	Analyze the factors affecting RDA	**K4**
	Categorized the methods used for deriving RDA	**K5**
	Suggest the points consider in planning a RDA for human	**K5**
	Compare the reference women and reference women	**K5**
1.2 - Carbohydrates – Definition, Nutritional classification,	Define CHO	**K2**

Functions, Digestion and absorption, Requirements and Sources.		
	Classify the different type of carbohydrates	**K4**
	Explain the functions, sources and requirements of carbohydrates	**K4**
	Describe the digestion and absorption of carbohydrates in small intestine	**K4**
	Distinguish between nutritional classification of carbohydrates	**K5**
	Relate the glucose and fatty acid metabolism	**K4**
Disorders- Diabetes mellitus Dietary Fibre – Definition, Classification, Sources and Role of Fibre in human Nutrition.	Define Diabetes and mellitus	**K2**
	Classify diabetes mellitus	**K4**
	Explain the clinical pathology , morbid anatomy of diabetes.	**K4**
	Discuss the clinical features of diabetes mellitus	**K4**
	Importance of diet during diabetes mellitus	**K5**
	Recommended dietary modification for diabetes mellitus patients	**K5**
	Modify the dietary habits of diabetes mellitus	**K5**
Fiber	Define fiber	**K2**
	Classify the soluble and in soluble fiber	**K3**
	Analyze the dietary fiber involved in human nutrition	**K4**
	Explain advantages and disadvantages of fiber	**K4**
UNIT-II Energy		
Energy – Definitions, units of Energy, Determination of energy value of foods ,	Describe the knowledge of energy and its value of foods.	**K4**
	Classify the units of energy	**K4**
	Determination of energy value of foods,	**K4**

	Discuss the energy utilization in cells	**K4**
	Classify direct and indirect calorimeter measurements	**K4**
2.1- Bomb Calorimeter, Types of calorimeter- Direct and Indirect calorimeter and Thermal effect of food.	Classify the different type Bomb calorimeter in food .	**K4**
	Measure the heat of a reaction , it is a crucial part of thermodynamics.	**K4**
	Relate the energy expenditure in foods	**K5**
BMR – Definitions, Determinations, Factors affecting the BMR, Specific dynamic action, Energy requirement and sources.	Categorized the factors affecting the BMR in human. .	**K4**
	Compare the nutritional requirements and sources of various methods.	**K4**
	Analyze the body composition, basal metabolic rate (BMR) and metabolic outcomes of adults	**K4**
	Explain the specific dynamic action	**K2**
UNIT-III- Protein and Lipids		
Proteins – Definition, Nutritional classification of protein, Functions of Proteins	Define proteins	**K2**
	Classify the various kinds of proteins like complete, partial complete and incomplete proteins	**K4**
	Distinguish between essential and non-essential amino acids	**K5**
	Importance of functions sources and requirements of protein	**K5**
LIPIDS	Define lipids	**K2**
	Categorized saturated and unsaturated fatty acids	**K4**
	Explain sources, requirements and functions of lipids in human	**K2**
	Describe the digestion and absorption of fatty acids in small intestine	**K4**
	Modify the dietary habits of high poly unsaturated fatty acids rich foods in CVD patients	**K5**

	Classify the difference between the terms cardiovascular diseases (CVDs) and coronary heart disease (CHD)	**K4**
	Discuss the different areas of the body likely to be affected by cardiovascular diseases	**K4**
UNIT IV		
Vitamins – Classification, functions and Deficiency	Define vitamins are required in the body	**K2**
	Classify the different kinds of vitamins involved in human body.	**K3**
	Explain the functions, sources of vitamins	**K2**
	Classify various kinds of vitamins	**K4**
Fat Soluble Vitamins – Vitamin A, D, E and K – Functions, Requirements, Sources and Effect of deficiency.	Analyze the between various kinds of fat soluble vitamins	**K4**
	Explain the characteristics of vitamins,	**K2**
	Classifyvitamins according to their solubility.	**K3**
	Compare and contrast the absorption and storage of fat-soluble vitamins.	**K4**
	Describe the role of vitamins in health and disease.	**K3**
Water soluble vitamins – Thiamine, Riboflavin, Niacin, Ascorbic acid, Folic acid, Vitamin B6 and B12 – Functions, Requirements, Sources and Effects of deficiency	Define the water-soluble vitamins, how they are absorbed, and their food sources	**K2**
	Describe the major functions of and deficiency and toxicity issues for each water-soluble vitamin	**K4**
	Explain the regulate body processes necessary for growth, reproductions, and the maintenance of health	**K4**
	Discuss the deficiency of water-soluble vitamins.	**K4**
UNIT V		
Minerals – Classification and General Functions.	Discuss the certain minerals are required in the body and that some minerals form essential structural components of tissues	**K5**

	Analyze the some minerals are essential components of important molecules such as hormones and enzymes	**K4**
	Classify the different types of minerals like macro and micro minerals	**K4**
Macrominerals–Calcium, Phosphorus, Magnesium, Sodium and Potassium – Functions, Requirements, Sources, Effects of Deficiency, Effect of imbalance of Sodium and Potassium.	Compare that sodium, potassium, calcium and chloride ions are important in maintaining the correct composition of cells and of the tissue fluids around them (homeostasis)	**K4**
	List out the importance of macro minerals in human body	**K4**
	Explain the functions of macro minerals like sodium, potassium calcium and phosphorus	**K4**
	Discuss the Effect of imbalance of Sodium and Potassium.	**K4**
	Compare the sources and requirements of macro minerals	**K4**
Micro Minerals – Iron, Iodine, Copper, Fluorine and Zinc – Functions, Requirements, Sources and Effect of Deficiency..	Construct theMicrominerals include Copper, Zinc, Cobalt, Chromium and Fluoride.	**K5**
	Analyze the mostly co-factors, and are necessary for the function of enzymes in the body, but are needed only in minor quantities.	**K4**
	Combine the sources and requirements of micro minerals	**K5**

4.Mapping Scheme for the PO, PSOs and COs

Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO 1	PSO 2	PSO3	PSO4
CO1	**H**	**M**	**H**	**H**	**M**	**H**	**H**	**M**	**-**	**H**	**H**	**M**	**H**
CO2	**H**	**L**	**M**	**H**	**M**	**M**	**M**	**H**	**L**	**H**	**H**	**H**	**H**
CO3	**H**	**H**	**M**	**M**	**H**	**M**	**H**	**H**	**M**	**H**	**M**	**H**	**M**
CO4	**H**	**H**	**H**	**M**	**M**	**H**	**H**	**M**	**H**	**H**	**H**	**H**	**H**
CO5	**M**	**M**	**H**	**M**	**M**	**L**	**M**	**L**	**L**	**M**	**H**	**M**	**L**
CO6	**H**	**M**	**H**	**H**	**H**	**H**	**M**	**M**	**M**	**H**	**M**	**L**	**L**

CO7	**L**	**H**	**M**	**M**	**M**	**M**	**H**	**M**	**L**	**M**	**H**	**H**	**H**
C08	**H**	**H**	**M**	**H**	**H**	**H**	**H**	**H**	**H**	**M**	**H**	**M**	**M**

L-Low **M-Moderate** **H- High**

5.Course assessment methods

Direct

1. **Continuous Internal Assessment I ,II**
2. **Group discussion, Presentation, Assignment**
3. **End Semester Examination**

Indirect

NAME OF THE COURSE COORDINATOR: MRS. C.ROSELIN

CORE III LAB : PRINCIPLES OF NUTRITION LAB

Semester: III **Code: U17ND3P3**
Credits: 2 **Hours/Week: 45**

1.Course Outcomes:
After completion of this course the students will be able to

CO. No	Course Outcomes	Level	Unit
CO1	Obtain in-depth knowledge on the structure of nutritional components.	K2	ALL
CO2	– Differentiate the various components of carbohydrates and proteins using qualitative tests.	K4	I, II
CO3	Analyze quantitatively the carbohydrates, proteins and fats present in various food stuff.	K4	I, II
CO4	Evaluate the various components of protein metabolism such as nitrogen in the food stuff.	K5	II, IV
CO5	Estimate the quantity of crude fiber present in various foods.	K5	V
CO6	Analyze the composition of foods with regards to its nutrient composition.	K4	ALL

2.A.SYLLABUS
Qualitative Analysis:

1. Qualitative test for Carbohydrate – Glucose, Fructose, Lactose, Maltose and Galactose.

2. Qualitative test for Protein.

3. Qualitative estimation of iron, Ascorbic acid Vitamin A.

4. Demonstration of estimation of nitrogen.

5. Demonstration of fiber estimation.

6. Demonstration of total fat estimation.

B. 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",15thEdition, Tata McGraw Hill Publishing Company Ltd., Bombay, 2001.

C. REFERENCE BOOKS

1. Sadasivam, S. and Manickam, "A. Biochemical Method", Second Edition, New Age International P. Ltd., Publishers, New Delhi, 2003.

2. Raghuramulu, N., Madhavannair, K. and KalyanaSundaram, National Institute of Nutrition, "A Manual of Laboratory Techniques", Hyderabad, 500007, 2013.

3. practical organic and chemistry by R. Plimmer - Longmans

4.Practical Biochemistry by Keith Wilson, John M Walker (Paperback).2000

5, Scientific Foundations of Clinical Biochemistry: Biochemistry in Clinical Practice v. 2: Amazon.co.uk: David L. Williams, Vincent Marks: Books.

3. SPECIFIC LEARNING OUTCOMES (SLO)

Unit	Course Content	Learning Outcomes	Blooms Taxonomic levels of Transaction
I	Carbohydrates		
	1. Qualitative test for Carbohydrate – Glucose, Fructose, Lactose, Maltose and Galactose.	Demonstrate various identification **tests for carbohydrates**	**K5**
		distinguish reducing and non-reducing sugars.	**K5**
		Plan qualitative tests for monosaccharides, disaccharides, and polysaccharides.	**K5**
II	Qualitative test for Protein.	Identify the chemical structures and importance of these compounds.	**K2**

		Analyze the various factors involved in protein components.	**K4**
		Determine the protein molecules for the given sample	**K5**
III	3. Qualitative estimation of iron, Ascorbic acid Vitamin A.	Demonstrate Ascorbic Acid Determination in Commercial Fruit Juice Samples by Cyclic Voltammetry	**K4**
		Determination of Vitamin-C (Ascorbic Acid) in different fresh Fruit and Vegetables. By using Idometric Titration Method	**K5**
		Estimation of iron in minute quantities by UV-vis spectrophotometry	**K5**
IV	Demonstration of estimation of nitrogen.	Analysis the **nitrogen** impacts of various diets.	**K4**
		Demonstrate the various methods used for nitrogen .	**K5**
V	Demonstration of fibre estimation.	Determination of crude fibre in different food samples	**K5**
		Estimate a good indicator on the amount of food freshness like vegetables, fruits and leafy products.	**K5**
VI	Demonstration of total fat estimation.	**Demonstrate the fatty substances present in food groups.**	**K5**

4.Mapping Scheme for the PO, PSOs and COs

Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO 1	PSO 2	PSO3	PSO4
CO1	**H**	**H**	**M**	**M**	**H**	**L**	**-**	**L**	**L**	**M**	**M**	**L**	**L**
CO2	**M**	**M**	**L**	**M**	**M**	**M**	**M**	**L**	**L**	**-**	**M**	**M**	**-**

CO3	**H**	**H**	**-**	**M**	**H**	**H**	**-**	**-**	**H**	**H**	**H**	**H**	**H**
CO4	**H**	**H**	**H**	**M**	**-**	**H**	**H**	**M**	**H**	**H**	**H**	**H**	**H**
CO5	**H**	**H**	**H**	**M**	**M**	**-**	**M**	**M**	**M**	**M**	**H**	**M**	**M**
CO6	**L**	**M**	**-**	**-**	**-**	**-**	**-**	**M**	**-**	**M**	**-**	**-**	**L**

5.Course assessment methods

Direct

1. **Continuous Internal Assessment I ,II**
2. **Group discussion, Presentation, Assignment, Poster presentation**
3. **End Semester Examination**

Indirect

NAME OF THE COURSE COORDINATOR : MRS. C. ROSELIN

ALLIED III: FOOD STANDARD AND QUALITY CONTROL

Semester: III **Code: U17ND3Y3**
Credits: 4 **Hours/Week: 60**

1.Course Outcomes:
After completion of this course the students will be able to

CO. No	Course Outcomes	Level	Unit
CO1	Identify and apply the various quality control measures involved in the food industry.	K2	I
CO2	Evaluate critically the role of food specification and the importance of reading food label.	K4	II
CO3	Analyze the effect of food additives and preservatives in processed foods.	K4	IV
CO4	Apply the role of sensory evaluation in the quality assessment of food products.	K4	III
CO5	Interpret the effects of food adulterants and experimentally identify common food adulterants and also the effects of naturally occurring toxins in foods.	K5	IV
CO6	Analyze various food laws in detail and their day-to-day application	.K4	V

2. A. Syllabus:

Unit I: **12 Hours**

Food quality ,quality features of food, quality checking of raw materials and processed food ,simple technique of quality checking of raw food materials – cereals ,pulses, vegetables, fruits , milk and meat products, oils and spices and condiments, processed foods- tinned foods ,baked food, advantages of quality control and stages of quality control.

Unit-II **12 Hours**

Quality control measures:

(a)Food specifications:- Food specifications for various food products- starchy food , milk and milk products, fruit products , beverages , spices and condiments , oils and fats; objectives and advantages .

(b)Food Additives & their specifications:- Classifications of food additives , usages and optimal level recommended for usage as specifications - Food colors , leavening agents , preservatives.

UNIT III **12 Hours**

Quality Evaluation of food

(a) Subjective evaluation: Sensory characters of food, organs involved in assessment – physiological process, types of sensory test- requirements to contact sensory evaluation, Role and purpose and defects in sensory evaluation- panel member, essential qualities of a panel member, procedure of sensory evaluation, popular centres for sensory evaluation in India and their role.

(b), objective evaluation:

Objectives, requirements, different test,and instruments used for objective valuation ,advantages and limitations,popularcentre in India.

Unit-IV

Food contaminates and adultrrants: **12 Hours**

(a).Food toxins – Myco toxins – aflotoxins , aspergills and pencillium species, Mushroom poisioning sea food toxins.

(b) Other toxins- Naturally occurring in foods ,Lathyrogens , haemoagglitunins, goitrogens

(c) toxic minerals and other inorganic components in food and water: sellinium , Fluorine, nitrates and nitrites ,oxalate and phytates.

(d). Food adulterations and food standards : adulterations- Definition, common food adulterants : Test for detecting food adulterants ,contamination with toxic minerals, pesticides and insecticides : Effects of food adulterants and contamination, measures to control food adulterants .Prevention of food adulterants act

Unit –V **12 hours**

Food standards and food laws:

(a) international food standard and Codex Alimentarious

(b) AGMARK & BIS

(c) FSSAI

(d) HACCP,

B. Topic for Self Study:

Sl. No.	Topics	Reference
1	Adverse effects of excessive food colourants.	https://www.newdelhitimes.com/adverse-effects-of-artificial-food-dyes123/

2	Case studies from food industry regarding mishandling of food additives.	https://www.intechopen.com/books/nutrition-in-health-and-disease-our-challenges-now-and-forthcoming-time/food-additives-in-food-products-a-case-study
3	Role of sensory evaluation in coffee and tea industry	https://www.alpha-mos.com/coffee-tea-0
	Safety standards to be followed in food processing units.	https://www.ag.ndsu.edu/foodlaw/processingsector/rules-and-standards-for-food-processing

C. TEXT BOOK

1. Srilakshmi, B., "Food science" ,7th edition, New Age International Pvt. Ltd., New Delhi., 2018.

2. Potter, N.N. and Hotchkiss, H.J., "Food Science", 5th edition, CBS Publishers and Distributors, New Delhi, 2007.

D. REFERENCES:

1. EdwardG.Schilling.,"Acceptance Sampling in Quality control",2ndEdition,CRCPress,Mallbook., 1996

2. Swaminathan.M., "Essential of Food and Nutrition", New Age publication, New Delhi.2011

3. EillianH.Meyer, "Food Chemistry", Affiliated West PressPvt.,Ltd, New Delhi,1973.

3. SPECIFIC LEARNING OUTCOMES

S.No	Syllabus	Learning outcomes	Blooms taxonomy
Unit I:			
1.1	**Course content of** Food quality, quality features of food.	Define food quality.	K2
		Classify various features of food quality	K3
1.2	Quality checking of raw materials and processed food ,simple technique of quality checking of raw food materials – cereals ,pulses, vegetables, fruits , milk and meat products, oils and spices and condiments, processed foods-tinned foods ,baked food.	Apply the various quality checking methods.	K3
		Classify the differences between quality checking of various food products	K4
		Explain the process of quality	K2

		checking of raw food materials	
		Differentiate the various kinds of techniques involved in food groups	K3
		Discuss the Quality and nutritive value of processed foods	K2
		Explain the features of tinned food	K2
1.3	Advantages of quality control and stages of quality control	List out the advantages of quality control.	K2
		Classify various stages of quality control and relate them.	K3
		Analyze the importance of the stages of quality control and list down their merits and demerits.	K4
II	**Course Content in Unit -2**		
2.1	**Quality control measures:** (a)Food specifications:- Food specifications for various food products- starchy food , milk and milk products, fruit products , beverages , spices and condiments , oils and fats; objectives and advantages .	Define food specifications and list out and label the specifications for various food products.	K2
		Classify and compare the advantages and disadvantages of foods.	K3
		List out the objectives and advantages of quality control.	K3
		Classify the various food groups specifications	K3
2.2	b)Food Additives & their specifications:- Classifications of food additives , usages and optimal level recommended for usage as specifications	Define food additives.	K2
		Classify food additives.	K3
		Analyze the usages and	K4

		compare the optimal level recommended for usage.	
		Explain food additives and optimal level recommended for usage as specifications	K2
2.3	Food colors , leavening agents , preservatives.	List out food colours.	K2
		Compare the effect of various leavening agents on cooking.	K4
		Analyze the effect of preservatives on various processed foods.	K4
UNIT III	**Quality Evaluation of food**		
3.1	(a) Subjective evaluation: Sensory characters of food, organs involved in assessment – physiological process, types of sensory test.	Define subjective evaluation with reference to various sensory characters in food.	K2
		Apply thethephysiological process of sensory tests.	K3
		Develop a proper technique to identify the various sensory tests.	K5
3.2	Requirements to conduct sensory evaluation, Role and purpose and defects in sensory evaluation-panel member, essential qualities of a panel member, procedure of sensory evaluation, popular centres for sensory evaluation in India and their role.	List out the requisites to conduct sensory evaluation. .	K2
		Summarize the role, purpose and defects in sensory evaluation. •	K5
		Explain the essential qualities needed for the panel members.	K4

3.4	**(b) objective evaluation:** .		
	Objectives, requirements, different test,and instruments used for objective evaluation ,advantages and limitations,popularcentre in India	Define objective evaluation.	K2
		Explain various requirements of objective evaluation.	K4
		Discuss the uses of the various instruments used for objective evaluation. .	K4
		Analyze the advantages and limitations of objective evaluation	K4
Unit IV	**Food contaminants and adulterants:**		
4.1	(a).Food toxins – Mycotoxins – aflatoxins , aspergillus and pencillium species, Mushroom poisoning, sea food toxins.	List out various types toxins present in food.	K2
		Classify the various microorganisms causing toxins.	K4
		Apply the effects of toxins to food spoilage.	K3
		Analyze food toxins depending upon the species	K4
4.2	Other toxins- Naturally occurring in foods,Lathyrogens , haemagglutinins, goitrogens	List out the naturally occurring toxins in foods.	K2
		Demonstrate the effect of lathyrogens, haemagglutinins and goitrogens on cooking	K5
4.3	(c) Toxic minerals and other inorganic components in food and water: selenium , Fluorine, nitrates and nitrites ,oxalate and	Explain the inorganic components in food and water	K5

	phytates.		
		Classify the naturally occurring inorganic compounds based on their toxic nature.	K3
		Apply the effect of these minerals including selenium , Fluorine, nitrates and nitrites ,oxalate and phytates. toxins on health adversely.	K3
4.4	(d). Food adulterations and food standards : adulterations- Definition, common food adulterants : Test for detecting food adulterants ,contamination with toxic minerals, pesticides and insecticides : Effects of food adulterants and contamination, measures to control food adulterants .Prevention of food adulterants act	List out the adulterants which contaminate foods.	K2
		Compare the effects of various food adulterants on human beings.	K4
		experimentally identify the common food adulterants present in food stuff	K4
		Explain Prevention of food adulterants act	K4
		Discuss contamination with toxic minerals, pesticides and insecticides	K4
V	**Food standards and food laws:**		
5.1	(a) international food standard and Codex Alimentarious	List the various International Food Standards.	K2
		Classify the various countries which are members of Codex Alimentarious and its role in food standards.	K3
		Explain the importance of Codex Alimentarious in	K4

		maintaining food quality.	
5.2	(b) AGMARK & BIS	List out the importance of BIS and AGMARK.	K2
		Compare the BIS and AGMARK to other FSSAI.	K4
5.3	(c) FSSAI& HACCP	Recall the importance of FSSAI in quality control of food stuffs.	K2
		Differentiate the various food stuffs which comes under FSSAI.	K4
		Application of HACCP principles in foods.	k3

4.Mapping Scheme for the PO, PSOs and COs

L-Low M-Moderate H- High

Mapping	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PSO1**	**PSO2**	**PSO3**	**PSO4**
CO1	M	L	-	L	-	L	L	L	-	M	M	-	H
CO2	-	M	-	-	H	M	-	H	-	-	L	-	H
CO3	-	H	-	-	-	M	-	-	-	M	M	-	H
CO4	M	L	-	-	-	M	L	-	M	-	M	M	H
CO5	M	M	-	-	M	H	L	M	M	H	M	-	H
CO6	-	M	-	M	L	-	M	L	-	L	-	H	M

5. Course assessment methods

Direct

1. **Continuous Internal Assessment I ,II**
2. **Group discussion, Presentation, Assignment, Poster presentation, Case study, Preparation of questionnaire, Assessment of Anthropometry**
3. **End Semester Examination**

Indirect

NAME OF THE COURSE COORDINATOR: MRS. K. MEERA

ALLIED PRACTICAL -II : FOOD STANDARD AND QUALITY CONTROL AND NUTRITIONAL BIOCHEMISTRY

Semester: III **Code: U17NDYP2**
Credits: 2 **Hours/Week: 45**

1.Course Outcomes:
After completion of this course the students will be able to

CO. No	Course Outcomes	Level	Unit
CO1	Interpret label and identify various preservatives and additives present in foods.	K4	III
CO2	Perform simple techniques of identifying food adulterants.	K4	III
CO3	Evaluate foods subjectively.	K4	IV
CO4	Identify presence of sugar and protein in urine.	K2	I
CO5	Estimate the quantity of glucose present in blood.	K4	I
CO6	Estimate the cholesterol content of blood.	K4	I

2.A. SYLLABUS

I Qualitative Analysis of urine and blood.

