ALAGAPPA UNIVERSITY

(Accredited with A+ Grade by NAAC (CGPA: 3.64) in the Third Cycle,
Graded as Category-I University and granted autonomy by MHRD-UGC)

DIRECTORATE OF COLLABORATIVE

PROGRAMMES

BSc Nutrition & Dietetics

Regulations and Syllabus

[For those who join the Course in July 2023 and after]

CHOICE BASED CREDIT SYSTEM

B.Sc Nutrition Dietetics conducted by Alagappa University, Karaikudi, Tamil Nadu through its Collaborative Institution _____ at _____.

Applicable to all the candidates admitted from the academic year **2023** onwards.

1. **Eligibility:**

   A pass in the Higher Secondary Examination (HSC) conducted by the Government of Tamil Nadu, or an examination accepted as equivalent thereto by the Syndicate. Candidate for admission to **B.Sc., Nutrition Dietetics** shall be required to have passed qualifying examination with at least 55% marks in Physics, Chemistry and Biology (PCB).

2. **For the Degree:**

   The candidates shall have subsequently undergone the prescribed programme of study in a institute for not less than three academic years, passed the examinations prescribed and fulfill such conditions as have been prescribed therefore.

3. **Admission:**

   Admission is based on the marks in the qualifying examination.

4. **Duration of the course:**

   The course shall extend over a period of **Three years** under semester pattern accounting to six semesters.

5. **Standard of Passing and Award of Division:**
   a. Students shall have a minimum of 40% of total marks of the University examinations in each subject. The overall passing minimum is 40% both in aggregate of Continuous Internal Assessment and external in each subject.
   b. The minimum marks for passing in each theory / Lab course shall be 40% of the marks prescribed for the paper / lab.
   c. A candidate who secures 40% or more marks but less than 50% of the aggregate marks prescribed for three years taken together, shall be awarded **THIRD CLASS.**
   d. A candidate who secures 40% or more marks but less than 60% of the aggregate marks prescribed for three years taken together, shall be awarded **SECOND CLASS.**
   e. A candidate who secures 60% or more of the aggregate marks prescribed for three years taken together, shall be awarded **FIRST CLASS.**
   f. Only Part-III subjects were considered for the ranking.
   g. The Practical / Project shall be assessed by the two examiners, by an internal examiner and an external examiner.

6. **Continuous internal Assessment:**
   a. Continuous Internal Assessment for each paper shall be by means of Written Tests, Assignments, Class tests and Seminars
   b. **25 marks** allotted for the Continuous Internal assessment is distributed for Written Test, Assignment, Class test and Seminars.
   c. Two Internal Tests of 2 hours duration may be conducted during the semester for each course / subject and the best marks may be considered and one Model Examination will be conducted at the end of the semester prior to University examination. Students may be asked to submit at least five assignments in each subject. They should also participate in Seminars conducted for each subject and marks allocated accordingly.
   d. Conduct of the continuous internal assessment shall be the responsibility of the concerned faculty.
   e. The continuous internal assessment marks are to be submitted to the University at the end of every year.
   f. The valued answer papers/assignments should be given to the students after the valuation is over and they should be asked to check up and satisfy themselves about the marks they have scored.
   g. All mark lists and other records connected with the continuous internal assessments should be in the safe custody of the institution for at least one year after the assessment.

7. Attendance:

Students must have earned 75% of attendance in each course for appearing for the examination.

Students who have earned 74% to 70% of attendance to be applied for condonation in the prescribed form with the prescribed fee.

Students who have earned 69% to 60% of attendance to be applied for condonation in the prescribed form with the prescribed fee along with the medical certificate.

Students who have below 60% of attendance are not eligible to appear for the examination. They shall re-do the semester(s) after completion of the programme.

8. Examination:

Candidate must complete course duration to appear for the university examination. Examination will be conducted with concurrence of Controller of Examinations as per the Alagappa University regulations. **University may send the representatives as the observer during examinations.** University Examination will be held at the end of the each semester for duration of 3 hours for each subject. Certificate will be issued as per the AU regulations. **Hall ticket will be issued to the 1st year candidates and upon submission of the list of enrolled students along with the prescribed course fee subsequent 2nd and 3rd year hall tickets will be issued.**

9. Question Paper pattern:

Maximum: 75 Marks	Duration: 3Hours
Part A - Short answer questions with no choice	: 10 x 02=20
Part B – Brief answer with either or type	: 05 x 05=25
Part C- Essay – type questions of either / or type	: 03 x 10=30

10. Miscellaneous

a. Each student posses the prescribed text books for the subject and the workshop tools as required for theory and practical classes.
b. Each student is issued with an identity card by the University to identify his / her admission to the course
c. Students are provided library and internet facilities for development of their `studies.
d. Students are to maintain the record of practicals conducted in the respective laboratory in a separate Practical Record Book and the same will have to be presented for review by the University examiner.
e. Students who successful complete the course within the stipulated period will be awarded the degree by the University.