1. Quantitative analysis of Urine sugar, protein, Bile pigments, Bile Salts
2. Estimation of Glucose in Urine(Benedict's Method)
3. Estimation of Urea in Urine (DAM Method)
4. Estimation of Blood Glucose (Folin-WU Method)
5. Estimation of Blood Urea (DAM Method)
6. Estimation of serum cholesterol (Zak's Method)

II FOOD STANDARDAND QUALITY CONTROL PRACTICAL

Display the standard food products available in the market.

III Food Adulterants

Physical and chemical method of identifying common food adulterants.

IV SE Common foods:

Sensory Evaluation of common foods by using five point Hedonic scale.

B. References :

1. InteazAlli., “Food Quality Assurances, Principles and Practices”, CRC press, India.

2. Margaret M.C. Williams, “Food Fundamentals”, John Wiley and Sons,London,1974.

3. SPECIFIC LEARNING OUTCOMES (SLO)

S.No	Syllabus	Learning outcomes	Blooms taxonomy
1	Qualititative analysis of Urine sugar, protein, Bile pigments, Bile Salts	Analyze urine qualitatively for sugar, proein, bile pigments and bile salts.	K4
2.	Estimation of Glucose in Urine(Benedict's Method)	Estimate the quantity of blood sugar in urine.	K5
3	Estimation of Urea in Urine (DAM Method)	Estimate the quantity of urea present in urine.	K5
4	Estimation of Blood Glucose (Folin-WU Method)	Assess the quantity of blood glucose.	K5
5	Estimation of Blood Urea (DAM Method)	Estimate blood urea.	K5
6.	Estimation of serum cholesterol (Zak's Method)	Demonstrate the quantity of cholesterol present in serum.	K5
	Food Standards and Quality Control		
7	**II FOOD STANDARDAND QUALITY CONTROL PRACTICAL**		
	Display the standard food products available in the market.	Identify and read the various components of a label. •	K2
		Compare the various additives present in foods.	K4
8	**IIIFood Adulterants**		
	Physical and chemical method of identifying common food	Identify the various adulterants	K2

	adulterants.	present in common foods.	
		Analyze the food adulterants in common foods.	K4
		Demonstrate simple techniques to identify food adulterants	K5
	IV SE Common foods:		
	Sensory Evaluation of common foods by using five point Hedonic scale.	Analyze common foods using sensory evaluation for the sensory attributes.	K4
		Classify the different Hedonic scale	K4

4.**Mapping Scheme for the PO, PSOs and COs**

Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4
CO1	M	L	-	L	-	L	L	L	-	M	M	-	H
CO2	-	M	-	-	H	M	-	H	-	-	L	-	H
CO3	-	H	-	-	-	M	-	-	-	M	M	-	H
CO4	M	L	-	-	-	M	L	-	M	-	M	M	H
CO5	M	M	-	-	M	H	L	M	M	H	M	-	H
CO6	-	M	-	M	L	-	M	L	-	L	-	H	M

5.Course assessment methods

Direct

1. **Continuous Internal Assessment I ,II**
2. **Group discussion, Presentation, laboratory maintenance**
3. **End Semester Examination**

Indirect

NAME OF THE COURSE COORDINATOR : MRS. K. MEERA

NMEC-I: BASICS IN NUTRITION

Semester: III **Code: U17ND3E1**
Credits: 2 **Hours/Week: 30**

1.Course Outcomes:
After completion of this course the students will be able to

CO. No	Course Outcomes	Level	Unit
CO1	Correlate the role of food and its importance in disease prevention.	K3	I
CO2	Compares the basic components present in food and the recommended allowance of each and every component.	K4	I, II
CO3	Classify the macronutrients in foods and their vital role in energy giving and body building functions.	K4	I
CO4	Analyze the micro and macronutrient deficiencies and the role of food in preventing them.	K4	II, III, IV,V
CO5	Acquire basic knowledge in the treatment of diseases through diet.	K4	II,III, IV,V
CO6	Appreciate the importance of good food habits in leading a healthy lifestyle.	K4	I

2.A. Syllabus:

Unit-I
Food:

Food definition, classification of food, basic five food groups classification of nutrients, RDA-reference man and women, factors influencing RDA

Unit-II
Carbohydrates: functions, sources, classifications and requirements, disorder of CHO- under nutrition and obesity and Diabetes mellitus, Role of dietary fibre in health and disease.

Unit-III
Proteins:

Sources, functions of proteins, nutritional classifications of amino acids and its requirements, deficiency of protein metabolism.

Unit-IV

Lipids:

Lipids - sources, functions of protein classifications and types of fatty acids and requirements, disorder of lipid metabolism- disease related to heart- hypertension and atherosclerosis.

UNIT -V

Macro minerals & Vitamins

Macro minerals: sources, functions. Classifications, Requirements of macro minerals and effect of deficiency and excess.

Micro minerals: sources, functions. Classifications, Requirements of iron, Iodine Zinc and flourine effect of deficiency and excess.

Vitamins

Fat soluble Vitamins: Vitamin A, Vitamin D, E & K. Functions, Sources, Requirements and Deficiency diseases.

Water soluble vitamins: Thiamine, Riboflavin, Niacin, Pantothenic acid, Biotin, Folic acid, Vitamin B12, VitaminB6 and Vitamin C, Functions, Sources , Requirements and Deficiency diseases.

B. Topics for self-study:

Sl. No.	Topics	Reference
1	Life style modification in prevention of diseases.	https://www.health.harvard.edu/newsletter_article/Lifestyle_prevention_Does_it_work_And_why
2	Food labels and their importance.	http://www.amzbolt.com/blog/Importance-of-checking-food-label/index.aspx
3	Hazards of junk food.	https://www.icicilombard.com/blog/health-insurance/hi/5-harmful-effects-of-junk-food
4	Role of vegetables in boosting immunity.	https://www.onhealth.com/content/1/immune_system_boosting_foods

C. Text Books

1. Srilakshmi, B., "Food science", 7th edition, New Age International Pvt. Ltd., New Delhi., 2018.
2. "Dietary Guidelines for Indians", ICMR, National Institute of Nutrition, Hyderabad, 2013.

3. SPECIFIC LEARNING OUTCOMES

S.No	Syllabus	Learning outcomes	Blooms taxonomy
Unit-I **1.1**	**Food:** Food definition ,classification of food, basic five food groups classification of nutrients,	Define food and Nutrition	2
		Classify the food	K3
		Explain the five basic food groups	K2
		Discuss the functions of food	K4

		based on classification and functions.	
		Illustrate the food pyramid	
1.2	RDA- reference man and women, factors influencing RDA	Define RDA	K2
		Compare reference women and reference men.	K5
		Discuss the factors affecting RDA	K4
		Analyze methods used for deriving RDA	K4
Unit-II			
2.1	Carbohydrates: functions, sources, classifications and requirements, disorder of CHO	Define carbohydrates	K2
		Classify the various kinds of carbohydrates	K4
2.2	- under nutrition and obesity and Diabetes mellitus, Role of dietary fibre in health and disease.	Explain the under nutrition	K2
		Classify the various types of diabetes mellitus.	K4
		Analyze the role of dietary fiber in health and diseases.	K4
UNIT III Proteins			
	Sources, functions of proteins, nutritional classifications of amino acids and its requirements, deficiency of protein metabolism.	Explain the functions, sources of proteins.	K2
		List out the daily dietary requirements and classify amino acids.	K2
		Analyze the deficiency of protein metabolism	K4
UNIT-IV	**Lipids:**		
	Lipids - sources, functions of protein classifications and types of fatty acids and	Explain the functions, sources of lipids.	

	requirements, disorder of lipid metabolism- disease related to heart- hypertension and atherosclerosis.		
		Discuss the requirements and the role of lipids in atherosclerosis and hypertension. .	K4
		Importance of the sources for a healthy lifestyle	K4
		Distinguish between lipid metabolism	K4
		Classify the various heart disease	K4
UNIT-V	**Macro minerals & Vitamins Macro minerals**		
5.1	Sources, functions. Classifications, Requirements of macro minerals and effect of deficiency and excess.	List the sources and functions of macro minerals.	K2
		Explain the requirements of various macrominerals.	K4
		Analyze the effect of deficiency and excess of macrominerals.	K4
5.2	**Micro minerals:**		
	sources, functions. Classifications, Requirements of iron, Iodine Zinc and flourine effect of deficiency and excess.	List the sources and functions of macro minerals.	K2
		Explain the requirements of various microminerals. .	K4
		Analyze the effect of deficiency and excess of microminerals	K4
5.3	**Vitamins** Fat soluble Vitamins: Vitamin A, Vitamin D, E & K. Functions, Sources, Requirements and Deficiency diseases.	List the sources and functions offat soluble vitamins.	K2
		Explain the requirements and deficiency diseases of these vitamins	K4
5.4	Water soluble vitamins: Thiamine, Riboflavin, Niacin, Pantothenic acid, Biotin,	List the sources and functions of water soluble vitamins.	K2

	Folic acid, Vitamin B12, VitaminB6 and Vitamin C, Functions, Sources , Requirements and Deficiency diseases.		
		Explain the requirements and deficiency diseases of these vitamins.	K2

4.Mapping scheme for the POs PSOs and COs

Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4
CO1	L	M	H		-	L	-	-	L	H	M	L	-
-CO2	H	L	H		-	M	-	-	M	M	H	M	-
CO3	L	H	L		-	-	-	-	H	L	M	M	-
CO4	M	H	H		-	M	-	M	H	H	M	H	-
CO5	M	H	H		-	-	-	-	M	H	H	H	-
CO6	H	L	H		-	L	-	-	M	M	H	M	-

L- LOW M-MEDIUM H-HIGH

5.Course assessment methods

Direct

1. **Continuous Internal Assessment I ,II**
2. **Group discussion, Presentation, Assignment, Poster presentation, Case study, Preparation of questionnaire, Assessment of Anthropometry**
3. **End Semester Examination**

Indirect

NAME OF THE COURSE COORDINATOR : MRS. C. ROSELIN

:

CORE IV: NUTRITION THROUGH LIFECYCLE

Semester: IV **Code: U17ND404**
Credits: 5 **Hours/Week: 90**

1.Course Outcomes:
After completion of this course the students will be able to

CO. No	Course Outcomes	Level	Unit Covered
CO1	Study the relationship between nutrition and health.	K2	I
CO2	Obtain knowledge on the nutritional needs pertaining to different stages of life.	K2	I
CO3	Compare the physiological changes on various stages of life and coping up with their daily dietary requirements.	K5	I,II,III,IV,V
CO4	Evaluate the changes during various stages of growth and development throughout life cycle.	K5	I,II,III,IV,V
CO5	Estimate the nutritional requirements throughout life cycle.	K5	I,II,III,IV,V
CO6	Plan and execute a diet for all stages of life and health conditions.	K5	I,II,III,IV,V

2.A. Syllabus :

UNIT – I **20 Hours**

a. Basics principles of meal planning, RDA , Food allowance for different age groups, factors influencing nutritional requirements for all age groups.

b. 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 **15 Hours**

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 the lactating failure.

UNIT – III **20 Hours**

a. Nutrition in infancy- birth weight of infants, rate of growth, milestones in development (only stage) immunization schedule, nutritional requirements, process of breast feeding, comparison of human milk with cow's milk, artificial feeding, weaning and supplementary foods, feeding problems.

b. Nutrition in pre- school 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 pre- school child.

UNIT- IV **20 Hours**

a. Nutrition in school age children – growth in school children, nutritional and food requirement, packed lunch- factors to be considered, sample menu for the school children.

b. 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 **15 Hours**

a. Nutrition in adulthood – reference men and reference women, nutritional requirements of an adult man and women, body composition, nutrition and health issues, planning diet to suit different income levels.

b. Nutrition in elderly – definitions 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.

B. Topics for self-study

Sl. No.	Topics	Reference
1	Effects of alcohol and smoking on pregnancy.	https://share.upmc.com/2016/03/how-smoking-alcohol-drugs-harm-your-baby/
2	Myths and realities regarding lactation.	https://www.chla.org/blog/rn-remedies/ten-myths-and-facts-about-breastfeeding
3	Feeding pre-term infants.	https://www.who.int/elena/titles/feeding_vlbw_infants/en/
4	Traditional food practices that are followed during puberty in girls and its significance.	https://www.prb.org/nutritionofwomenandadolescentgirlswhyitmatters/

C. TEXT BOOKS:

1. Mahtab,S, Banarji, Kamala Krishnasamy ,G.N.V. Brahmam, “Text book of Human Nutrition”, Third Edition,Oxford and IBH PublishingCo.P.Lit.,New Delhi, 2012.

2. Srilakshmi, B., “Dietetics”, Sixth Edition, New Age International (p) Ltd., New Delhi,2013.

D. Reference books:

1. “Dietary Guidelines for Indians”, ICMR, National Institute of Nutrition, Hydrabad,2013.

2. Gobalan,C. Rama Sastri B.V. andBalasubramanian, “Nutritive value of Indian Foods”, NIN, ICMR, Hydrabad,2014.

3. Krause,M.V and Hunscher, M.A., “Food, Nutrition and Diet Therapy”,14th Edition, W.B.Saunders. 2014

3. SPECIFIC LEARNING OUTCOMES (SLO)

Unit	Course Content	Learning Outcomes	Blooms Taxonomic levels of Transaction
I	Meal planning and Pregnancy		
1.1	a. Basics principles of meal planning, RDA , Food allowance for different age groups, factors influencing nutritional requirements for all age groups	Identify the basic principles of meal planning.	**K2**
		Explain the food allowance for different age groups	**K2**
		Distinguish the concepts of food requirements in all age groups.	**K4**
		Discuss the factors influencing all age groups.	**K4**
1.2	b. 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.	Describe and explain: normal physiology of pregnancy	**K4**
		Consider the principles for antenatal controls and risk estimation of pregnancy and delivery	**K4**
		Analyze the complications including multiples, fetal growth abnormalities and infections in pregnancy.	**K4**

		Explain the medical disorders in pregnancy including hypertensive disorders, diabetes and epilepsy	**K2**
		Plan a balanced diet chart for pregnant women.	**K5**
II	Lactating women		
2.1	Nutrition for lactating women- physiology and psychology of lactation,	Analyze the importance of breastfeeding, and the consequences of not breastfeeding, in terms of health outcomes.	**K4**
		Explain the physiology and psychology of lactation	**K2**
2.2	colostrums- composition, composition of breast milk, Factors affecting the volume and composition of breast milk,	Effect the role of human milk and breastfeeding in improving the health and wellbeing outcomes of infants,	**K4**
		Explain the mothers and the wider family and in promoting and protecting public health.	**K2**
		Analyze the factors affecting the volume and composition of breast milk,	**K4**
		Distinguish between how milk and mother milk	**K5**
2.3	Hormonal control, nutritional requirements of a nursing mother, diet planning, factors responsible for the lactating failure.	Describe the food needs of breastfeeding mothers.	**K4**
		Plan a balanced diet and supplementation of lactating women.	**K5**
		Discuss factors responsible for the lactating failure.	**K4**
		Assess their nutritional requirement and sources of lactating women	**K4**
III	**Infancy and Pre School children**		

3.1	a. Nutrition in infancy- birth weight of infants, rate of growth, milestones in development (only stage) immunization schedule,	Explain the concept of human growth and development from conception to infancy.	**K2**
		Summarize overall physical growth patterns during infancy;	**K2**
		Classify the difference types of immunization schedule	**K4**
		Explain the different stages of growth and development of infancy	**K2**
3.2	Nutritional requirements, process of breast feeding, comparison of human milk with cow's milk, artificial feeding, weaning and supplementary foods, feeding problems.	Describe the growth of the brain during infancy; Overall Physical Growth and development..	**K4**
		Discuss the feeding recommendations for mothers.	**K3**
		Compare the human milk and cow;s milk.	**K4**
		Explain artificial feeding.	**K4**
		Classify the various feeding problems.	**K4**
		Plan and prepare for a supplementary foods.	**K5**
3.3	Nutrition in pre- school age- growth and development, nutritional requirements, factors affecting nutritional status, food requirement, low cost supplementary foods,	Define preschool age groups	**K2**
		Analyze the various kinds of growth and development of pre schools age children's	**K4**
		Explain the factors affecting pre schools age group.	**K2**
		Assess their nutritional statutes of pre school children.	**K4**
		Demonstrate the supplementary foods for pre school children.	**K5**

3.4	Nutrition related problems in childhood, diet planning for the pre-school child.	Explain the nutritional related problems of pre school children.	**K2**
		Suggest five recipes rich in A suitable for a pre school child.	**K2**
		Describe in detail three stages of treatment of protein energy malnutrition	**K2**
		Plan a day's for a 4 year old child from a low income group.	**K5**
IV	School age children and Adolescent		
4.1	a. Nutrition in school age children – growth in school children, nutritional and food requirement, packed lunch-factors to be considered, sample menu for the school children.	Compare the nutritional requirements of 7-9 year old and 10-12 year students.	**K4**
		Explain the role of Mid-Day meal programme in alleviating malnutrition.	**K4**
		Explain the causes of obesity in school going children.	**K4**
		Describe role of school authorities in maintaining the school canteens	**K4**
		Describe the points to be considered in planning diets for school children.	**K4**
		Explain the role of school authorities in maintaining the health of the child.	**K4**
		Plan a packed lunch for a 12 year old boy.	**K5**
4.2	Nutrition in adolescence – growth and development, body composition, puberty, secondary sexual characteristics, psychological changes,	Discuss the common nutrient deficiencies in adolescents.	**K2**
		Explain eating disorders like anorexia Nervosa and bulimia nervosa	**K2**
		Distinguish the nutritional problems of Indian and western adolescents.	**K4**

		Explain the nutritional problems of adolescents boys.	**K2**
		Plan a day's diet of an adolescents girl sufferings from nutritional anaemia.	**K5**
4.3	Nutritional requirements, nutritional problems, malnutrition due to early marriage, food habits and diet plan.	Consider the malnutrition deficiency including anaemia, obesity, hormonal imbalances and life style disorders.	**K4**
		Explain malnutrition like under and over nutrition	**K2**
		Compare the nutritional requirements of boys and girls.	**K5**
V	**Adult and Old age periods:**		
5.1	a. Nutrition in adulthood – reference men and reference women, nutritional requirements of an adult man and women, body composition, Nutritionand health issues, planning diet to suit different income levels.	Classify the reference man reference women.	**K3**
		Explain the nutritional requirements of an adulthood.	**K4**
		Compare the body composition of men and women.	**K4**
		Discuss the nutritional health problems of adult	**K4**
		Plan and prepare for a days menu for adulthood	**K5**
5.2	Nutrition in elderly – definitions 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.	Discuss the modifications of calorie requirement during old age.	**K4**
		Describes the nutritional problems during old age.	**K4**

		Suggest the recipes for old man giving reasons.	**k4**
		Classify the differences in body composition of an adult and old man.	**K3**
		Discuss the role of physiological changes and socio economic factors in relation to food intake.	**K4**
		Explain the degenerative diseases to be prevented during old age.	**K4**
		Plan a day's diet for a 57 year old clerk for your choices.	**K5**

4.Mapping Scheme for the PO, PSOs and COs

Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO 1	PSO 2	PSO3	PO4
CO1	**M**	**H**	**H**	**M**	**H**	**L**	**L**	**L**	**H**	**H**	**H**	**M**	**M**
CO2	**H**	**H**	**H**	**H**	**M**	**M**	**M**	**-M**	**M**	**H**	**M**	**H**	**L**
CO3	**H**	**H**	**H**	**M**	**L**	**M**	**M**	**-M**	**M**	**H**	**H**	**M**	**L**
CO4	**M**	**H**	**H**	**H**	**M**	**M**	**M**	**M**	**M**	**H**	**H**	**M**	**L**
CO5	**M**	**H**	**H**	**H**	**M**	**L**	**H**	**M**	**M**	**L**	**H**	**H**	**M**
CO6	**H**	**H**	**H**	**H**	**M**	**M**	**H**	**L**	**L**	**H**	**M**	**M**	**L**
CO7	**H**	**H**	**H**	**H**	**H**	**H**	**M**	**H**	**L**	**M**	**H**	**M**	**M**

L-Low **M-Moderate** **H- High**

5.Course assessment methods

Direct

1. **Continuous Internal Assessment I ,II**
2. **Group discussion, Presentation, Assignment, Poster presentation, Case study**
3. **End Semester Examination**

Indirect

NAME OF THE COURSE COORDINATOR: MRS. C. ROSELIN

:

CORE IV PRACTICAL: NUTRITION THROUGH LIFECYCLE LAB

Semester: IV **Code: U17ND4P4**
Credits: 3 **Hours/Week: 45**

1.Course Outcomes:
After completion of this course the students will be able to

CO. No	Course Outcomes	Level	Unit Covered
CO1	Estimate the critical nutritional factors that contribute to healthy growth, development and functional capacity throughout life.	K4	I
CO2	Apply a variety of dietary assessment methods and describe the various measurements employed to monitor nutritional status at different life stages.	K3	I
CO3	Plan a nutritional requirement of women before and during pregnancy and lactation, discuss strategies to overcome nutrition-related problems.	K5	I
CO4	Integrate the physiological, cultural and behavioral factors that determine nutrition requirements from infancy to adulthood.	K5	I
CO5	Describe conditions associated with ageing and their nutritional implications, discuss successful dietary interventions to stabilize physiological decline and enhance physical and mental resilience.	K4	I
CO6	Support practical session equips one with the knowledge and skills to handle an emergency situation.	K5	I

2.A. Syllabus:

Menu planning

1. Planning, Preparing and serving a meal for

a. Expectant women
b. Lactating women

c. Infancy
d. Pre-School children
e. School going children
f. Adolescent
g. Adult
h. Old age person

3.SPECIFIC LEARNING OUTCOMES

Unit	Course Content	Learning Outcomes Blooms	Taxonomic levels of Transaction R, U, Ap, An E, C
I	Expectant women	**Consider the basic concepts of pregnancy**	**K4**
		Apply knowledge of the dietary habits of this period.	**K3**
		Support the growth of fetus and maintaining a healthy weight.	**K5**
		Plan and prepare balance diet getting enough nutrients.	**K5**
II	Lactating women	**Discuss the importance of breastfeeding .**	**K4**
		Effect of maternal dietary intake	**K4**
		Consider that modifying maternal diet.	**K4**
		Plan and prepare a healthy diet for lactating women.	**K5**
III	Infancy	**Compare the basic concepts of infancy.**	**K4**
		Support the dietary habits and monitoring the growth pattern	**K5**
		Plan a supplementary foods in infancy period	**K5**
IV	Preschool children	**Discuss knowledge of preschool children**	**K4**

		Analyze the food habits of this periods.	**K4**
		Plan a day's diet for preschool children	**K5**
V	School going children	**Explain the nutritional requirements of school going children**	**K4**
		Plan and prepare a diet for this periods	**K5**
VI	Adolescents	**Explain the growth pattern of adolescents**	**K4**
		Plan and prepare for a diet in this periods.	**K5**
VI	Adult and old age people	**Explain the body fluids and maintenance of this periods of lifespan**	**K4**
		Plan and prepare a model diet for this type of people.	**K5**

4.Mapping Scheme for the PO, PSOs and COs

L=Low M= Medium H= High

Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO 1	PSO 2	PSO3	PO4
CO1	**M**	**H**	**H**	**M**	**H**	**L**	**L**	**L**	**H**	**H**	**H**	**M**	**M**
CO2	**H**	**H**	**H**	**H**	**M**	**M**	**M**	**-M**	**M**	**H**	**M**	**H**	**L**
CO3	**H**	**H**	**H**	**M**	**L**	**M**	**M**	**-M**	**M**	**H**	**H**	**M**	**L**
CO4	**M**	**H**	**H**	**H**	**M**	**M**	**M**	**M**	**M**	**H**	**H**	**M**	**L**
CO5	**M**	**H**	**H**	**H**	**M**	**L**	**H**	**M**	**M**	**L**	**H**	**H**	**M**
Co6	**M**	**M**	**H**	**M**	**L**	**L**	**L**	**L**	**H**	**H**	**M**	**M**	**L**

5.Course assessment methods

Direct

1. **Continuous Internal Assessment I ,II**
2. **Group discussion, Presentation, Assignment, Poster presentation, Case study, Preparation of questionnaire, Assessment of Anthropometry**
3. **End Semester Examination**

Indirect

NAME OF THE COURSE COORDINATOR: MRS. C. ROSELIN

ALLIED: NUTRITIONAL BIOCHEMISTRY

Semester: IV **Code: U17ND4Y4**
Credits: 4 **Hours/Week: 60**

1.Course Outcomes:
After completion of this course the students will be able to

CO. No	Course Outcomes	Level	Unit Covered
CO1	Obtain an in-depth understanding on the functioning of cells.	K2	I
CO2	Correlate various metabolic pathways with thorough understanding of their interrelationship.	K4	I
CO3	Evaluate the effects of the essential amino acids and their role in carbohydrate metabolism and vitamin synthesis.	K5	II
CO4	Analyse the effect of metabolism on various disorders.	K4	I,II,III,IV,V
CO5	Interpret the role of nucleic acids and the role of DNA and RNA.	K5	IV
CO6	Interpret the fate of food in the body in both health and disease	K5	I,II,III,IV,V

2.A. Syllabus:

UNIT-I **12Hours**

Carbohydrate Metabolism

Definition, Classification of carbohydrates – Monosaccharide, Disaccharide and polysaccharide. Metabolism – glycolytic pathway, Electron transport chain, glycogenesis, Glycogenolysis and Gluconeogenesis.Disorder of carbohydrate metabolism-Diabetes mellitus – Definition, Types, Diagnosis and Complications

UNIT-II **12 Hours**

Protein metabolism

a) Definition, Classification of protein, Structure, Physical properties, Chemical properties, Amino acids- Essential and non- essential.

b)Inborn errors of aminoacid metabolism-Albuminuria, phenylketonuria, cystinuria and Maple syrup disease.

UNIT-III **12 Hours**

Lipid metabolism

a) Definition, Structure, Classification of lipids-Saturated, Unsaturated fatty acid, Bio Synthesis of fatty acid.

b) **Lipoproteins**: Types, composition, role and significance in diseases.

c) **Inborn errors of fat metabolism**-Wolman disease, Gaucher's disease and Niemannpick disease.

UNIT-IV **12 Hours**

Genetic & Liver Function Metabolism

a) Nucleic acids – Types, Composition, Functions, Replication and Transcription.

b) **Liver function test**- Functions of Liver, Tests based on metabolic functions, capacity for detoxification, enzymes, Bile Synthesis.

UNIT-V **12 Hours**

Basic Clinical Techniques:

a) Collection and preservation of blood and urine - Normal and abnormal constituents of urine and blood.

Renal Function Tests:

b) Insulin clearance test, urea clearance test, endogenous creatinine clearance, concentration test, addis test, mosenthal test, urea concentration test and dye test.

B. Topics for self-study

Sl. No.	Topics	Reference
1	Oligosaccharides in health and disease.	https://www.verywellfit.com/oligosaccharides-and-prebiotics-health-benefits-2242223
2	Branched Chain Amino Acids in energy production.	https://nutritionandmetabolism.biomedcentral.com/articles/10.1186/s12986-018-0271-1
3	EPA and DHA in health.	https://www.webmd.com/diet/features/what-to-know-about-omega-3s-and-fish#1
4	Common genetic aberrations.	https://www.medicinenet.com/genetic_disease/article.htm

C. TEXT BOOKS

1. AmbikaShanmugam, "Fundamentals of Biochemistry for Medical Students", Seventh Edition, New age publishing Pvt.Ltd., New Delhi, 1986.

2. Deb.A.C., "Fundamentals of Bio chemistry", 5th edition, New Central Book Agency(P) Ltd.,1992.

3. Sathyanarayana,U.,Chakrapani,U., "Textbook of Biochemistry". 3rd edition, Books and Allied (P) Ltd, Kolkata, , 2010.

D. REFERENCE BOOKS

1. West, E.S., Todd, W.R., Mason, H.S and Van Bruggen, J.T, "Text book of biochemistry", Amerind , 4th Edition, Publishing Co PvtLTd., 1974.

2. Devlin, T.M., "Text Book of Biochemistry (with Clinical corrections)", 2nd edition, John Wiley and sons, 1986.

3. Ramakrishnan,S.,Prassanan,K.G.,Rajan,R., "Text book of Medical Bio chemistry", 2nd edition, Orient Longman limited, 1989.

3.SPECIFIC LEARNING OUTCOMES (SLO)

Unit	Course Content	Learning Outcomes Blooms	Taxonomic levels of Transaction R, U, Ap, An E, C
1.1	**Carbohydrate Metabolism** Definition, Classification of carbohydrates – Monosaccharide, Disaccharide and polysaccharide.	Define Carbohydrates.	**K2**
		Classify different types of carbohydrates.	**K3**
1.2	Metabolism – glycolytic pathway, Electron transport chain,	Apply the knowledge obtained in understanding glycolytic pathway in production of energy.	**K3**
		Explain the electron transport chain in energy production.	**K4**
1.3	Glycogenesis, Glycogenolysis and Gluconeogenesis	Compare various pathways of metabolism and reach a satisfactory conclusion on energy production.	**K5**
		Explain the functions of Gluconeogenesis	**K4**
		Distinguish between the glycogenolysis and glycogenesis	**K5**

1.4	Disorder of carbohydrate metabolism-Diabetes mellitus – Definition, Types, Diagnosis and Complications	Explain the different disorders of carbohydrate metabolism.	**K4**
		Assess the complexity of carbohydrate metabolism and its role in causing diabetes mellitus.	**K4**
		Classify the types of diabetes mellitus	**K4**
		Discuss the Diagnosis and Complications of diabetes mellitus.	**K4**
	Course content in unit II		
2.1	**Protein metabolism** Definition, Classification of protein, Structure.	Define protein.	**K2**
		Classify the different proteins based on their structure.	**K3**
2.2	Physical properties, Chemical properties.	Discuss the physical and chemical properties of proteins.	**K4**
		Classify the chemical and physical properties of protein metabolism	**K4**
2.3	Amino acids- Essential and non-essential.	Apply the role of essential and nonessential amino acids with relevant to nutrition.	**K3**
		Analyze the functions of amino acids both essential and non essential amino acids.	**K4**
2.4	Inborn errors of aminoacid metabolism-Albuminuria, phenylketonuria, cystinuria and Maple syrup disease.	Discuss the various protein metabolic disorders with relevance to specific amino acids.	**K4**

		Explain the phenylketonuria, cystinuria and Maple syrup disease.	**K4**
		Describe the inborn errors metabolism	**K3**
	Course content in unit III		
	Lipid metabolism Definition, Structure, Classification of lipids-Saturated, Unsaturated fatty acid,	Define lipids.	**K2**
		Classify lipids with relevance to its structure and function.	**K3**
		Classify the various types of mono and poly unsaturated fatty acids.	**K3**
		Compare the mono, poly and omega 3 fatty acids.	**K4**
3.2	Bio Synthesis of fatty acid.	Analyze biosynthesis of fatty acid and the role of fatty acids in body functions.	**K4**
	Lipoproteins: Types, composition, role and significance in diseases.	Define lipoproteins.	**K2**
		Classify the different types of lipoproteins.	**K3**
		Evaluate the role of lipoproteins in health and disease.	**K5**
3.3	**Inborn errors of fat metabolism**- Wolman disease, Gaucher's disease and Niemannpick disease.	Analyze the various types of inborn errors of fat metabolism.	**K4**
		Compare Wolman disease and Gaucher's disease	**K4**

		Discuss the Niemannpick disease.	**K4**
	UNIT-IV		
	Genetic & Liver Function Metabolism Nucleic acids – Types, Composition, Functions	Define nucleic acids.	**K2**
		Classify the various nucleic acids.	**K3**
		Analyze the functions of nucleic acids.	**K4**
4.2	Replication and Transcription.	Compare the various processes of replication, transcription and translation and analyze their importance.	**K4**
4.3	**Liver function test**- Functions of Liver, Tests based on metabolic functions,	Explain the various functions of liver.	**K4**
		Assess the role of liver in health and disease.	**K4**
		Evaluate the various liver function tests in health and disease.	**K5**
		Demonstrate the tests based on metabolic functions of liver	**K5**
4.4	Capacity for detoxification, enzymes, Bile Synthesis	Evaluate the capacity of liver in detoxification.	**K5**
		Assess the role of liver in production of enzymes.	**K4**
		Discuss the process of synthesis of bile	**K4**
	Course content in unit V		

5.1	Collection and preservation of blood and urine - Normal and abnormal constituents of urine and blood.	Compare the normal and abnormal constituents of urine and blood.	**K4**
		Demonstrate the collection and preservation of blood and urine.	**K5**
5.2	**Renal Function Tests**: Insulin clearance test, urea clearance test, endogenous creatinine clearance, concentration test,	Discuss the various renal function tests.	**K4**
		Assess the results of various renal function tests in health and disease	**K5**
5.3	Addis test, Mosenthaltest, urea concentration test and dye test.	Discuss the various renal function tests.	**K4**
		Demonstrate the results of various renal function tests in health and disease.	**K5**

4.Mapping Scheme for the PO, PSOs and COs

L-Low M-Moderate H- High

Mapping	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PSO1**	**PSO2**	**PSO3**	**PSO4**
CO1	M	L	-	L	-	L	L	L	-	M	M	-	H
CO2	-	M	-	-	H	M	-	H	-	-	L	-	H
CO3	-	H	-	-	-	M	-	-	-	M	M	-	H
CO4	M	L	-	-	-	M	L	-	M	-	M	M	H
CO5	M	M	-	-	M	H	L	M	M	H	M	-	H
CO6	-	M	-	M	L	-	M	L	-	L	-	H	M

5.Course assessment methods

Direct

1. **Continuous Internal Assessment I ,II**
2. **Group discussion, Presentation, Assignment, Poster presentation, metabolic cycle representation**
3. **End Semester Examination**

Indirect

NAME OF THE COURSE COORDINATOR: MRS. K. MEERA

ALLIED PRACTICAL II: FOOD STANDARD AND QUALITY CONTROL AND NUTRITIONAL BIOCHEMISTRY PRACTICAL

Semester: III & IV **Code: U17NDYP2**
Credits: 2 **Hours/Week: 45**

1.Course Outcomes:
After completion of this course the students will be able to

CO. No	Course Outcomes	Level	Unit
CO1	Read label and identify various preservatives and additives present in foods.	K2	II
CO2	Perform simple techniques of identifying food adulterants.	K5	III
CO3	Evaluate foods subjectively.	K5	IV
CO4	Analyze presence of sugar and protein in urine.	K4	I
CO5	Estimate the quantity of glucose present in blood.	K5	I
CO6	Estimate the cholesterol content of blood.	K5	I

2.A. Syllabus:

Qualitative Analysis of urine and blood.

1. Quantitative analysis of Urine sugar, protein, Bile pigments, Bile Salts
2. Estimation of Glucose in Urine(Benedict's Method)
3. Estimation of Urea in Urine (DAM Method)
4. Estimation of Blood Glucose (Folin-WU Method)
5. Estimation of Blood Urea (DAM Method)
6. Estimation of serum cholesterol (Zak's Method)

II FOOD STANDARDAND QUALITY CONTROL PRACTICAL

Display the standard food products available in the market.

III Food Adulterants

Physical and chemical method of identifying common food adulterants.

IV SE Common foods:

Sensory Evaluation of common foods by using five point Hedonic scale.

B. References :

1. InteazAlli., “Food Quality Assurances, Principles and Practices”, CRC press, India.

2. Margaret M.C. Williams, “Food Fundamentals”, John Wiley and Sons,London,1974.

3. SPECIFIC LEARNING OUTCOMES (SLO)

S.No	Syllabus	Learning outcomes	Blooms taxonomy
1	Qualititative analysis of Urine sugar, protein, Bile pigments, Bile Salts	Analyze urine qualitatively for sugar, proein, bile pigments and bile salts.	K4
2.	Estimation of Glucose in Urine(Benedict's Method)	Estimate the quantity of blood sugar in urine.	K5
3	Estimation of Urea in Urine (DAM Method)	Estimate the quantity of urea present in urine.	K5
4	Estimation of Blood Glucose (Folin-WU Method)	Assess the quantity of blood glucose.	K5
5	Estimation of Blood Urea (DAM Method)	Estimate blood urea.	K5
6.	Estimation of serum cholesterol (Zak's Method)	Demonstrate the quantity of cholesterol present in serum.	K5
	Food Standards and Quality Control		
7	**II FOOD STANDARDAND QUALITY CONTROL PRACTICAL**		
	Display the standard food products available in the market.	Identify and read the various components of a label.	K2
		Compare the various additives present in foods.	K4
8	**IIIFood Adulterants**		
	Physical and chemical method of identifying common food adulterants.	Identify the various adulterants present in common foods.	K2

		Analyze the food adulterants in common foods.	K4
		Demonstrate simple techniques to identify food adulterants	K5
	IV SE Common foods:		
	Sensory Evaluation of common foods by using five point Hedonic scale.	Analyze common foods using sensory evaluation for the sensory attributes.	K4
		Classify the different Hedonic scale	K4

4.Mapping Scheme for the PO, PSOs and COs

L-Low M-Moderate H- High

Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4
CO1	M	L	-	L	-	L	L	L	-	M	M	-	H
CO2	-	M	-	-	H	M	-	H	-	-	L	-	H
CO3	-	H	-	-	-	M	-	-	-	M	M	-	H
CO4	M	L	-	-	-	M	L	-	M	-	M	M	H
CO5	M	M	-	-	M	H	L	M	M	H	M	-	H
CO6	-	M	-	M	L	-	M	L	-	L	-	H	M

5.Course assessment methods

Direct

1. **Continuous Internal Assessment I ,II**
2. **Laboratory Practices**
3. **End Semester Examination**

Indirect

NAME OF THE COURSE COORDINATOR: MRS. K. MEERA

NMEC -II : DIET IN HEALTH AND DISEASE

Semester: IV **Code: U17ND4E2**

Credits: 2 **Hours/Week: 30**

1.Course Outcomes:

After completion of this course the students will be able to

CO. No	Course Outcomes	Level	Unit
CO1	Identify the essentials of food constituents and its important functions in our body.	K2	I
CO2	Explain the role of diet for persons with fever, obesity, underweight and anemia.	K4	II
CO3	Compare the effect of healthy food and physical activity on human body.	K4	III
CO4	Interpret the results of unhealthy lifestyle and inheritance of genes.	K4	IV
CO5	Discuss the nutritional requirements during different diseases and disorders.	K4	IV
CO6	Analyze the nutritional deficiencies and other risk factors associated with various nutritional problems and its dietary management.	K4	V

2.A.Syllabus:

Unit-I **6 Hours**

Nutrition and nutrients:

Food - definition ,classification of food, basic five food groups classification of nutrients, RDA-reference man and women, factors influencing RDA.
Macronutrients and micronutrients.

UNITII **6 Hours**

Diet in Fever

a. Causes, Types, general Dietary consideration
b. Typhoid, Influenza, Malaria and Tuberculosis
c. Diet in Obesity and underweight.
d. Nutritional Anaemia – prevalence, causes, Types, iron deficiency anaemia and Prevention of anaemia.

UNIY – III **6 Hours**

Diet in Cardio vasculardisease

a. Prevalence, clinical effects
b. Risk factors, Role of fat in the development of atherosclerosis
c. Hypertension
d. Dietary management
e. physical activity and Heart diseases

UNIT IV **6 Hours**

Diet in Diabetes Mellitus

a. Prevalence, Types, etiology and symptoms
b. Diagnosis, treatment and Complication
c. Dietary management

Diet in diseases of the Kidney

a. Functions of kidney
b. Symptoms, Chronic and acute renal failure and urinary Calculi
c. Principles of Dietary Management

UNIT V **6 Hours**

Diet in Cancer

a. Risk factors and Symptoms
b. Nutritional problems of Cancer therapy
c. Nutritional requirements
d. Role of food in the prevention of cancer.

B. Topics for self-study:

Sl. No.	Topics	Reference
1	Role of fiber in health and disease.	https://www.mayoclinic.org/healthy-lifestyle/nutrition-and-healthy-eating/in-depth/fiber/art-20043983
2	Common immunity boosters which help in viral infections .	https://www.onhealth.com/content/1/immune_system_boosting_foods
3	Prevention of diabetes and heart disease through lifestyle modification.	https://www.health.harvard.edu/newsletter_article/Lifestyle_prevention_Does_it_work_And_why

4	Harmful preservatives found in junk food.	https://www.icicilombard.com/blog/health-insurance/hi/5-harmful-effects-of-junk-food

C. References:

1. Antia P. "Clinical Dietetics and Nutrition",2nd edition,Oxford University Press.

2. Garrow J.S, James W.P.T, Ralph A, (2000), "Human Nutrition and Dietetics",10th edition, Churchill Livingston,London.

3. Srilakshmi B, "Dietetics", 7th Edition, New Age International, New Delhi, (2016).

3.SPECIFIC LEARNING OUTCOMES (SLO)

S.No	Syllabus	Learning outcomes	Blooms taxonomy
UNIT I	**Nutrition and nutrients:**		
1.1	Food - definition ,classification of food, basic five food groups classification of nutrients, Macronutrients and micronutrients.	definition of food, balanced diet, nutrition and nutrients.	**K2**
		Classify foods and nutrients based on its functions.	**K3**
		Discus the basic five groups	**K4**
		Explain macoro and micro nutrients	**K2**
1.2	RDA- reference man and women, factors influencing RDA.	Define reference man and woman.	**K2**
		Analyse the requirement of men and women by knowing their both internal and external parameters. •	**K4**
		Explain the methods used for deriving RDA	**K2**
II			
2.1	**Diet in Fever** a. Causes, Types, general Dietary consideration b. Typhoid, Influenza, Malaria and Tuberculosis	Explain the types of fevers, causes and general dietary consideration.	**K2**

		Summarize every type of fevers, its incubation period and the symptoms.	**K2**
2.2	Diet in Obesity and underweight.	Interpret the factors associated with obesity and overweight.	**K4**
		Plan a diet for obesity and overweight.	**K5**
2.3	Nutritional Anemia – prevalence, causes, Types, iron deficiency anaemia and Prevention of anaemia.	Explain the types of anaemia, prevalence and causes.	**K2**
		Plan a diet for treating and preventing from nutritional anemia.	**K5**
III	**Diet in Cardio vasculardisease**		
	a. Prevalence, clinical effects b. Risk factors, Role of fat in the development of atherosclerosis c. Hypertension d. Dietary management e. physical activity and Heart diseases	• Define cardiovascular diseases.	**K2**
		Explain the role of fat and other factors associated with the development of cardiovascular diseases.	**K2**
		Discuss hypertension	**K4**
		Develop dietary management and good physical activity to prevent from cardiovascular diseases.	**K5**
IV	**Diet in Diabetes Mellitus**		
4.1	a. Prevalence, Types, etiology and symptoms b. Diagnosis, treatment and Complication c. Dietary management	Define Diabetes mellitus.	**K2**
		Explain prevalence, types, causes, symptoms of Diabetes mellitus.	**K2**
		Analyse the factors behind	**K4**

		Diabetes mellitus and plan a dietary management.	
		Discuss the dietary management of diabetes mellitus	**K2**
4.2	**Diet in diseases of the Kidney** a. Functions of kidney b. Symptoms, Chronic and acute renal failure and urinary Calculi c. Principles of Dietary Management	Assess the functions of kidney and the diseases of kidney.	**K4**
		Explain the causes and symptoms of kidney diseases.	**K2**
		Plan a model diet for kidney diseases.	**K5**
V	**Diet in Cancer**		
	a. Risk factors and Symptoms b. Nutritional problems of Cancer therapy c. Nutritional requirements d. Role of food in the prevention of cancer.	Define cancer and its types.	**K2**
		Explain the symptoms, causes of cancer and the consequences of cancer therapy.	**K2**
		Analyse the nutritional requirement of cancer patients by knowing various factors associated with cancer risk and solve.	**K4**

4.Mapping scheme for the POs PSOs and COs

Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4
CO1	H	-	M	L	-	-	-	-	M	M	M	M	-
CO2	-	H	M	H	-	-	M	H	H	H	H	H	-
CO3	H	-	L	H	L	-	L	-	-	-	M	-	-
CO4	-	M	M	M	L	-	L	-	-	-	M	-	-
CO5	L	-	M	H	H	L	M	L	H	M	H	H	-
CO6	M	M	M	H	H	L	M	H	H	M	H	H	-

5.Course assessment methods

Direct

1. **Continuous Internal Assessment I ,II**
2. **Group discussion, Presentation, Assignment, Poster presentation, Case study, Preparation of questionnaire, Assessment of Anthropometry**
3. **End Semester Examination**

Indirect

NAME OF THE COURSE COORDINATOR: MS. K. MAHESWARI

CORE V : DIETETICS- I

Semester: V **Code: U17ND505**

Credits: 5 **Hours/Week: 90**

1.Course Outcomes:

After completion of this course the students will be able to

CO. No	Course Outcomes	Level	Unit
CO1	comprehend the concept, purpose and principles of diet therapy and role and types of dietitians.	K4	I
CO2	Explain in-depth knowledge in the running of a dietary department in a hospital.	K3	I
CO3	Identify and solve problems by thinking critically and integrating scientific information and research into practice.	K3	II
CO4	Develop and deliver appropriate information, products, and services to individuals, groups, and populations.	K5	III
CO5	Evaluate the role of various feeding techniques and identify the appropriate technique needed for a specific patient and discuss the role of various nutraceuticals as a dietary supplement.	K5	V
CO6	Formulate etiological factors and complications, assessment parameters and dietary modifications in management of weight and the dietetic treatment for diseases of digestive system.	K5	IV

2.A.SYLLABUS

UNIT – I **(18hours)**

Basic Concepts about Dietetics

a. Definition of dietetics, dietitian, goals of diet therapy.
b. Types of dietitian, role and responsibilities of dietitians, qualifications, qualities and professional ethics, code of conduct.

c. Therapeutic adaptations of normal diet, Routine hospital diets –Regular, soft, full fluid, clear fluid diet.
d. Specially modified therapeutic diets, High calorie, low calorie, high and low protein, bland, high and low residue diets.

UNIT- II **(18hours)**

Special feeding methods

a. Enteral nutrition – methods – nasogastric, gastrostomy and jejunostomy. Types of food, infusion techniques, TPN – Types of infusion, TPN formula for adults.
b. Dietary modification, diet planning and preventive measures for – PEM, iron deficiency anaemia and Vitamin A deficiency.
c. Causes, risk factors, pathogenesis, dietary modifications, diet planning and counseling measures for febrile conditions – fevers of long duration and short duration.

UNIT- III **(18hours)**

Malnutrition

a. Causes, risk factors, pathogenesis, dietary modifications, diet planning and counseling measures for overweight.
b. Causes, risk factors, pathogenesis, dietary modifications, diet planning and counseling for underweight.
c. Anorexia nervosa and Bulemia.

UNIT IV **(18hours)**

Diseases of the gastrointestinal tract

Diseases of upper-gastrointestinal tract: Causes, pathogenesis, dietary modification and dietplanning for:

(i) GERD
(ii) Gastritis
(iii)Peptic ulcer

Diseases of lower-intestinal tract: Causes, pathogenesis, dietary modification and diet planning for:

(i) Diarrhea, dysentery
(ii) Constipation.
(iii)Haemorrhoids.
(iv)Surgery of colon – gastrostomy, jejunostomy.
(v) Cancer of colon.

UNIT V **(18hours)**

Nutraceuticals& Dietary counselling

(i) Nutraceuticals – Definition, types, use of nutraceuticals in the prevention and treatment of – obesity, Diabetes, CVD and Cancer.

(ii) Functional foods .

B.Topics for self-study:

Sl. No.	Topics	Reference
1	Type of feeding in pre-term neonates.	https://www.who.int/elena/titles/feeding_vlbw_infants/en/
2	Different type of feeding techniques in bariatric surgery.	https://www.mayoclinic.org/tests-procedures/gastric-bypass-surgery/in-depth/gastric-bypass-diet/art-20048472

3	Traditional functional foods in preventing viral infections.	https://encyclopedia.pub/item/revision/1c614cb88c258b6b3e8e24d193f76d33

C. Text Books:

1. Srilakshmi, B. " Dietetics", 7th Edition, New Age International P. Ltd., New Delhi, 2016.
2. "Dietary Guidelines of Indians" – A Manual, National Institute of Nutrition, Hyderabad, 2011.
3. Garg, M. ,"Diet, Nutrition and Health", ABD Publishers, 2006.
4. Corinne H.Robinson, M.R.Lawber, W.L.Chenoweth and A.E.Garwick, "Normal and Therapeutic Nutrition",MacMillan Publishing CO, New York, 1982

D. Reference Books:

1. Krause, M.V. and Mahan, L.K. "Food, Nutrition and Diet Therapy", 14th Edition W.B. Saunders Company, Philadelphia, 2009.
2. MaimunNisha, "Diet Planning for Diseases", Kalpaz Publishers, 2006.

3.SPECIFIC LEARNING OUTCOMES (SLO)

Unit	Course Content	Learning Outcomes	Blooms taxonomy (K1, K2, K3,K4,K5,K6)
I	**Basic Concepts about Dietetics**	Classify various type of dietitian [commercial and non commercial]	**K4**
1.1	Definition of dietetics, dietitian, goals of diet therapy.	**Identify the nutrition related problems and determine and evaluate nutrition interventions.**	**K1**
		Apply the critical thinking skills of therapeutic fields.	**K3**
		Discuss change of dietary habits of an individual or populations.	**K2**
1.2	Types of dietitian, role and responsibilities of dietitians, qualifications, qualities and	Assess the role of dietetics in human well-being, in relation to the needs, resources, and potentials of individuals, groups, and families	K6

	professional ethics, code of conduct.	Analyse a code of ethics to guiding the dietetic profession.	K4
		Outline commitments and obligations of the dietetic practitioner to self, client, society and the profession.	K3
1.3	Therapeutic adaptations of normal diet, Routine hospital diets – Regular, soft, full fluid, clear fluid diet.	Explain the nutrition concepts to evaluate and improve the nutritional health of individual with medical conditions.	K5
		Develop knowledge on hospital diets , concepts and practice to critically analyze the situations in the therapeutic fields.	K3
		Discuss the length of hospitalization and tolerance to oral feeding .	K6
		Compare soft and liquid diet for individual needs.	K5
1.4	Specially modified therapeutic diets, High calorie, low calorie, high and low protein, bland, high and low residue diets.	Describe the various nutrients and modified it for different conditions.	K3
		Explain the specific nutrient concerns of individuals.	K2
		Classify the various specialized hospital diets for therapeutic conditions.	K4
		Compare the low and high protein diet, bland, low and high carbohydrates diet and low residue diet.	K5
II	**Special feeding methods**		
2.1	Enteral nutrition – methods – nasogastric, gastrostomy and jejunostomy.	Discuss nutritional status of the patients and determine the most appropriate form of the nutrition support required for enteral feeding.	K6
		Explain the merits and demerits of different types of feeding methods.	K5

		Classify the various types of feeding methods such as nasogastric, gastrostomy and jejunostomy.	K5
2.2	Types of food, infusion techniques, TPN – Types of infusion, TPN formula for adults.	Design a suitable parenteral nutrition formulation for a patients and monitor nutrition support for potential metabolic , infections, and recommended TPN formula adjustments to better meet nutritional needs or to prevent adverse effects.	K6
		Classify the golden rules and regulations for TPN and PPN formulas.	K5
		Relate the techniques involved in the formation of parenteral nutrition.	K4
		Analyse the nutritional management of TPN and PPN.	K 4
2.2	Dietary modification, diet planning and preventive measures for – PEM, iron deficiency anaemia and Vitamin A deficiency.	Analyze the nutrient needs into menus for individuals and groups .	K4
		Describe the concepts, factors associated with PEM.	K3
		Classify the a virous types of anemia (Megloplastyanemia , Pernicious anemia's and Iron defeiciencyanaemia)	K4
		Plan a days menu for iron deficiency anemia.	K6
		Analyze the impact of vitamin A deficiency on child health, blindness and othercomplications.	K4
2.3	Causes, risk factors, pathogenesis, dietary modifications, diet planning and counseling measures for febrile conditions – fevers of long duration and short duration.	Classify the concepts of pathogenesis ,dietary modifications in planning a diet for febrile conditions. .	K5
		Compare the different etiologies factors, signs, symptoms of fever and planning a diet for febrile	K4

		conditions like fever	
		Apply the nutritional components of different types of fever such as chronic and acute .	K3
		Plan a diet for chronic fever condition and prepare a recommended value for energy and protein.	K6
UNIT- III	**Malnutrition**		
3.1	**Diseases of the gastrointestinal tract** Diseases of upper-gastrointestinal tract: Causes, pathogenesis, dietary modification and dietplanning for: (iv)GERD (v) Gastritis (vi)Peptic ulcer	Identify the main mechanism by which structure and functions of the gastrointestinal system is disturbed during disease process and describe the scientific bases of disease that result.	K2
		Analyze the problems during GI tract and its causes, pathogenesis and its effect of dietary modifications.	K4
		Develop expertise in the management of patients with upper gastro intestinal tract problems like peptic ulcer.gastritis and Ulcerative colitis	K3
		Plan the dietary modifications for low residue diet, and high protein diet and low carbohydrate diet.	K6
3.2	Diseases of lower-intestinal tract: Causes, pathogenesis, dietary modification and diet planning for: (vi)Diarrhea, dysentery (vii) Constipation. (viii) Haemorrhoids. (ix)Surgery of colon – gastrostomy, jejunostomy. Cancer of colon.	Discuss the anatomy, physiology of organs, structure related to GI tract.	K6
		Explain the pathophysiology of inflammation, relation to acute and chronic diarrhea, dysentery and constipation.	K5

		Classify the condition of hemorrhagic from non-hemorrhagic abdominal dysfunction.	K5
		Compare the different types of cancer cells and describe the nutritional requirements , Dietary management of colon cancer.	K5
		Analyze the nutritional problems of cancer like problems related to surgical treatment, problems related to Radiotherapy and problems related to chemotherapy.	K4
		Plan and prepare the feed formula of gastrostomy and jejuostomypatients	K6
IV	**Diabetes Mellitus& Kidney disease:**		
4.1	a) Types –IDM, NIDM, GDM .	**Classify type 1 and type 2 diabetes mellitus.**	K5
		Discuss complications in diabetes mellitus	K6
		Importance of diabetic diet and dietary modification.	K5
		Compare hyper glycaemia and hypoglycaemia.	K5
		Combine gestational diabetes mellitus and the hormonal role.	K5
4.2	b) Pathogenesis,Symptoms, Causes, Diagnostic tests, Complications.	**Explain the causes, symptoms, risk factors, pathological condition and complications of diabetes**	K2
		Explain various diagnostics methods for diabetes mellitus.	K2

		Determine the insulin resistance, glycaemic load, ketoacidosis and aspartame,	K5
		Evaluate the clinical symptoms and diagnosis of diabetes.	K5
4.3	c) Dietary modification and diet planning of the disease	**Discuss the dietary supplements used in diabetes mellitus.**	K5
		Plan a diet for diabetic patients.	K6
		Formulate the points consider to dietary modification of planning a diabetes mellitus.	K6
4.4	Pathogenesis ,Symptoms, causes, Nutritional modification, diet planning and dialysis for kidney disease a) Nephritis b) Nephrosis c) Urinary Calculi d) Renal failure – acute andchronic renal failure.	**Discuss factors that contribute to the pathogenesis, as well as the symptoms, risks, and outcomes associated with CKD (chronic kidney disease)**	K5
		List the acid ash diets and foods to be included and avoided for urinary calculi.	K3
		Discuss the factors contributing to oxalate stones.	K5
		Importance of dietary modification in chronic renal failure.	K5
		Distinguish between nephritis and nephrosis.	K4
		Explain renal transplantation	K2
		Explain the dietary modifications for treatment of glomerulonephritis.	K2
		Classify the different types of dialysis.	K5
		Formulate the dietary supplements for renal failure patients.	K6
UNIT V	**Nutraceuticals& Functional foods** **(i) Nutraceuticals –** Definition, types, use of nutraceuticals in the prevention and treatment of – obesity, Diabetes, CVD and Cancer. (ii) Functional foods .	Classify nutrceuticals and functional foods , dietary supplements	K5

		Identification of neutraceuticals in prevention or cure various diseases.	K3
		Discuss free radical in the body and their effects and.	K6
		Identify different dietary fibres and complex carbohydrates as functional food ingredients for scavenging free radicals	K3
		Explain the role of natural and synthetic antioxidents, functional foods in prevention of chronic diseases.	K2
		Analyze the effects of processing, storage, environmental factors and regulatory aspects for maintaining quality of nutraceuticals and functional foods.	K4
		Discuss the diet plan for prebiotic foods and its treated with CVD, Obesity and cancer.	K6

4.Mapping Scheme for the PO, PSOs and COs

Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO 1	PSO 2	PSO3	PO4
CO1	**H**	**H**	**H**	**H**	**H**	**L**	**M**	**L**	**M**	**H**	**H**	**H**	**M**
CO2	**H**	**H**	**H**	**H**	**H**	**M**	**H**	**L**	**L**	**H**	**H**	**L**	**L**
CO3	**H**	**H**	**H**	**H**	**H**	**H**	**H**	**M**	**M**	**M**	**H**	**M**	**M**
CO4	**M**	**M**	**H**	**H**	**H**	**H**	**M**	**M**	**L**	**H**	**H**	**M**	**L**
CO5	**L**	**M**	**M**	**M**	**M**	**M**	**M**	**M**	**M**	**M**	**H**	**L**	**M**
CO6	**M**	**M**	**M**	**M**	**M**	**M**	**M**	**L**	**L**	**H**	**M**	**M**	**M**

L-Low **M-Moderate** **H- High**

5.Course assessment methods

Direct

1. **Continuous Internal Assessment I ,II**
2. **Group discussion, Presentation, Assignment, Poster presentation**
3. **End Semester Examination**

Indirect

NAME OF THE COURSE COORDINATOR: MRS. C. ROSELIN

CORE VI : COMMUNITY NUTRITION

Semester: V **Code: U17ND506**

Credits: 5 **Hours/Week: 90**

1.Course Outcomes:

After completion of this course the students will be able to

CO. No	Course Outcomes	Level	Unit Covered
CO1	Develop ideas to improve health and nutrition in the community.	K4	I
CO2	Predict the reasons for malnutrition and improve the health status of affected individuals.	K5	II
CO3	Summarize the role of different National and International organizations for the welfare of individuals.	K5	IV
CO4	Explain prophylaxis programmes, a Solution to nutrition crisis using nutrition education.	K4	IV
CO5	Evaluate the relationship between malnutrition and national disasters and other environmental factors to create awareness using nutrition education.	K5	V
CO6	Assess the nutritional status of the individuals using various assessment methods.	K5	III

2.A. SYLLABUS

UNIT-I **(15hours)**

Malnutrition

Nutrition and healthin National Development: Malnutrition - Etiology , symptoms, Under nutrition and Over nutrition, Prevalence of malnutrition, balance between food and population growth.

UNIT-II

Macro and Micro Nutrient Deficiency **(18hours)**

Nutritional problems confronting our country - PEM - classification - Kwashiorkar and Marasmus - etiology, symptoms, pathological changes, biochemical changes, Anaemia- etiology, symptoms, prophylaxis Prevalence programmes.

UNIT-III **(21hours)**

Nutritional Assessment

Methods of assessment of Nutritional status - sampling, Direct assessment - Diet survey, anthropometry, clinical and biochemical estimation. Indirect assessment - Food balance sheet, Agricultural data, Ecological parameter and vital statistics, use of growth chart.

UNIT-IV **(18hours)**

Nutritional Programme

Role of National and International organizations - ICDS, Noon Meal Programme, FAO, WHO, UNICEF, CARE, ICMR, ICAR, CSIR, NIN, CFTRI, National Nutrition Policy, NGO.

UNIT-V **(18hours)**

Nutrition Education& Intervention programme:

Nutrition Education - Meaning, Scope, Methods - Planning, conduct of evaluation of Nutrition education Programme.

B. Topics for self-study:

Sl. No.	Topics	Reference
1	Incidence of vitamin B-complex deficiency in malnourished children.	http://www.theprofesional.com/index.php/tpmj/article/download/3937/3041/
2	Food security and national development.	http://www.fao.org/sustainable-development-goals/overview/fao-and-the-post-2015-development-agenda/food-security-and-the-right-to-food/en/
3	New nutritional policies implemented recently (after 2018).	https://niti.gov.in/writereaddata/files/document_publication/Nutrition_Strategy_Booklet.pdf
4	Public distribution system.	https://economictimes.indiatimes.com/definition/Public-distribution-system

C. TEXT BOOKS

1. A Lesties Banks and Hislop J.A., “Health and Hygiene”,Universal Tutorial Press, London, 1987.

2. SenhaH.K,“Challenges in Rural Development”I Discovery publishing,1996.

3. “Food consumption and planning” - Vol V, International encyclopedia,1998

D. REFERENCE

1. Willium Hobson., “Theory and practice of public Health”, Oxford University press, London,2001

2. Sabarwal B, “Applied Nutrition and Health Education”, Common wealth publishers, New Delhi,2003

3. Barbara Hernandez.,McGraw Hill., “Foundations of Community Health Education, London,1999

4. P.K. Shukla, “Nutritional Problems of India”, Prentice Hall, India,2001

3.SPECIFIC LEARNING OUTCOMES (SLO)

UNIT	Course content	Learning outcomes	Blooms Taxonomic levels (K1, K2, K3, K4, K5,K6)
	UNIT-I Malnutrition		
I	Nutrition and health in national development Malnutrition- etiology, symptoms, under nutrition and over nutrition, prevalence of malnutrition Balance between food and population growth	Explain nutrition and health in national development.	K2
		List out the symptoms , causes and risk factors of malnutrition	
		Discuss the national development of health and nutrition	K4
		Classify the different types of malnutrition.	K3
		Classify the reasons for malnutrition and compare the prevalence of malnutrition.	K3
		Find out the population rate and average food production	K3
		Assess the population growth and food security	K4
		Explain the prevalence of malnutrition in INDIA	K2
		Analyze the food and population growth of growth.	K4
	Unit II Macro and Micro Nutrient Deficiency		
II	Nutritional problems confronting our country-PEM-classification-Kwashiorkar and Marasmus	Classify PEM	K4
		summarize the etiology and symptoms of protein energy malnutrition	K5
	Etiology, symptoms, pathological changes, biochemical changes	Examine the pathological and biochemical changes occur in PEM	.k4
	Anemia- etiology, symptoms	Explain the causes and symptoms with different types of anemia	K2
	Prophylaxis prevalence programmes	Discuss the prophylaxis programmes for various diseases.	K4
		Summarize the prevalence programmes in India	K5
	UNIT-III Nutritional Assessment		
III	Methods of assessment of nutritional status-sampling	Explain the sampling methods for the assessment of nutritional status.	K2
		Assess the nutritional status of the human being.	K4

		Classify the various methods used for collecting the nutritional status	K4
	Direct assessment-Diet survey, anthropometry, clinical and biochemical estimation	Analyze the at risk groups through direct assessment method	K4
		Classify the various methods used for assess the nutritional status.	K4
		Distinguish between A,B,C and D methods of assessment	K5
		Compare the diet survey and anthropometry assessment	K5
		Discuss the clinical and biochemical method of assessment.	K4
	Indirect assessment-Food balance sheet, agricultural data, ecological parameter, vital health statistics, use of growth chart.	Analyze the relationship between nutritional status of the individuals and various parameters.	K4
		Classify the direct and indirect methods of assessment.	K4
		Differentiate between balance sheet and growth chart.	K5
	Unit IV NutritionalProgramme		
IV	Role of national organizations- ICDS, Noon Meal Programme, ICMR, ICAR, CSIR, NIN, CFTRI, National Nutrition Policy,NGO	Explain the functions of national organizations	.K2
		List out the role of national organizations	
		Categorize the various national programmes in health related .	K4
		Apply the knowledge of ICMR, NIN	K3
		Discuss the role of CFTRI in health related programmes.	K4
		Explain the role and functions of National nutrition policy.	K2
	Role of International organizations- FAO, WHO, UNICEF, CARE	Explain the functions of international organizations.	K2
		Compare the WHO & UNICEF and their role and functions	K4
		Categorize the FAO and CARE of the programmes.	K5
	UNIT-V Nutrition Education & Intervention programme		
	Nutrition education-Meaning, Scope, Methods	Analyze the methods and scope of nutrition education.	K4

V		Discuss the various methods used for nutrition education	K4
	Planning, conduct of evaluation of Nutrition education programme	Plan and conduct of nutrition education programme and discuss the impact of nutrition education programme	K5
		Compare the nutrition education and nutrition assessment mehods.	K5

4.Mapping scheme for the POs PSOs and COs

Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4
CO1	M	H	H	H	-	L	-	M	H	H	H	M	-
CO2	H	-	H	H	M	M	H	H	H	H	H	L	M
CO3	-	H	-	-	M	H	L	L	-	-	-	-	-
CO4	M	H	H	H	-	H	M	H	H	M	-	H	L
CO5	-	-	M	H	H	H	H	H	-	M	-	L	L
CO6	L	L	-	M	H	-	-	L	-	-	L	-	-

L- LOW M-MEDIUM H-HIGH

5.Course assessment methods

Direct

1. **Continuous Internal Assessment I ,II**
2. **Group discussion, Presentation, Assignment, Poster presentation**
3. **End Semester Examination**

Indirect

NAME OF THE COURSE COORDINATOR: MS. K. MAHESWARI

PRACTICAL -CORE: DIETETICS- I LAB

Semester: V **Code: U17ND5P5**

Credits: 3 **Hours/Week: 60**

1.Course Outcomes:

After completion of this course the students will be able to

CO. No	Course Outcomes	Level	Unit
CO1	Analyze the epidemiology of various diseases and plan diet accordingly.	K4	I
CO2	Evaluate the need of each and every patient and plan diet according to their individual needs.	K5	I
CO3	Plan and execute a diet for various disease conditions.	K6	I
CO4	Acquire practical knowledge in hospitals by attending dietary internship.	K5	I
CO5	Equip themselves in the field of dietetics and to approach different patients.	K6	I
CO6	Develop the managerial skills in preparation of diet and supervision both professionally and personally.	K6	I

2.A.SYLLABUS

1.Planning,Nutritive value calculation and preparation of Various Diets

a. Clearfluid diet, full fluid diet and soft diet.

b. Low and medium cost diet for protein calorie malnutrition,

c. Fevers

d. Diet for Vitamin A deficiency and iron deficiency anaemia

e. diet for Obese and underweight conditions.

f. Diet for Peptic ulcer, diarrhoea and constipation.

g. Diet for Surgery and burns.

B. References:

1. Garg.M. Diet, "Nutrition and Health", ABD Publishers,2006.

2. NIN.,"Dietary Guidelines of Indians- A Manual", National Institute of Nutrition, Hyderabad,2011.

3.SPECIFIC LEARNING OUTCOMES

Unit	Course Content	Learning Outcomes	Blooms Taxonomic levels of Transaction
	Basic Concepts about Dietetics		
I	Clearfluid diet, full fluid diet and soft diet.	Analyze theroutine hospital diets and its effect on improving the condition of the patient.	**K4**
		Explain the role of diet therapy and how it plays a key role in assisting and supporting the patient recovery process.	**K5**
		Plan a day's diet for clear .full liquid diet and soft diet for therapeutic conditions.	**K6**
II	Low and medium cost diet for protein calorie malnutrition.	Analyze the preventive measures on protein energy malnutrition.	K4
		Demonstrate how a nutrition assessment can decreases the incidence of malnutrition.	K3
		Plan a menu for special feeding methods such as Low and medium cost diet	K6
		Plan a diet to improve the nutritional status of the PEM affected individuals.	K6
III	Fevers	Compare the clinical and biochemical effects of different types of fever.	K5
		Plan and prepare appropriate diets for acute and chronic fever	K6.

IV	Diet for Vitamin A deficiency and iron deficiency anaemia	Analyze the knowledge obtained in preparing diet rich in vitamin.	K4
		Analyze the clinical findings and supplement appropriately iron rich foods.	K4
		Plan a different diet for Vitamin A deficiency and iron deficiency anaemia	K6
V	Diet for Obese and underweight conditions	Compare the weight of the patients with normal person and enhance the diet based on RDA.	K5
		Analyze the predisposing factors, lifestyle and diet of the patients and plan and execute a diet based on BMI.	K4
VI	Diet for Peptic ulcer, diarrhea and constipation.	Apply the knowledge acquired on the working of gastrointestinal tract ,plan diet for peptic ulcer	K3
		Analyze the importance of electrolyte and water	K5
		plan healthy diet for diaarhea	K6
		Plan a high fiber diet for constipation.	K6
VII	Diet for burns.	Plan a protein rich diet for various degree of burns affected patients	K6

Mapping	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PSO1**	**PSO2**	**PSO3**	**PSO4**

4.Mapping scheme for the POs PSOs and Cos

CO1	L	L	M	H	H	M	H	H	L	H	H	H	L
CO2	M	M	M	H	H	M	H	H	L	H	H	H	L
CO3	M	H	H	H	M	H	M	H	M	H	H	H	L
CO4	-	M	L	L	L	-	-	M	L	M	M	H	-
CO5	L	H	L	H	L	-	-	M	M	M	M	M	-
CO6	H	H	L	H	L	M	-	H	-	L	-	-	H

L- LOW M-MEDIUM H-HIGH

5.Course assessment methods

Direct

1. **Continuous Internal Assessment I ,II**
2. **Group discussion, Presentation, Assignment, Poster presentation, Case study**
3. **End Semester Examination**

Indirect

NAME OF THE COURSE COORDINATOR: MRS. C. ROSELIN

Elective I: FOOD PRESERVATION

Semester: V **Code: U17ND5;1**

Credits: 4 **Hours/Week: 75**

1.Course Outcomes:

After completion of this course the students will be able to

CO. No	Course Outcomes	Level	Unit
CO1	Extend the knowledge in preservation, needs and in their principles.	K2	I
CO2	Utilize various food additives and techniques in surplus foods during season to avoid wastage.	K3	II
CO3	Compare and contrast the ancient and modern techniques of food preservation that helps in preventing food spoilage.	K4	III
CO4	Analyze the role of microbes in food spoilage and its effects on human.	K4	IV
CO5	List the preserved food products available in the market and the preservatives used with its uses.	K4	V
CO6	Apply the preservation techniques in preserving various foods to become a successful entrepreneur.	K3	V

2.A.SYLLABUS

UNIT I **(13hours)**

PRESERVATION

(i) History, importance.

(ii) Definition, needs, principles of food preservation.

(iii)Methodsof low and high temperature.

(iv) Dehydration – Types, objectives and principles of dehydration, steps involved in dehydration process, merits and demerits- effects on nutritive value in dehydrated foods.

UNIT II **(15hours)**

FOOD ADDITIVES

(i) Food additives – Definition; Preservatives – class 1 and class 2 preservatives, colours, flavouring agents, sweeteners, emulsifiers and stabilizers, leavening agents, antioxidants, flour improvers.
(ii) Government regulations.

UNIT III **(17hours)**

PRESERVATION TYPES

(i) Bacteriostatic – Dehydration-types of dehydration (Sun drying, spray drying) Pickling, Salting, Smoking, Freezing – slow and quick, merits and demerits.
(ii) Bactericidal – Canning-steps involved in the process of canning, Irradiation, microwave cooking.

UNIT IV **(15hours)**

Food Spoilage

(i) Definition, role of microorganisms in food spoilage, types of food spoilage, causes of spoilage, factors affecting spoilage, kinds of spoilage – perishable and non-perishable.
(ii) Anaerobic and aerobic microorganisms involved in food preservation – mold, fungi, bacteria.
(iii) Remedial measures to be taken on spoilage.
(iv) Storage conditions – storage conditions leading to food spoilage.

UNIT V **(15hours)**

PRESERVED FOODS

(i) Products using sugar - squash, jam, jelly
(ii) Products using salt - tomato ketchup, pickles, chutneys.
(iii) Preservation using vinegar
(ii) Preparation of dehydrated products – papads, vathal, vadams and dehydrated vegetables.

B. Topics for self-study

Sl. No.	Topics	Reference
1	Walk-in refrigerators in Five-star hotels.	https://www.irl.co.in/products/walk-in-cooler.html
2	Conventional sun drying versus mechanized dehydration.	http://ecoursesonline.iasri.res.in/mod/page/view.php?id=111449
3	Natural food additives as antioxidants.	https://madridge.org/journal-of-food-technology/mjft-1-1000102.php
4	Fenugreek as a preservative.	https://www.freepatentsonline.com/6372220.html#

C. TEXTBOOKS

1. N.ShakuntalaManay&M.Shadaksharaswamy, “Foods Facts and Principles (III Revised Edition)”, New Age International (P) Ltd. Publishers, New Delhi,2011

2. M.Swaminathan., “Food and Nutrition”, Bangalore Printing and Publishing Company, Bangalore,2010

D. REFERENCES

1. Maria Parloa (2012), “Canned fruit, preserves and jellies: Household methods of preparation”, Published by US department of Agriculture, Washington
2. M. Shafiur, Rahman (2017), “Handbook of food preservation,” 2nd edition, CRC press.

3. SPECIFIC LEARNING OUTCOMES (SLO)

UNIT	Course content	Learning outcomes	Blooms Taxonomic levels of Transaction
	UNIT IPRESERVATION		
I	Preservation I).History, importance	Explain preservation and its origin.	K2
	(ii) Definition, needs, principles of food preservation	List the needs and importance of food preservation. Apply the principles of food preservation in preservation techniques Justify preservation is important	K4 K3 K5
	(iii)Methods of low and high temperature	List the methods of high and low temperature preservation. Identify the temperatures of the methods of preservation.	K4 K3
	(iv) Dehydration – Types, objectives and principles of dehydration, steps involved in dehydration process, merits and demerits- effects on nutritive value in dehydrated foods	Outline the process of dehydration. Explain the objectives and principles of dehydration. Analyze the merits and demerits of the process. Evaluate the nutritive value of the dehydrated products	K2 K2 K4 K5
	UNIT II FOOD ADDITIVES		
II	**FOOD ADDITIVES** (i) Food additives – Definition; Preservatives – class 1 and class 2 preservatives, colours, flavouring agents, sweeteners, emulsifiers and stabilizers, leavening agents, antioxidants, flour improvers.	Categorize different food additives. List the uses of each food additive. Analyze the changes occurred after the addition of food additives. Develop quality products by using food additives List the food additives used in the commercial commodities	K4 K4 K4 K3 K4

	(ii) Government regulations	Summarize the government regulations in using food additives.	K2
	UNIT IIIPRESERVATION TYPES		
III	(i) Bacteriostatic – Dehydration-types of dehydration (Sun drying, spray drying) Pickling, Salting, Smoking, Freezing – slow and quick, merits and demerits	Explain bacteriostatic methods. Explain dehydration and types of dehydration. Assess pickling, salting and smoking process. Distinguish the slow and quick freezing process. Compare the merits and demerits of the various methods.	K2 K5 K5 K4 K4
	(ii) Bactericidal – Canning-steps involved in the process of canning, Irradiation, microwave cooking.	Outline the steps involved in canning, irradiation and microwave cooking process. List of microorganisms killed during these process. Analyze the merits and demerits of these process.	K2 K4 K4
	UNIT IV Food Spoilage		
IV	**Food Spoilage** (i) Definition, role of microorganisms in food spoilage, types of food spoilage, causes of spoilage, factors affecting spoilage, kinds of spoilage – perishable and non-perishable	Explain food spoilage. Classify the types of food spoilage. List the causes of food spoilage. Elaborate the role of microorganisms in food spoilage. Categorize the factors affecting food spoilage. Distinguish perishable and non perishable foods and kinds of spoilage in it.	K2 K4 K4 K6 K4 K4
	(ii) Anaerobic and aerobic microorganisms involved in food preservation – mold, fungi, bacteria	Classify the anaerobic and aerobic microorganisms. Evaluate the role of microorganism in food preservation.	K2 K5
	(iii) Remedial measures to be	Plan strategies to prevent spoilage.	K3

	taken on spoilage		
	(iv) Storage conditions – storage conditions leading to food spoilage	Select proper storage conditions for foods.	K3
	UNIT V PRESERVED FOODS		
V	**PRESERVED FOODS** (i) Products using sugar - squash, jam, jelly	Develop products using sugar as a preservative. Explain the mechanism of the action of sugar.	K6 K2
	(ii) Products using salt - tomato ketchup, pickles, chutneys	Formulate food products where salt is used as a preservative. Explain the mechanism of the action of salt.	K6 K2
	(iii) Preservation using vinegar	Develop vinegar and vinegar based products.	K6
	(iv) Preparation of dehydrated products – papads, vathal, vadams and dehydrated vegetables.	Develop and analyze the quality of dehydrated products.	K4 & K6

4.Mapping scheme for the POs PSOs and COs

Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4
CO1	L	-	-	-	-	H	-	M	L	H	-	M	H
CO2	-	-	-	L	-	H	-	-	L	L	-	L	H
CO3	-	-	M	-	-	H	-	M	-	-	-	L	M
CO4	H	-	L	H	L	H	M	L	M	L	-	M	-
CO5	H	-	L	L	M	M	-	-	-	L	-	L	M
CO6	-	-	-	-	M	L	M	M	-	H	-	M	H

L- LOW M-MEDIUM H-HIGH

5.Course assessment methods

Direct

1. **Continuous Internal Assessment I ,II**
2. **Group discussion, Presentation, Assignment, Poster presentation, collection of labels**
3. **End Semester Examination**

Indirect

NAME OF THE COURSE COORDINATOR: MS. K. MAHESWARI

Elective II: PRINCIPLES OF RESOURCE MANAGEMENT AND INTERIOR DESIGN

Semester: V **Code: U17ND5:3**

Credits: 4 **Hours/Week: 75**

1.Course Outcomes:

After completion of this course the students will be able to

CO. No	Course Outcomes	Level	Unit
CO1	Make use of efficient management skills with good managerial potentials and Identify human and non-human resources for efficient management of the family	K3	I
CO2	Explain put forth by recent trends in availability of resources	K2	II
CO3	Evaluate elements needed for appropriate designing to achieve required visual effect.	K5	III, V
CO4	Analyze theme-based color harmonies in interiors.	K3	II
CO5	Evaluate and choose furniture for different areas of an establishment.	K5	IV
CO6	Determine the composition, construction, and finishes applied on fabrics for furnishings.	K5	V

2.A.SYLLABUS

UNIT I **(18hours)**

1.1 **Resource Management**: Understanding, meaning, classification and characteristics of resources, factors affecting utilization of resources.

1.2 Maximizing the use of resources and resource conservation.

1.3 Availability and management of specific resources by an individual / family-money, time, energy, space.
1.4 **Functions of management**: Decision making, planning, supervising, controlling, organizing.

UNIT II **(18hours)**

2.1 **Design and good taste**: Objectives of aesthetic planning, beauty, expressiveness, functionalism, concept of design, purpose of design, elements of design, types of design, structural design and decorative design.
2.2 **Colour**: Sources of colour – dimension of colour (hue, value, intensify/chroma). The pang colour system (primary, secondary, intermediate hue, tertiary and quaternary colour).
2.3 **Procedure for making a colour scheme for a room**: Factors affecting the use of colour scheme for room (the room, mood, style, fashion, personality, possession).
2.4 Application of art principle in the use of colours for a room (balance, proportion, harmony, rhythm, emphasis).

UNIT III **(18hours)**

3.1 **Lighting**: Source of light (natural, artificial light).
3.2 **Types of lighting**: General/ambient lighting, task lighting, accent lighting.
3.3 **Requirements of an ideal lighting installation** – Steadiness of the source of light, elimination of glare, avoidance of shadows, sufficient illumination to suit the nature of the visual task, nonproduction of excessive heat, minimum consumption of oxygen from the air.

UNIT IV **(18hours)**

4.1 **Furniture**: Requirement and arrangement in the home, materials used in furnishing items.
4.2 **Furnishing**: Different types of furnishing, factors considered in the selection of furnishing.
4.3 **Floor coverings**: Factors for selecting floor coverings, salient features of carpet, types use and care of floor coverings.

UNIT V **(18hours)**

5.1 Accessories: Selection, types, use and care of accessories.
5.2 Traditional and Modern: Art objects, pictures.
5.3 Flower arrangement: Principles, types and steps in preparing flower arrangement.

B. Topics for self-study:

Sl. No.	Topics	Reference
1	Comparison of resource management techniques at home and industry.	https://www.planview.com/resources/guide/resource-management-software/top-12-resource-management-best-practices/
2	Interior design for budget consumers.	https://www.housebeautiful.com/home-remodeling/interior-designers/g4293/interior-designer-tricks-to-update-a-room/
3	National and international flower arrangements.	https://www.myweddingplanning.in/wedding-flower-decor
4	Personal touch in decorating your house.	https://www.homify.in/ideabooks/729123/here-s-how-to-add-a-personal-touch-to-your-home-decor

C. TEXTBOOKS

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2. Alexender, M.J., "Designing Interior Environment", Har Court Brace Jauaroui Inc., New York, 1972.
3. Sherwood, R.F. "Homes Today and Tomorrow", Chart Bannet, Co., Inc.,PEORIC, Illinois, 1972.
4. Premavathy Seetharaman and Parveen Banu, "Interior Design and Decoration", CBS Publishers, New Delhi, 2007.

D. REFERENCES

1. Nickell, P. and Dorsey, J.M. "Management in Family Living", John Wiley and Sons, Inc, New York 1960.
2. Goldstein, H and Goldstein, V. "Art in Everyday Life", Macmillan and Company, New York, 1966.
3. Rutt, A.H., "Home Furnishings", John Wiley and Sons, New York, 1961.
4. Roy Day, "All about Decorating Your Home" Hamlyn, London, 1976.

3.SPECIFIC LEARNING OUTCOMES (SLO)

UNIT	Course Content in unit 1	Learning Outcomes	Blooms Taxonomic levels of Transaction
	UNIT I		
I	1.1 **Resource Management**: Understanding, meaning, classification and characteristics of resources, factors affecting utilization of resources.	Classify resources Identify the characteristics of resources. List the factors affecting utilization of resources.	K2 K3 K4
	1.2 Maximizing the use of resources and resource conservation.	Extend the use of resource conservation and utilization.	K2
	1.3 Availability and management of specific resources by an individual / family-money, time, energy, space.	Identify the resources available in a family setting. Develop the skills in utilizing the available resources in the residence programme. Make use of the techniques involved in efficient use of available resources.	K3 K3 K3

	1.4 Functions **of management**: Decision making, planning, supervising, controlling, organizing.	Relate decision making to management. Outline steps in decision making, planning, characteristics, role of planning, Monitoring – process, importance. Importance of planning, decision making, organizing.	K2 K2 K5
	UNIT II		
II	**Design and good taste**: Objectives of aesthetic planning, beauty, expressiveness, functionalism, concept of design, purpose of design, elements of design, types of design, structural design and decorative design.	Apply various elements and principles on two dimensional and 3 dimensional compositions Develop designs suitable for various applications. Make use of various techniques in creating art	K3 K3 K3
	2.2 **Colour**: Sources of colour – dimension of colour (hue, value, intensify/chroma). The pang colour system (primary, secondary, intermediate hue, tertiary and quaternary colour).	Apply theoretical knowledge on colourto practical situations in interior design. Categorize the qualities of colour Discover skills on recent trends in use of colour	K3 K4 K4
	2.3 **Procedure for making a colour scheme for a room**: Factors affecting the use of colour scheme for room (the room, mood, style, fashion, personality, possession).	Apply variouscolour harmonies in room interiors. Analyze forms, patterns and color schemes	K3 K4
	2.4 Application of art principle in the use of colours for a room (balance, proportion, harmony, rhythm, emphasis).	Apply the principles of art in using colors for a room	K3
	UNIT III		
III	3.1 **Lighting**: Source of light (natural, artificial light).	Distinguish the natural and artificial sources of light.	K4
	3.2 **Types of lighting**: General/ambient lighting, task lighting, accent lighting.	Classify the types of light. Test for applications of lighting.	K4 K4

	3.3 **Requirements of an ideal lighting installation** – Steadiness of the source of light, elimination of glare, avoidance of shadows, sufficient illumination to suit the nature of the visual task, nonproduction of excessive heat, minimum consumption of oxygen from the air.	Apply Modern features in use of color and lighting in residential and commercial spaces	K3
	UNIT IV		
IV	4.1 **Furniture**: Requirement and arrangement in the home, materials used in furnishing items.	Develop the art and skill of designing furniture for various purposes Develop knowledge on selection, arrangement, care and maintenance of furniture	K3 K6
	4.2 **Furnishing**: Different types of furnishing, factors considered in the selection of furnishing.	Analyze the composition, construction, and finishes applied on fabrics for furnishings. Examine recent trends in furnishings	K4 K4
	4.3 **Floor coverings**: Factors for selecting floor coverings, salient features of carpet, types use and care of floor coverings.	Classify the type of floor coverings and their uses.	K4
	UNIT V		
V	5.1 Accessories: Selection, types, use and care of accessories.	Classify accessories. Apply the knowledge of selection, use and care of accessories.	K2 K3
	5.2 Traditional and Modern: Art objects, pictures.	Apply art in creating aesthetic interiors	K3
	5.3 Flower arrangement: Principles, types and steps in preparing flower arrangement	Classify flowering and ornamental plants. Discover possibilities of a career in the retail flower business. Outline the steps in storing and handling of flowers to retain freshness. Invent different types of floral arrangements. Discover possibilities of a career in the	K2 K4 K2 K6 K4

		retail flower business	

4.Mapping scheme for the POs PSOs and COs

Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4
CO1	-	-	-	-	-	M	-	M	-	-	-	-	-
CO2	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-

L- LOW M-MEDIUM H-HIGH

5.Course assessment methods

Direct

1. **Continuous Internal Assessment I ,II**
2. **Group discussion, Presentation, Assignment, Poster presentation, model making**
3. **End Semester Examination**

Indirect

NAME OF THE COURSE COORDINATOR: DR. P. VASANTHAKUMARI

SBEC II: NUTRITION IN SPECIAL CONDIITION

Semester: V **Code: U17ND5S2**

Credits: 2 **Hours/Week: 30**

1.Course Outcomes:

After completion of this course the students will be able to

CO. No	Course Outcomes	Level	Unit
CO1	Evaluate the concept, purpose and principles of diet therapy for children with special needs.	K5	I
CO2	Gain in-depth knowledge in various epidemics and endemics and planning a diet for the same.	K4	II
CO3	Identify and solve food related issues during natural disasters.	K2	III
CO4	Develop and deliver appropriate information, products, and services to individuals, groups, and populations.	K6	II
CO5	Evaluate the role of various feeding techniques for people in special environments such as spacecraft and remote areas such as army personnel.	K5	V
CO6	Plan and prepare a balanced diet for people with special needs.	K6	IV

2.A. SYLLABUS

UNIT I: **(6 hours)**

Nutritional care for the children with special needs

Overview of the disability, food and nutritional needs and their modification.

i. Attention deficit hyperactivity disorder.
ii. Autism.
iii. Cerebral palsy.

iv. Down's syndrome.

Unit-II **(6 hours)**

Epidemic diseases - (i) Dengue, chikenguniya and other epidemic conditions.
Hypothyroidism and hyperthyroidism.
Wilson's Disease.

Unit- III **(6 hours)**

Nutritional Emergency
Nutrition during emergency: Natural calamity - war, flood, fire famine
Nutrition in sea voyage, Mountaineering,

Unit- IV **(6 hours)**

Space Nutrition:
Food Selection. Food preparation for space ,Planning and serving the food, Classification of space food and Dehydrated foods use in space.

Unit – V **(6 hours)**

Armed forces nutrition:
The history of Military nutrition, Nutrient Support in Military person, the role of nutrient in injured person, Estimation of energy and protein metabolism in armed person.

B. Topics for self-study:

Sl. No.	Topics	Reference
1	Role of nutrition in pandemic. .	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7306972/#:~:text=Nutritional%20status%20of%20individuals%20has,to%20strengthen%20the%20immune%20system
2	Recent natural calamity which needed nutritional support.	https://www.todaysdietitian.com/newarchives/0118p34.shtml
3	Military nutrition in different terrains.	https://apps.dtic.mil/dtic/tr/fulltext/u2/a269969.pdf
4	Evolution of space nutrition.	https://www.history.com/news/cosmic-cuisine-the-evolution-of-space-food#

C.References:

1. Gibney ., "Public Health Nutrition",Blackwell Publishing, 2004.
2. Khanna., "Textbook of Nutrition and Dietetics", Phoenix Publisher,2013.
3.Sharma S, Wadhwa A.,"Nutrition in the Community- A textbook", Elite Publishing House Pvt. Ltd, 2003.
4. Srilakshmi B. "Dietetics" Seventh Edition, New Age International (P) Ltd, 2016
5. Bamji MS, Rao NP, and Reddy V. Text Book of Human Nutrition; Oxford & IBH Publishing Co. Pvt Ltd, 2009.
6. Lakra P, Singh MD. Textbook of Nutrition and Health,, First Ed, 2008; Academic
7. Defiance Food Services Integrated Project Food for thought (DVD), Team 2007.

3. SPECIFIC LEARNING OUTCOMES(SLO)

Unit	Course Content	Learning Outcomes	Blooms taxonomy (K1, K2, K3,K4,K5,K6)
UNIT-I	**Nutritional care for the children with special needs**		
1.1	Overview of the disabilility, food and nutritional needs and their modification. i. Attention deficit hyperactivity disorder.	Discuss the signs and symptoms of ADHD	K5
		Evaluate the nutritional requirement of child suffering from ADHD.	K5
		Explain the modifications in diet for children with ADHD.	K2
1.2	Autism	Analyze the signs and symptoms of autism spectrum disorder.	K5
		Discuss the dietary modifications of diet for ASD.	K5
1.3	Cerebral palsy	Critically analyze the causes, signs and symptoms of cerebral palsy.	K4
		Interpret the role of dietary modification in child suffering from cerebral palsy.	K5
1.4	Down's syndrome	Define Down's syndrome.	K1
		Assess the causes, signs and symptoms of Down's syndrome.	K5

		Critically analyze the dietary modifications required for Down's syndrome.	K4
UNIT-II	**Epidemic diseases**		
2,1	(i) Dengue, chikenguniya and other epidemic conditions.	Define epidemic.	K1
		Describe the relationship between immunity and viral infections.	K5
		Evaluate the role of diet in various epidemic diseases.	K4
2.2	Hypothyroidism and hyperthyroidism.	Discuss the pathophysiology of hypothyroidism.	K 5
		Elaborate the role of thyroid hormone in causing hypo and hyperthyroidism.	K6
		Explain the role of goitrogens in the treatment of hypothyroidism.	K4
2.3	Wilson's disease	Define Wilson's disease.	K1
		Discuss the effect of copper in causing Wilson's disease.	K6
		Analyze the role of dietary modification in Wilson's disease.	K4
UNIT III	**Nutritional Emergency**	.	
3.1	Nutrition during emergency: Natural calamity - war, flood, fire famine	Define disaster management.	K1
		Interpret the management of diet during various disaster conditions.	K5
		Analyze the importance of proper food distribution during war, flood and famine.	K4
3.2	Nutrition in sea voyage, Mountaineering,	Discuss the role of nutrition during mountaineering.	K5
		Justify the types of foods which can be carried during mountaineering expeditions.	K5
		Enumerate and discuss the difficulties faced regarding food supply during sea voyage	K5

		Assess the nutritional deficiencies that are possible during expeditions.	K5
UNIT-IV	**Space Nutrition:**	.	
4.1	Food Selection. Food preparation for space ,Planning and serving the food, Classification of space food and Dehydrated foods use in space.	Discuss the parameters involved in selection of foods while preparation for space expedition.	K5
		Train the space scientists on consuming the foods and assess the difficulties involved in the chose foods.	K6
		Appraise the importance of processed foods and dehydrated foods in providing proper nutrition to the persons involved in voyage.	K5
UNIT-V	**Armed forces nutrition**	.	
5.1	The history of Military nutrition, Nutrient Support in Military person, the role of nutrient in injured person, Estimation of energy and protein metabolism in armed person.	Recall the history of military nutrition and nutrtion during world wars.	K2
		Assess the nutritional requirement of military personnel.	K5
		Analyze the nutrient support needed for persons working in armed forces.	K4
	.	Evaluate the nutritional needs of injured persons and plan diet accordingly.	K6
		Estimate the energy and protein metabolism of military persons and plan diet based on it.	K6

4.Mapping Scheme for the PO, PSOs and COs

L=Low M= Medium H= High

Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO 1	PSO 2	PSO3	PO4
CO1	**M**	**H**	**H**	**H**	**M**	**M**	**L**	**L**	**L**	**H**	**H**	**L**	**L**
CO2	**M**	**H**	**H**	**H**	**M**	**M**	**L**	**L**	**M**	**H**	**M**	**L**	**L**
CO3	**H**	**M**	**H**	**M**	**M**	**M**	**M**	**L**	**M**	**M**	**L**	**M**	**L**

CO4	**H**	**H**	**M**	**M**	**M**	**M**	**M**	**L**	**L**	**M**	**M**	**M**	**L**
CO5	**M**	**H**	**M**	**M**	**L**	**L**	**M**	**M**	**M**	**M**	**H**	**L**	**M**
CO6	**H**	**M**	**H**	**M**	**M**	**M**	**M**	**M**	**M**	**H**	**M**	**L**	**M**

L-Low **M-Moderate** **H- High**

5.Course assessment methods

Direct

1. **Continuous Internal Assessment I ,II**
2. **Group discussion, Presentation, Assignment**
3. **End Semester Examination**

Indirect

NAME OF THE COURSE COORDINATOR: MRS. K. MEERA

SBEC III: BAKERY AND CONFECTIONERY

Semester: V **Code: U17ND5S3**

Credits: 2 **Hours/Week: 30**

1.Course Outcomes:

After completion of this course the students will be able to

CO. No	Course Outcomes	Level	Unit
CO1	Develop knowledge on the basic principles and concepts of bakery industry	K3	I
CO2	Analyze the role of various major and minor ingredients in baking	K4	II
CO3	Examine the role of yeast in bread making and the type of doughs in bakery industry	K4	III
CO4	Develop deep sense of knowledge in cake making, the faults and remedial measures in cakes	K3	II
CO5	Apply principles of baking in the preparation of biscuits and cookies, faults and its remedies in it.	K3	V
CO6	Develop entrepreneur skills with the knowledge of baking.	K3	IV

2.A.SYLLABUS

UNIT I **(6hours)**

Introduction of bakery–definition, principles, types of baked and confectionary products.

Major and minor equipment – required to start a small bakery unit.

UNIT II **(6hours)**

Major and minor ingredient in baking

Major ingredients – flour, fat, sugar and leavening agent – types, role in bakery

Minor ingredients – milk, water, salt – types, role in bakery

UNIT III **(6hours)**

Bread

Principles involved in the yeast products preparation, methods – straight dough method, salt delayed method, no dough time method, sponge and dough method, ferment and dough method.

Methods of Processing

Faults and remedies in baked bread, types of bread improvers.

UNIT IV **(6hours)**

Cake

Principles involved in the preparation of cake, sponge cake – types (fatless sponge, Genoese sponge, plain sponge, gel sponge).

Methods – sugar batter method, flour batter method, blending method, boiling method, sugar water method, all-in process method (slow speed, medium speed, fast speed), foaming method.

Faults and remedies in baked cakes.

Icing –Types and Preparation Methods

UNIT V **(6hours)**

Biscuits and cookies

Principles involved in cookies preparation, methods for mixing cookies – single or one stage method, creaming or sugar batter method, blending or rub in method, foaming method, flour batter method.

Types – sheeted types, piped types, bar types, dropped types, rolled types

Difference between biscuits and cookies

Faults and remedies in baked biscuits and cookies

B. Topics for self-study:

Sl. No.	Topics	Reference
1	Preparation of pastries.	https://hmhub.me/pastry-recipes-and-methods-of-preparation/
2	Cookies using millets.	https://www.superhealthykids.com/recipes/millet-cookies/
3	Alternative for all-purpose flour.	https://www.thespruceeats.com/a-substitute-for-all-purpose-flour-3976522
4	International bakery products.	https://www.britannica.com/topic/baking

C.TEXT BOOKS

1. John Kingslee A, "Professional Text to Bakery and Confectionary", 1st edition, New Age International (P) Limited Publishers, 2006.

2. YogambalAshokkumar, "Theory of Bakery and Confectionery", 5th edition, PHI Learning Private Limited, New Delhi 2009.

D. REFERENCE BOOKS

1. Wayne Gisslen, "The Professional Baking", 6th edition, Publishers John Wiley & Sons 2012.

2. Pat Sinclair,"Basic Baking", Publisher Agate,2006

3. SPECIFIC LEARNING OUTCOMES (SLO)

Course content in unit I	**Learning outcomes**	**Blooms Taxonomy K1,K2,K3,K4,K5,K6**
UNIT-I		
Introduction of bakery– definition, principles, types of baked and confectionary products. **Major and minor equipment –** required to start a small bakery unit.	Explain the principles to be followed in preparing bakery and confectionary products.	**K4**
	Classify the major and minor equipments needed to start a bakery unit.	**K4**
	Compile the informations and can start a new business in this field.	**K4**
Course content in unit II		
Major and minor ingredient in baking **Major ingredients –** flour, fat, sugar and leavening agent – types, role in bakery **Minor ingredients –** milk, water, salt – types, role in bakery	Explain the role of major and minor ingredients in baking.	**K4**
	Discuss the major ingredients for baking	**K4**
	Classify the major and minor ingredients for bread making.	**K4**
	Classify the different types of bakery method.	**K4**
Course content in unit III		
Bread Principles involved in the yeast products preparation, methods – straight dough method, salt delayed method, no dough time method, sponge and dough method, ferment and dough method. Methods of Processing Faults and remedies in baked bread, types of bread improvers	Explain the principles involved in the processing of bread and their methods.	K4
	Discuss the methods to prepare bread.	K4

	Compare the normal bread by adding nutritionally rich components.	K4
	Analyze the Methods of Processing Faults and remedies in baked bread, types of bread improvers	K4
Course content in unit IV		
Cake Principles involved in the preparation of cake, sponge cake – types (fatless sponge, Genoese sponge, plain sponge, gel sponge). Methods – sugar batter method, flour batter method, blending method, boiling method, sugar water method, all-in process method (slow speed, medium speed, fast speed), foaming method Faults and remedies in baked cakes. Icing –Types and Preparation Methods	Compare theprinciples involved in the processing of cake and their methods of icing.	K4
	Summarize the techiques involved in the making of cake.	K4
	Asses the normal cake by adding nutritionally rich components.	K4
Course content in unit V		
Biscuits and cookies Principles involved in cookies preparation, methods for mixing cookies – single or one stage method, creaming or sugar batter method, blending or rub in method, foaming method, flour batter method.	Classify the methods of cookies and biscuits preparation.	K3
	Examine the types of cookies. Formulate a new variety of biscuits than normal by adding nutritionally rich components.	K4
	Discuss the components of blending or rub in method.	K4
	Combine foaming method and flour method.	K4
Types – sheeted types, piped types, bar types, dropped types, rolled types Difference between biscuits	Classify the different types of baking methods.	K4

and cookies Faults and remedies in baked biscuits and cookies		
	Discuss faults and remedies in baked biscuits and cookies	K4
	Difference between biscuits and cookies	K4
	Compare the piped types and bar types.	K5
	Distinguish between dropped types and rolled types	K3

4.Mapping scheme for the POs PSOs and COs

Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4
CO1	-	-	-	-	-	L	-	-	-	-	-	L	H
CO2	H	-	-	-	-	H	-	-	L	L	-	M	H
CO3	,M	-	-	-	-	H	-	-	M	L	-	M	M
CO4	-	-	-	L	-	H	-	-	-	M	-	H	H
CO5	-	-	-	M	-	L	-	L	L	L	-	-	H
CO6	M	-	M	H	-	M	-	L	H	H	L	M	H

L- LOW M-MEDIUM H-HIGH

5.Course assessment methods

Direct

1. **Continuous Internal Assessment I ,II**
2. **Group discussion, Presentation, Assignment, Poster presentation,**
3. **End Semester Examination**

Indirect

NAME OF THE COURSE COORDINATOR: MRS. C. ROSELIN

CORE VII: DIETETICS-II

Semester: VI **Code: U17ND607**

Credits: 5 **Hours/Week: 6**

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1. COURSE OUTCOMES

At the end of the course, the students will be able to:

CO. No	Course Outcomes	Level	Unit
CO1	Identify the concept, purpose and principles of diet therapy and the effect of the role and types of dietitians. Gain in-depth knowledge in the running of a dietary department in a hospital.	K2	I
CO2	Analyze solve problems by thinking critically and integrating scientific information and research into practice.	K4	II
CO3	Develop and deliver appropriate information, products, and services to individuals, groups, and populations.	K5	II, III
CO4	Evaluate the role of various feeding techniques and identify the appropriate technique needed for a specific patient.	K5	IV
CO5	Suggest the tilogical factors and complications, assessment parameters and dietary modifications in management of weight.	K5	V
CO6	Provides opportunity for interaction with patients, and thus, students get hands-on training in hospitals, in association with dietitians and clinicians.	K5	V

2.A. SYLLABUS

UNIT- I **(15 hours)**

Diabetes Mellitus

a) Types –IDM, NIDM, GDM

b) Pathogenesis,Symptoms, Causes, Diagnostic tests, Complications.

c) Dietary modification and diet planning of the disease.

UNIT II **(18 hours)**

Diseases of the liver

a) Diseases of the liver, gall bladder and exocrine pancreas – pathogenesis, causes, signs and symptoms, dietary modifications and diet planning for:

i. Liver- fatty liver, hepatitis, cirrhosis, hepatic coma
ii. Gall bladder – cholecystiits, cholelithiasis
iii. Pancreas – Pancreatitis.

b) Nutritional care for patients with inborn errors of metabolism – prognosis, symptoms, dietary management – phenylketonuria, galactosemia.

UNIT- III **(21 hours)**

Kidney Disease:

Pathogenesis ,Symptoms, causes, Nutritional modification, diet planning and dialysis for kidney disease

a) Nephritis

b) Nephrosis

c) Urinary Calculi

d) Renal failure – acute andchronic

UNIT IV **(16 hours)**

Disease of the cardio vascular system

Pathogenesis, symptoms, causes, diagnostic tests, complications, dietary modification and diet planning of:

a) Hypertension
b) Atherosclerosis – Myocardial infarction
c) Ischemic heart disease
d) Hyperlipidemia
e) Acute and Chronic cardiac disease and congestive cardiac failure.
f) CABG.

UNIT-V **(20 hours)**

Skeletal and Allergy

a) **Nutritional care in disease of the musculoskeletal system** – Arthritis, Oesteoporosis, Gout, dental caries.

b)**Allergies**– Food allergy and intolerance, Factors influencing ,Symptoms, test for allergy, Nutritional care and elimination diet.

Nutrition Care in Cancer and AIDS

c) **Cancer** – mechanism of cancer formation, pathophysiology ,classification, , etiology, symptoms, dietary management and role of food in prevention of cancer.

d)**AIDS –** epidemiological features, mode of transmission, clinical manifestation and dietary management.

B. TOPICS FOR SELF-STUDY

B. Topics for self-study:

Sl. No.	Topics	Reference
1	Diseases caused due to autoimmunity and dietary modifications for the same.	https://www.todaysdietitian.com/newarchives/110211p36.shtml
2	Correlation between diabetes, cardiac disease and renal disease.	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4045477/#
3	Cardiac transplant and liver transplant – feeding patterns.	https://journals.lww.com/transplantationdirect/Fulltext/2019/01000/Simultaneous_Versus_Sequential_Heart_liver.9.aspx
4	Nutrition in neurological disorders.	https://lllnutrition.com/mod_lll/TOPIC25/m251.pdf

C.TEXT BOOKS

1. Antia, F.P, “Clinical dietetics and Nutrition”,4th Edition, Oxford University Press, New Delhi,2002.

2. Joshi, S.A, “Nutrition and Dietetics”,2nd edition, TATA McGraw Hill publications, New Delhi, 2008.

3. Srilakshmi. B, “Dietetics”, 7th Edition, New Age International (P) Ltd. Publishers, Chennai, 2016.

4. Swaminathan, M. “Essentials of Food and Nutrition-Vol. I and II”BAPPCO., The Bangalore Printing and Publishing co., ltd., No.88, Mysore Road, Bangalore ,2010

5. Davidson and passmore, “Human Nutrition and Dietetics”, English Language Book Society, Livingstone,1986.

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1. Mahan,L.K.,Arlin.M.T.,Krause’s, “Food Nutrition and Diet Therapy”, 14TH Edition. W.B.Saunder Company, London ,2016.

2. Williams, S.R., “Nutrition and Diet Therapy”, 6th Edition,Times Mirror / Mosby College Publishing, St. Louis, 1989.

3. Raheena Begum, “A Text Book of Foods, Nutrition and Dietetics”, Sterling Publishers, New Delhi.1989.

4. Gopalan,C., “Dietary Guidelines for Indians – A Manual”, National Institute of Nutrition, Hyderabad, 2005

5. Shills, M.E, Oslon, J.A, Shike, M and Ross, A.C, “Modern Nutrition in Health and Disease”, 10th Edition, Lippincott Williams and Wilkins 2006.

E. WEB LINKS:

3. SPECIFIC LEARNING OUTCOMES (SL0)

Unit	Course Content	Learning Outcomes	Blooms Taxonomic levels of Transaction k1,k2,k3,k4,k5 & k6
I	**Diabetes Mellitus**	**Apply the mechanism involved in diabetes mellitus.**	**K3**
1.1	a) Types –IDM, NIDM, GDM .	**Classify the various types of diabetes mellitus.**	**K4**
		Distinguish between IDDM & NIDDM	**K4**
		Examine Gestational diabetes mellitus	**K4**
		Explain how types of insulin affect modification of diet	**K2**
		Describe the clinical symptoms and diagnosis of diabetes.	**K4**
		Summarize the nutritional requirements of diabetes mellitus	**K5**
		Plan and prepare for diabetic diet for adult women.	**K5**
1.2	b) Pathogenesis, Symptoms, Causes, Diagnostic tests, Complications.	**Explain the causes, symptoms, risk factors, pathological condition and complications of diabetes**	**K2**
		Discuss the glucose tolerance test	**K4**
		Differentiate between hypo and hyper glycaemia.	**K4**
1.3	c) Dietary modification and diet planning of the disease	**Exhibit restrictive eating behaviors, they express feelings of dietary deprivation, and rigid dietary control is perceived as the only way to a proper diet and weight management**	**K4**
		Explain the dietary habits of diabetes mellitus	**K4**
		Explain the dietary supplements used in diabetes mellitus	**K2**
		Discuss the preventive aspects of diabetes mellitus	**K4**
II	**Diseases of the liver**		

2.1	a) Diseases of the liver, gall bladder and exocrine pancreas – pathogenesis, causes, signs and symptoms, dietary modifications and diet planning for: iv. Liver- fatty liver, hepatitis, cirrhosis, hepatic coma v. Gall bladder – cholecystiits, cholelithiasis vi. Pancreas – Pancreatitis.	**Define live disease and fatty liver**	**K2**
		Classify the various kinds of liver disease	**K3**
		Analyze on hepatic encephalopathy	**K4**
		Classify patients suffering from infective hepatitis and cirrhosis of liver	**K3**
		Discuss the nutritional support required in acute and chronic pancreatitis	**K4**
		Assess the cholecystitis	
2.2	b) Nutritional care for patients with inborn errors of metabolism – prognosis, symptoms, dietary management – phenylketonuria, galactosemia.	**Classify the inborn error metabolism.**	**K3**
		Explain the causes and dietary management of this conditions.	**K2**
		Explain the agents responsible for phenylketonuria,	**K2**
		Analyze galactosemia and its conditions of human being	**K4**
III	**Kidney Disease:**		

3.1	Pathogenesis ,Symptoms, causes, Nutritional modification, diet planning and dialysis for kidney disease a) Nephritis b) Nephrosis c) Urinary Calculi d) Renal failure – acute andchronic	**Differentiate between nephritis and nephrosis**	**K3**
		Explain the dietary modifications for treatment of glomerulonephritis	**K2**
		Explain the formation of kidney stone	**K2**
		Assess the food included or avoided in the nephritic condition	**K5**
		Describe the factors contributing to oxalate stones.	**K3**
		Discuss the diet control in dialysis	**K4**
		Classify the different types of dialysis	**K4**
		Suggest the acid and alkaline ash diet for nephritic patients	**K5**
		Plan a day's diet for a school boy suffering from nephrosis	**K5**
		Summarize the nutrition and renal transplantation	**K5**
IV	**Disease of the cardio vascular system**		
4.1	Pathogenesis, symptoms, causes, diagnostic tests, complications, dietary modification and diet planning of: g) Hypertension h) Atherosclerosis – Myocardial infarction i) Ischemic heart disease j) Hyperlipidemia k) Acute and Chronic cardiac disease and congestive cardiac	**Describe the risk factor of heart attack**	**K3**

	failure. **l)** CABG.		
		Describe the role in fat in the cause of atherosclerosis	**K3**
		Explain the objectives and principles of planning a diet for atherosclerosis	**K4**
		Analyze the role of unsaturated fatty acids in the diet	**K4**
		Explain why sodium is restricted in hypertension	**K2**
		Discuss the causes, risk factors and dietary modifications of hypercholesterolemia	**K3**
		Apply the food should be included and avoided for atherosclerotic patients	**K3**
		List five foods low in cholesterol and food high in cholesterol	**K4**
		Explain the role of fruits and vegetables in the prevention of heart disease	**K4**
		Describe the role of fat in the treatment of arthrosclerosis	**K3**
		Explain the role of functional foods in the prevention of atherosclerosis	**K2**
		Plan a day's diet for a 45 year executive who had a heart attack three months ago	**K5**
		Suggest the high omega three fatty acid rich foods in CVD	**K5**
V	**Skeletal disease , Allergy, Cancer and AIDS**		
5.1	a) **Nutritional care in disease of the musculoskeletal system** – Arthritis,	**Explain the healthy musculoskeletal ageing and the risk factors associated**	**K2**

	Oesteoporosis, Gout, dental caries.	**with premature ageing**	
		Compare better care and development of therapies for common musculoskeletal disorders.	**K5**
5.2	**Allergies** – Food allergy and intolerance, Factors influencing ,Symptoms, test for allergy, Nutritional care and elimination diet.	**Comprehend the difference between food intolerances and food allergies;**	**K5**
		Classification and causes of adverse reactions to food;	**K3**
		Recognize the symptoms and signs of food allergies	**K4**
5.3	**Nutrition Care in Cancer** c) **Cancer** – mechanism of cancer formation, pathophysiology ,classification, , etiology, symptoms, dietary management and role of food in prevention of cancer.	**Describe of the biological nature of cancer, its development and progression.**	**K3**
		Explain the principles of and care required in cancer management.	**K2**
		Suggests that nutritional intervention must be initiated before chemoradiotherapy, and it needs to be continued after treatment	**K5**
5.4	**AIDS –** epidemiological features, mode of transmission, clinical manifestation and dietary management.	**Suggest the diet and therapeutic supplementary feeding for HIV and AIDS patients.**	**K5**
		Explain the role of nutrition – eating the right type and amount of food in the right combinations.	**K2**

		Plan a day's menu for HIV or AIDS patients	**K5**
		Suggest the foods to be included and avoided for HIV a patients	**K5**

4. Mapping Scheme

L=Low M= Medium H= High

U17ND 607	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO 1	PSO 2	PSO3	PO4
CO1	**H**	**H**	**H**	**H**	**H**	**M**	**M**	**M**	**M**	**H**	**H**	**H**	**L**
CO2	**H**	**H**	**H**	**H**	**H**	**M**	**L**	**L**	**M**	**H**	**M**	**M**	**M**
CO3	**H**	**H**	**M**	**M**	**M**	**M**	**M**	**M**	**M**	**M**	**M**	**M**	**M**
CO4	**H**	**H**	**H**	**M**	**H**	**H**	**M**	**M**	**L**	**L**	**M**	**M**	**M**
CO5	**M**	**H**	**M**	**M**	**L**	**M**	**M**	**M**	**M**	**M**	**H**	**M**	**L**
CO6	**H**	**H**	**H**	**H**	**H**	**M**	**M**	**M**	**M**	**H**	**M**	**L**	**M**

5.Course assessment methods

Direct

1. **Continuous Internal Assessment I ,II**
2. **Group discussion, Presentation, Assignment**
3. **End Semester Examination**

Indirect

NAME OF THE COURSE COORDINATOR: MRS. C. ROSELIN

COREVIII: NUTRITION AND FITNESS

Semester: VI **Code: U17ND608**

Credits: 5 **Hours/Week: 6**

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1. COURSE OUTCOMES

At the end of the course, the students will be able to:

CO. No	Course Outcomes	Level	Unit
CO1	Obtain knowledge regarding the body composition and their techniques to measure. K1	K1	I
CO2	Analyze the importance of fitness to enhance endurance, strength and flexibility. K4	K4	II
CO3	Assess the fluid requirement of the body of the sports person and supplement the required fluid and electrolyte appropriately. K5	K5	II, III
CO4	Appreciate the need of nutrients and their metabolism during exercise and supplement nutrient loss accordingly. K6	K6	IV
CO5	Evaluate the significant changes during exercise, needs of the sports persons and the role of nutritional supplements. K5	K5	V
CO6	Compare the effects of yoga and fitness on various body systems and the nutritional needs in special conditions. K6	K6	V

2.A. SYLLABUS

UNIT – I **(15 hours)**

Body composition and fitness

Body Composition- classification (Fat mass and fat free Mass) and its components, factors influencing body mass composition. Techniques for measuring body composition

Fitness-definition, parameters of fitness- cardiovascular endurance, muscular strength, muscular endurance, flexibility and body composition

UNIT -II **(15 hours)**

Assessment and benefit of exercise

Benefit of exercise- physiological, psychological and sociological. Physical activity guidelines.

Assessing personal fitness- preparticipation, screening and risk assessment.

Role of exercise in disease prevention – diabetes, cardiovascular disease, obesity, bone health and cancer.

UNIT – III **(15 hours)**

Energy systems and electrolyte balance

Reviews of different energy systems for endurance and power activity- Fuels and nutrients to support physical activity .Shifts in carbohydrate and fat metabolism, mobilization of fat stores during exercise.

Water and electrolyte balance- Losses and their replenishment during exercise and sports event, effect of dehydration, sports drinks.

UNIT-IV **(15 hours)**

Nutrition for sport persons

Definition, physiological and significant changes during exercise, types of stress faced by sports persons, nutrition needs of sports persons-macro and micronutrient needs, role of water and electrolytes.

Role of nutrition and recommendations – pre-exercise, during and post –exercise

Nutrition supplement and ergogenic aids.

UNIT-V **(15 hours)**

Yoga and nutrition fitness in special conditions

5.1 Yoga and fitness- effects on general vitality and on immune, endocrine, neurons, digestion and muscular systems, dietary pattern. Awareness about the alternative systems for health and fitness like ayurveda, yoga, vegetarianism and traditional diets.

5.2 Nutrition and fitness in special conditions- space mission and high attitude-changes in body composition, nutrient requirements, food system and suitable types of food.

B. TOPICS FOR SELF-STUDY

Sl. No.	Topics	Reference
1	BCAA as sports supplement.	https://www.otsuka.co.jp/en/nutraceutical/about/nutrition/sports-nutrition/essential-nutrients/bcaa.html# :
2	Carbohydrate loading.	https://www.mayoclinic.org/healthy-lifestyle/nutrition-and-healthy-eating/in- depth/carbohydrate-loading/art-

		20048518
3	Female athlete triad.	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3435916/#:
4	Difference between sports drink and health drink.	https://www.aappublications.org/content/32/6/32.2#

C. TEXTBOOK

1. Mahan, L.K. &Ecott-Stump,s.,Krause's"Food, Nutrition and Diet therapy", 14th edition,W.B.Sunders ltd,2016.
2. Sizer, F. &Whitney,E., "Nutrition- Concepts & Controversies",8th edition, Wadsworth Thomson learning,2000.
3. Shills, M.E., Olson, J.A., Shike,N. and Ross, A.C.(Ed),"Modern Nutrition in Health & disease", 9th edition, Williams & Wilkins,1999

D. REFERENCES

1. Whitney, E.N. &Rolfes, S.R., "Understanding Nutrition", 8thedition, West/Wadsworth, an International Thomson publishing Co., 2002
2. Ira Wolinsky ,Ed) ,"Nutrition in exercise and sports", 3rd Edition, CRC press,1988
3. Parizkova,J. "Nutrition, physical activity and health in early life", Ed.Wolinsky,I., CRC press, 2001
4. Mc Ardle, W.Katch, F. and Katch,V."Exercise Physiology. Energy, Nutrition and Human performance", 4th edition, Williams and Wilkins, Philadelphia,2009
5. Barbak Ann Dushman,"Complete guide to fitness and health", American college of sports medicine library and congress catalog in publication data,2006.

E. WEB LINKS:

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3. SPECIFIC LEARNING OUTCOMES (SLO)

Unit	Course Content	Learning Outcomes	Blooms taxonomy (K1, K2, K3,K4,K5,K6)
I	**Body composition and fitness**		
1.1	Classification (Fat mass and fat free Mass) and its components, factors influencing body mass composition. Techniques for measuring body composition	**Classify the various components in our body**	**K4**
		Discuss the factors that influence the body mass composition	**K5**
		Analyze the various techniques used in measuring body components.	**K4**
1.2	**Fitness-**definition, parameters of fitness- cardiovascular endurance, muscular strength, muscular endurance, flexibility and body composition	Define fitness.	K1
		Discuss the various parameters involved in fitness	K6
		Evaluate the role of cardiac endurance in physical activity	K5
		Explain the role of muscular endurance in muscle strengthening	K2
		Compare cardiac endurance and muscular endurance	K5
UNIt-II	**Assessment and benefit of exercise**		
2.1	**Benefit of exercise-** physiological, psychological and sociological. Physical activity guidelines.	Discuss Physiology of exercise.	K6
		Explain the psychosocial behavior of sports persons.	K5
		Reason out the physical activity for sports persons.	K6
2.2	**As Asessing personal fitness-** preparticipation, screening and risk assessment.	Assess the personal fitness of the individual before participation in any sports activity.	K5

		Identify the screening activities needed to assess a person's fitness.	K3
		Relate the risks involved in physical fitness regime.	K4
2.3	**R Role of exercise in disease prevention** – diabetes, cardiovascular disease, obesity, bone health and cancer.	Analyse the impact of exercise on disease prevetion.	K 4
		Assess the role of exercise in prevention of diabetes.	K5
		Critically analyze the role of exercise in carbohydrate metabolism and insulin sensitivity.	K4
		Evaluate the effect of exercise on pumping of heart.	K5
		Categorize the role of exercise in the prevention of heart diseases.	K6
		Appraise the impact of exercise on weight reduction and thus preventing obesity.	K5
		Meticulously analyze the role of exercise on weight bearing and prevention of bone damage..	K5
		Compare the effect of exercise on various cancer condition and management of cancer.	K6
UNIT-III	**Energy systems and electrolyte balance**		K
3.1	Reviews of different energy systems for endurance and power activity-Shifts in carbohydrate and fat metabolism, mobilization of fat stores during exercise.	Assess the role of carbohydrate metabolism in providing energy during physical activity.	K5
		Evaluate the impact of fat metabolism in providing energy during exercise.	K5
		Compare the effects of various metabolisms and the interrelationship between them in providing energy during physical stress.	K6

		Analyze the role of amino acid metabolism in providing energy and repair of muscle damage.	K4
		Critically assess the concept of carbohydrate loading and the conditions during which carbohydrate loading is required.	K5
3.2	**Water and electrolyte balance-** Losses and their replenishment during exercise and sports event,.	Recall the physiology of fluid and electrolyte balance in the body.	K2
		Relate homeostasis of fluid and minerals in the body during normal conditions.	K4
		Explain the effect of water loss during physical activity.	K5
		Stress the need for water and electrolyte replenishment during and after exercise/sports event.	K5
3.3	E Effect of dehydration, sports drinks.	Discuss the effect of sports drinks on dehydration.	K5
		Analyze the various sports drink available in the market.	K4
UNIT IV	**Nutrition for sport persons**		
4.1	Definition, physiological and significant changes during exercise, types of stress faced by sports persons, nutrition needs of sports persons-macro and micronutrient needs, role of water and electrolytes.	Discuss the physiology of exercise.	K5
	.	Assess the types of stress faced by sports persons.	K5
		Perceive the changes required in nutrient requirement of a sports person based on his sports activity.	K6
		Relate the macro and micronutrient requirement of a normal and a sports person.	K5

		Appraise the importance of fluid and electrolyte supplementation during physical activity.	K5
4.2	**Role of nutrition and recommendations** – pre-exercise, during and post –exercise Nutrition supplement and ergogenic aids.	Correlate the importance of pre and post exercise nutrition supplementation.	K5
4.2		Compare the nutritional supplementation required depending upon the sports activity.	K6
		Define ergogenic foods.	K1
		Relate between natural and artificial ergogenic aids.	K5
		Stress the advantages and disadvantages of ergogenic aids.	K4
UNIT V	**Yoga and nutrition fitness in special conditions**		
5.1	**Yoga and fitness-** effects on general vitality and on immune, endocrine, neurons, digestion and muscular systems, dietary pattern.Awareness about the alternative systems for health and fitness like ayurveda, yoga, vegetarianism and traditional diets.	Discuss the role of Yoga in the physical fitness of an individual.	K5
		Evaluate the impact of Yoga on vitality and immunity of the body.	K5
		Assess the effect of Yoga on the well-being and functioning of various organs in the body.	K5
		Discuss the alternate systems of medicines followed in our country.	K5
		Stress the importance of dietary modification in Ayurveda with relevance to the basic concept of Ayurveda.	K5
		List out various types of traditional diets followed throughout the world.	K2

		Compare and contrast the advantages and disadvantages of veganism.	K6
5.2	**Nutrition and fitness in special conditions-** space mission and high attitude-changes in body composition, nutrient requirements, food system and suitable types of food.	Discuss the various challenges involved in planning diet for space scientists.	K5
		Explain in detail the physiological/metabolicchanges that take place during rise and fall of altitudes.	K2
		Analyze the dietary modifications required to alter the nutrient composition during mountaineering and high altitudes.	K4
		List out the foods to be avoided and included during space expeditions	K2
		Classify the foods to be avoided in high altitudes with reasons.	K5

4. Mapping Scheme

L-Low M-Moderate H- High

Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4
CO1	M	L	L	-	L	-	-	L	-	L	L	M	-
CO2	H	-	H	-	H	-	-	H	M	H	-	-	-
CO3	-	H	-	H	M	-	L	-	M	H	-	-	-
CO4	L	M	-	M	-	-	-	-	-	M	-	L	-
CO5	-	M	M	-	L	L	-	-	M	M	-	M	-
CO6	-	-	-	L	-	-	M	L	-	M	M	-	-

5.Course assessment methods

Direct

1. **Continuous Internal Assessment I ,II**
2. **Group discussion, Presentation, Assignment**
3. **End Semester Examination**

Indirect

NAME OF THE COURSE COORDINATOR: MRS. K. MEERA

CORE IX: INSTITUTIONAL FOOD SERVICE MANAGEMENT

Semester: VI **Code: U17ND609**

Credits: 5 **Hours/Week: 6**

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1. COURSE OUTCOMES

At the end of the course, the students will be able to:

CO. No	Course Outcomes	Level	Unit
CO1	Obtain an in-depth knowledge about the layout of various areas in food establishments.	K2	I
CO2	Explain the factors involved in selection and purchase of equipment's and the base materials used in the manufacture of equipments.	K2	II
CO3	Analyse the various types of food service systems and styles of service.	K4	II, III
CO4	Relate the Indian menu pattern with the western world and the techniques in writing menu card.	K5	IV
CO5	Explain the duties of a purchasing officer, methods of purchasing and procedure to be followed while purchasing, receiving and storage.	K2	V
CO6	Evaluate the quality standards of a recipe, their portioning and the expenditure of the cost on food, labour and overhead expenses.	K5	V

2.A. SYLLABUS

UNIT – I **(15 hours)**

Layout

Food Plan Layout: Flow of work, characteristics of a typical food service layout, layout of food plants-space allocation for the various areas and flow of traffic through receiving, storage, preparation, service and dish washing areas; arrangements of equipments in work centers; optimum working heights.

UNIT – II **(15 hours)**

Equipment and Furnishings

(i) Classification of equipment, factors involved in selection of equipments; purchase of equipment, operational know-how, care and maintenance of equipments; dining room furnishings.

(ii) Materials Used: Base materials used in the manufacture of equipments, materials used for finishes, materials used in the manufacture of dining room furnishings.

UNIT III **(15 hours)**

Food Service – Classification of food service according to

(i) Types of food service systems - Conventional systems, Commissary system, read prepared system and assembly –service system.

(ii) Styles ofService : Service of food-self-service, tray service, Waiter –Waitress Service and portable service, formal and informal service

Meal Planning

(iii) Menu : Types of menu, Principles involved in menu Planning: Indian and Western, menu planner, why menu Planning; techniques in writing menucard.

UNIT – IV ***Quantity Food Purchasing and Storage.*** **(15 hours)**

Purchasing : Purchasing officer, duties, purchasing procedure, selection of supplier, methods of purchasing, purchase specifications.

(i) Receiving : Procedure and forms.

(ii)Storing and issuing : Objectives, types of store records, and stores issues.

Quantity Food Production and Service.

(iii) Quality standards and control.

(iv) Standardisation of recipes

(v) Portion control: Utilization of left over foods.

(vi)Ways and means of creating good atmosphere (Interior decoration)

(vii) Informal and formal service styles (Table Service)

UNIT – V **(15 hours)**

Cost control

(i) Food Cost Control : Principles of food cost control, elements of cost-food cost, labour cost and overhead expenses; why good cost control; factors responsible for losses in a food

(ii) Service industry; methods of controlling goods costs leading to profit; costing of dishes, meals and events; methods of pricing items.

B. TOPICS FOR SELF-STUDY

Sl. No.	Topics	Reference
1	International serving style.	https://djubo.com/blog/different-styles-service/
2	International cuisine.	http://www.your4sure.com/popular-international-cuisines/#
3	Basics of accounting.	https://www.indeed.com/career-advice/career-development/basic-accounting#
4	Balance sheet basics.	https://www.accountingverse.com/accounting-basics/how-to-make-a-balance-sheet.html

C. TEXTBOOK

1. MohiniSelti and SurjeetMalhan, "Catering Management – an integrated approach", Wiley Eastern Limited, New Delhi, 1987.
2. West, B.B., Wood, L., Harger, V.F. and Shugart, G., "Food Service in Institutions", John Wiley and Sons, New York, 1988.

D. REFERENCES

1. Kotschevar, L. and Terrel, M.E, "Food service Planning, Layout and Equipment", John Wiley and Sons, 1971.
2. Kotas, R and Davis, B., "Food Cost Control", Mc.Millan& Sons, 1973.

E. WEB LINKS:

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3.SPECIFIC LEARNING OUTCOMES (SLO)

Unit	Syllabus	Learning outcomes	Blooms Taxonomy
1.1	Food Plan Layout: Flow of work, characteristics of a typical food service layout, layout of food plants-space.	Define food plan layout	K2
		Classify the various typical food service layout	**K3**
		Plan a new food plant layouts for various food service areas	**K5**
1.2	Allocation for the various areas and flow of traffic through receiving, storage, preparation, service and dish washing areas; arrangements of equipments in work centers; optimum working heights.	Classify the different types area like receiving, storage, preparation, service and dish washing areas;	**K4**
		Distinguish between arrangements of work centre	**K4**
		Plan a work layouts of food service areas.	**K5**
		Suggest the points consider in plan food service area	**K5**
UNIT	**IIEquipment and Furnishings**		
2.1	factors involved in selection	Explain the factors	**K2**

	of equipments; purchase of equipment, operational know-how, care and maintenance of equipments; dining room furnishings.	involved in selection of equipments	
		Discuss the purchase of equipment in service area.	**K4**
		Assess the dining room furnishings.	**K4**
		Distinguish between care and maintenance of equipments; dining room furnishings	**K4**
2.2	Materials Used: Base materials used in the manufacture of equipments, materials used for finishes, materials used in the manufacture of dining room furnishings.	Classify the Base materials used in the manufacture of equipments	**K3**
		Explain the materials used for finishes, materials used in the manufacture of dining room furnishings.	**K2**
		Analyze the various materials used for different room	**K4**
		Suggests the points used for preparation of materials in food service areas.	**K5**
UNIT III	**Food Service**		
3.1	Types of food service systems - Conventional systems, Commissary system, read prepared system and assembly –service system.	Define food service systems.	**K2**
		Compare the Conventional systems, Commissary system,	**K4**
		Classify the read prepared system and assembly –service system.	**K3**
		Explain the various types of food service system	**K2**
3.2	Styles of Service : Service of food-self-service, tray service, Waiter –Waitress Service and portable service, formal and informal service	Define styles of service	**K2**

		Compare the Service of food-self-service, tray service system in food industry	**K4**
		Classify the various kinds of style of service in food establishments	**K4**
		Distinguish between formal and informal service	**K5**
3.3	(iii) Menu : Types of menu, Principles involved in menu Planning: Indian and Western, menu planner, why menu Planning; techniques in writing menu card.	Identify menu.	**K2**
		Explain Principles involved in menu Planning	**K2**
		Discuss the menu Planning;	**K4**
		Analyze the techniques in writing menu card.	**K4**
UNIT IV	***Quantity Food Purchasing and Storage.***		
4.1	Purchasing : Purchasing officer, duties, purchasing procedure, selection of supplier, methods of purchasing, purchase specifications.	Define purchasing methods.	**K2**
		Explain Purchasing officer, duties and responsibility of manager.	**K2**
		Classify the various methods of methods of purchasing, purchase specifications.	**K4**
		Discuss the methods and principle involved in purchasing order	**K4**
		Plan a model purchasing order	**K5**
4.2	Receiving : Procedure and forms. (ii)Storing and issuing : Objectives, types of store records, and stores issues.	Define receiving procedure	

		Classify the procedure and principle for preparation of receiving area.	**K3**
		Explain the objectives and types of receiving areas.	**K4**
		Analyze the mechanism involved in maintenance and stores of receiving area	**K4**
4.3	Quality standards and control.	Explain quality standards, standardisation of recipes and portion control.	**K4**
		Discuss the basic concepts of standards and quality control	**K3**
		Analyze the concepts and ethics of quality of food	**K4**
4.4	Standardisation of recipes Portion control: Utilization of left over foods.	Define Standardization	**K2**
		Explain the portion control	**K2**
		Discuss : Utilization of left over foods.	**K4**
4-5	Ways and means of creating good atmosphere (Interior decoration) (vii) Informal and formal service styles (Table Service)	Choose the interiors of the establisbment based on the type of service offered and establishment.	**K3**
		Explain the interior decoration	**K2**
		Compare the and formal service styles	**K5**
		Suggest the points consider in style of service	**K5**
V	**Cost control**		
5.1	Food Cost Control : Principles of food cost control, elements of cost-food cost, labour cost and overhead expenses; why good cost control; factors responsible for losses in a food	Define cost control	**K2**

		Explain the principles of food cost control	**K2**
		Discuss the elements of cost-food cost,	**K2**
		Distinguish between labour cost and over headed expanses	**K5**
		Analyse the factors responsible for losses in a food	**K4**
5.2	(ii) Service industry; methods of controlling goods costs leading to profit; costing of dishes, meals and events; methods of pricing items.	Summarize the cost controlling methods leading to profit.	**K5**
		Discuss the methods of controlling goods costs leading to profit	**K4**
		Compare the costing of dishes, meals and events; methods of pricing items.	**K5**
		Apply pricing methods to fix the price of a formulated new product.	**K3**

4.Mapping Scheme

Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4
CO1	-	-	-	-	-	L	-	-	-	-	-	-	-
CO2	-	-	-	-	-	L		-	-	-	-	-	-
CO3	-	-	-	-	-	-	-	H	-	-	-	-	L
CO4	-	-	-	-	-	L	-	L	-	-	-	-	L
CO5	L	-	-	-	-	H	-	H	L	-	-	L	M
CO6	L	L	-	L	-	M	L	H	L	M	-	M	H

5.Course assessment methods

Direct

1. **Continuous Internal Assessment I ,II**
2. **Group discussion, Presentation, Assignment**
3. **End Semester Examination**

Indirect

NAME OF THE COURSE COORDINATOR: MRS. C. ROSELIN

THEORY ELECTIVE-III : FOOD PRODUCT DEVELOPMENT AND MARKETING STRATEGY

Semester: VI **Code: U17ND6:1**

Credits: 3 **Hours/Week: 4**

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1. COURSE OUTCOMES

At the end of the course, the students will be able to:

CO. No	Course Outcomes	Level	Unit
CO1	Identify the basic principles and concepts of food product development –k2	K2	I
CO2	Analyze various cultural factors involved in the dietary pattern of various groups.-k4	K4	II
CO3	Discuss the steps involved in product development, portion size, cost calculation and nutritive value calculation.-k4	K4	II, III
CO4	Develop a new food product for different age groups.=k5	K5	IV
CO5	Compare the market structure and develop practical skills in formulating and promoting the food product in a market.=k5	K5	V
CO6	Develop of the global trends in developing entrepreneur skills.-k6	K6	V

2.A. SYLLABUS

UNIT-I **(15 hours)**

Concepts of product development:

Basic principles and concept of food product development, cultural approach to development of dietary pattern of various groups-language, linguistic, regional, religious (ethnic), Factors involved in food habit alteration, availability, importance and role of different research and development departments in food production industry.

UNIT-II **(15 hours)**

Market Process

Steps in product development-material resources based on market demand, standardization methods involved in product development. Portion size and portion control; Calculation of nutritive value and cost of production, shelf life and storage stability evaluation procedure of developed food products.

UNIT-III **(15 hours)**

Formula Development

Formulation of new food products for infants, preschool children, adolescents, pregnant and nursing mothers, old age, sports persons, armed sources personnel and therapeutic uses. Selection and training of judges, Development of Score Card and analysis of data, Role of advertisement and Technologies in promotion of new products.

UNIT-IV **(15 hours)**

Government proportion

Concept of market and marketing - approaches of study marketing and marketing functions, market structure, marketing efficiency and market integration, Role of Government in promoting agricultural marketing. Market promotion and positioning of food products.

UNIT-V **(15 hours)**

Sanitation:

Conditions for sale, license and identification and quality processing, conditions for distribution, storage and sanitation, Studying the global market status, Role of export promoting agencies, Economic feasibility of new products.

B. TOPICS FOR SELF-STUDY

Sl. No.	Topics	Reference
1	Low cost recipes.	https://vikaspedia.in/health/nutrition/nutritive-value-of-foods/low-cost-nutritious-supplements
2	Novel foods without preservatives.	https://www.researchgate.net/publication/328283201_Novel_natural_food_preservatives_and_applications_in_seafood_preservation_A_review
3	Spirulina in food processing industry.	https://www.longdom.org/proceedings/spirulina-arthrospira-platensis-as-food-a-commodity-to-better-feed-the-world-37470.html
4	Nutrigenomics in new product development.	https://www.newfoodmagazine.com/article/77093/inspiring-the-food-of-tomorrow/

C. TEXTBOOK

1. Sudhir Gupta, “Handbook of Packaging Technology”, Engineers India Research Institute, New Delhi , (2017)
2. Khanaka, S.S., “Entrepreneurial Development”, S. Chand and Company Ltd, New Delhi, 2016.

D. REFERENCES

1. Suja, R. Nair, “Consumer Behaviour and Marketing Research”, 1st Edition, Himalaya Publishers, (2014).
2. Hmacfie, “Consumer led Food Product Development”, Weedhead Publishing Ltd., UK, (2017)
3. Fuller, Gordon, W., “New Food Product Development”, 2nd Edition, CRC Press, Boca Raton, Florida, (2015
4. Schaffner .D,J, Schroder , W.R. “Food Marketing and International Perspectives”, Web/McGraw Hill , (2010)

E. WEB LINKS:

3. SPECIFIC LEARNING OUTCOMES (SLO)

UNIT	Course content	Learning outcomes	Blooms Taxonomic levels of Transaction
	UNIT-IConcepts of product development:		
I	Basic principles and concept of food product development	List the principles of new food product development. Determine the concept of food product development.	K4 K5
	cultural approach to development of dietary pattern of various groups-language, linguistic, regional, religious (ethnic)	Analyze different cultural practices. Determine the factors influences food habits Plan and develop a new food product based on their cultural differences.	K4 K5 K6
	Factors involved in food habit	Analyze the factors involved in	K4

	alteration, availability, importance and role of different research and development departments in food production industry.	food habit alteration and availability List the importance of research and development department in food production industry. Explain the role of research and development in food production industry.	 K4 K5
	UNIT-IIMarket Process		
II	Steps in product development-material resources based on market demand,	Outline the steps involved in new product development. Survey on market demand. Develop a new food product based on market demand.	K2 K4 K6
	standardization methods involved in product development.	Summarize the standardization procedures. Apply the standardization methods to make new food products.	K2 K3
	Portion size and portion control;	Explain portion control and portion size. Utilize the portion control techniques in new food product development.	K2 K3
	Calculation of nutritive value and cost of production, shelf life and storage stability evaluation procedure of developed food products.	Evaluate the nutritive value of the developed product. Estimate the cost for the developed food product. Test for shelf life and storage stability of the product.	K5 K5 K4
	UNIT-IIIFormula Development		
III	Formulation of new food products for infants, preschool children, adolescents, pregnant and nursing mothers, old age, sports persons, armed sources personnel and therapeutic uses.	Formulate new food products for different age groups based on their nutritional requirement. List the dietary needs of various age groups. Analyze the therapeutic uses of formulated food products	K6 K4 K4
	Selection and training of judges, Development of Score Card and analysis of data, Role of advertisement and Technologies in promotion of new products.	Select panel numbers and their training. Develop score card and analysis of data. importance of ads and other technologies to promote new food products.	K3 K3 K5
	UNIT-IVGovernment proportion		
	Concept of market and marketing - approaches of study marketing and marketing functions	Summarize the concept market and marketing. List the marketing functions.	K2 K4
	market structure, marketing efficiency and market integration,	Apply marketing theories to market the food products.	K3

IV		Analyze the market structure and market efficiency.	K4
	Role of Government in promoting agricultural marketing.	Prioritize Government in promoting agricultural products.	K5
	Market promotion and positioning of food products.	Identify the appropriate way to promote the developed food products.	K3
	UNIT-VSanitation:		
V	Conditions for sale, license and identification and quality processing, conditions for distribution, storage and sanitation,	List the conditions for getting license, to sale, distribution and storage.	K4
	Studying the global market status, Role of export promoting agencies, Economic feasibility of new products.	Plan and develop an economically feasible new food product. Functions of the export promoting agencies.	K6 K5

4. Mapping Scheme

Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4
CO1	-	L	M	-	L	M	M	M	L	-	-	L	H
CO2	-	L	-	-	-	H	L	L	M	M	-	L	H
CO3	M	-	-	-	L	H	M	H	M	M	L	H	H
CO4	M	L	H	M	M	H	-	H	M	H	L	H	H
CO5	-	-	-	-	-	-	-	M	-	M	-	M	-
CO6	-	-	-	M	-	-	L	M	M	-	-	L	H

L-Low M-Medium H-High

5.Course assessment methods

Direct

1. **Continuous Internal Assessment I ,II**
2. **Group discussion, Presentation, Assignment, Poster presentation, End Semester Examination**

Indirect

NAME OF THE COURSE COORDINATOR: MS. K. MAHESWARI

PRACTICAL CORE IV: DIETETICS- II PRACTICAL &DIETARY INTERNSHIP

Semester: VI **Code: U17ND6P6**

Credits: 3 **Hours/Week: 3**

1. COURSE OUTCOMES

At the end of the course, the students will be able to:

CO. No	Course Outcomes	Level	Unit Covered
CO1	Identify the epidemiology of various diseases and plan diet accordingly	K2	I
CO2	Evaluate the need of each and every patient and plan diet according to their individual needs.	K5	II
CO3	Plan and execute a diet for various disease conditions.	K5	II, III
CO4	Acquire practical knowledge in hospitals by attending dietary internship.	K5	IV
CO5	Equip themselves in the field of dietetics and to approach different patients.	K5	V
CO6	Develop the managerial skills in preparation of diet and supervision both professionally and personally.	K5	V

2.A. SYLLABUS

PLANNING ,NUTRITIVE VALUE CALCULATION ANDPREPARATION DIET FOR…

1. Diabetes Mellitus-IDDM, NIDDM and Gestational Diabetes

2. Hypertension, atherosclerosis and congestive heart disease

3. Nephritis, nephrotic syndrome acute and chronic renal failure and nephrolithiasis.

4. Liver disease – cirrhosis, jaundice, hepatitis.

5. Cancer

6. AIDS

B. TOPICS FOR SELF-STUDY

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C. TEXTBOOK-

D. REFERENCES

1. Krause,M.V.Mahan, "Nutrition Diet Therapy", 13th Edition.,W.B.Saunders Company, Philadelphia,2013.
2. MaimunNisha," Diet Planning for Disease",Kalpaz Pub, 2006.
3. Srilakshmi.V. "Dietetics", New age International pub., New Delhi,

3. SPECIFIC LEARNING OUTCOMES (SLO)

S.No.	Syllabus	Learning outcomes	Blooms taxonomy K1,k2,k3,k4,k5,& k6
1.	Diabetes Mellitus-IDDM, NIDDM and Gestational Diabetes	Classify Diabetes mellitus and plan a diet accordingly.	K3
		Analyze the causes of diabetes diseases. •	K4
		Plan a diet based on the condition of the patient.	K5
2.	Hypertension, atherosclerosis and congestive heart disease	Demonstrate various blood pressure.	K5
		Analyze the causes of cardiovascular diseases.	K4

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		Plan a diet based on the condition of the patient.	K5
3	Nephritis, nephrotic syndrome acute and chronic renal failure and nephrolithiasis.	Identify the condition of the infected person and the causes.	K2
		Estimate the required amount of nutrients necessary to relieve the condition and plan a diet based on it .	K5
		Plan a days diet for nephritic syndrome	K5
		Formulate the dietary supplements for chronic renal failure	K5
4.	Liver disease – cirrhosis, jaundice, hepatitis	Difference types of disease for liver.	K4
		Plan a days diet for fatty liver	K5
		Suggest the dietary modifications of liver disease	K5
		Develop the food supplementary food for cirrhosis patients	K5
5	Cancer	Identify the various types of cancer	K2
		Suggest the dietary requirements for various cancer patients	K5
		Plan and prepare for a days menu for adult women in who are suffering from breast cancer.	K5
		Develop the diet supplements of cancer patients	K5
6.	AIDS	Identify the HIV or AIDS	K2
		Suggest the dietary requirements for AIDS patients	K5
		Plan and prepare for a days menu for adult women in who are suffering from Severe	K5

		AIDS	
		Develop the diet supplements of AIDS patients	K5
	Poisson process - Monte Carlo simulation	discrete probability distributions	
1.2	Generating functions Introduction - Moment generating functions – Cumulant generating functions – Definition- Calculating moments - Linear functions - Further applications of generating functions.	Apply the generating moments and cumulants foe various discrete distributions	K3
II	**Joint Distribution**		
2.1	Introduction - Joint distributions - Joint probability (density) functions - Conditional probability (density) functions - Independence of random variables - Expectations of functions of two variables – Convolutions	Make use of the concept of , what is meant by jointly distributed random variables, marginal distributions and conditional distributions.	K3
2.2	Moments of linear combinations of random variables - Using generating functions to derive distributions of linear combinations of independent random variables - Moment generating functions - Using MGFs to derive relationships among variables	Apply the concept to generate Moments and functions and able to find the relationship between variables	K3
III	**Expectation & CLT**		
3.1	The conditional expectation $E[Y \mid X = x]$ - The random variable $E[Y \mid X]$ - The random variable var $[Y \mid X]$ and the '$E[V]$ var$[E]$ 'result - The Central Limit Theorem - Normal approximations - The continuity correction - Comparing simulated samples.	Expectations, conditional expectations Define the conditional expectation of one random variable given the value of another random variable, and calculate such a quantity.	K3
IV	**Statistical Inference**		

4.1	Introduction - Basic definitions - Moments of the sample mean and variance - Sampling distributions for the normal - The	Explain various types of sampling and the relationship between	K2

	t result - The F result for variance ratios - The method of moments -	various sampling distributions	
4.2	The method of maximum likelihood – Unbiasedness - Mean square error - Asymptotic distribution of MLEs - Comparing the method of moments with MLE - The bootstrap method	Inference the method of moments for constructing estimators of population parameters.	K4
V	**Confidence Interval**		
5.1	Introduction - Confidence intervals in general - Derivation of confidence intervals - Confidence intervals for the normal distribution - Confidence intervals for binomial & Poisson parameters - Confidence intervals for two-sample problems - Paired data - Hypotheses, test statistics, decisions and errors -	Choose the confidence interval for distributions	K5
5.2	Significance and p-values - Basic tests – single samples - Basic tests – two independent samples - Basic test – paired data - Tests and confidence intervals - Non-parametric tests - Chi-square tests.	Develop the test for hypothesis in various situation and conclude	K6

4. Mapping Scheme

Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4
CO1	L	L	M	H	H	M	H	H	L	H	H	H	L
CO2	M	M	M	H	H	M	H	H	L	H	H	H	L
CO3	M	H	H	H	M	H	M	H	M	H	H	H	L
CO4	-	M	L	L	L	-	-	M	L	M	M	H	-
CO5	L	H	L	H	L	-	-	M	M	M	M	M	-
CO6	H	H	L	H	L	M	-	H	-	L	-	-	H

L-Low **M-Moderate** **H- High**

5.Course assessment methods

Direct
1. Continuous Internal Assessment I ,II 2. **Group discussion, Presentation, Assignment, Poster presentation** **3. End sem examination**
Indirect

NAME OF THE COURSE COORDINATOR: MRS. C. ROSELIN