11. Fee structure

Course fee shall be as prescribed by the University and 50% of the course fee should be disbursed to University. Special fees and other fees shall be as prescribed by the Institution and the fees structure must intimated to the University. Course fees should be only by Demand draft / NEFT and AU has right to revise the fees accordingly.

Semester pattern

Course Fee payment deadline
Fee must be paid before 30th September of the academic year

12. Other Regulations:

Besides the above, the common regulation of the University shall also be applicable to this programme.

SYLLABUS UNDER CBCS PATTERN (w.e.f.2023-24) BSc NUTRITION & DIETETICS PROGRAMME STRUCTURE

Sem.	Part	Courses	Course/ Sub Code	Title of the Paper	T/P	Cr.	Hrs./ Wk	Max. Marks		
								Int.	Ext.	Total
I	I	T/OL	96311T/11H/ 11F	Tamil /Other Languages -I	T	3	3	25	75	100
	II	E	96312	General English - I	T	3	3	25	75	100
	III	CC	96313	Food Science	T	4	5	25	75	100
		CC	96314	Food Chemistry	T	4	5	25	75	100
		CC	96315	Food Microbiology	T	4	4	25	75	100
		CC	96316	Food Chemistry, Microbiology and Food Science - Practical	P	2	4	25	75	100
		Allied	96317	Fundamentals of Biochemistry	T	4	4	25	75	100
	IV	SEC -I	96318	Value Education	T	2	2	25	75	100
				Library						
				Total		**26**	**30**	**200**	**600**	**800**
II	I	T/OL	96321T/H/F/ M/TU/A/S	Tamil/Other Languages-II	T	3	4	25	75	100
	II	E	96322	General English - II	T	3	4	25	75	100
	III	CC	96323	Principles of Nutrition	T	4	5	25	75	100
		CC	96324	Nutrition through Life Cycle	T	4	5	25	75	100
		CC	96325	Principles of Nutrition - Practical	P	2	4	25	75	100
		Allied	96326	Human Physiology	T	4	5	25	75	100
	IV	SEC -II	96527	Environmental Studies	T	2	2	25	75	100
				Library		--	1	--	--	--
				Total		**22**	**30**	**175**	**525**	**700**
III	I	T/OL	96331T/H/F/ M/TU/A/S	Tamil/Other Languages-III	T	3	4	25	75	100
	II	E	96332	General English – III	T	3	4	25	75	100
	III	CC	96333	Basic Food Processing and Preservation	T	4	5	25	75	100
		CC	96334	Food Standards and Quality Control	T	4	5	25	75	100
		CC	96335	Basic Food Processing and Preservation - Practical	P	2	4	25	75	100
		Allied	96336	Nutrition for Health and Fitness	T	4	4	25	75	100
	IV	SEC -III	96337	Entrepreneurship	T	2	2	25	75	100
		SEC - IV	96338A	1.Adipadai Tamil	P	2	2	25	75	100
			96338B	2.Advance Tamil	T					
			96338C	3. IT skills for Employment	T					
				4. MOOC'S	T					
				Total		**24**	**30**	**200**	**600**	**800**
IV	I	T/OL	96341T/H/F/ M/TU/A/S/	Tamil/Other Languages-IV	T	3	3	25	75	100
	II	E	96342	General English – IV	T	3	3	25	75	100
	III	CC	96343	Dietetics - I	T	4	4	25	75	100
		CC	96344	Food Service Management	T	3	4	25	75	100
		CC	96345	Food Product Development and Marketing Strategy	T	3	4	25	75	100
		CC	96346	Dietetics - I Practical	P	2	4	25	75	100
		Allied	96347	Bakery and Confectionary	T	3	3	25	75	100
		DSE	96348A	Computers in Food Science/	T	3	3	25	75	100

			96348B	Sports Nutrition						
	IV	SEC -V	96349A 96349B 96349C	1.Adipadai Tamil	P	2	2	25	75	100
				2.Advance Tamil	T					
				3. Small Business Management	T					
				4. MOOC'S	T					
				Total		**26**	**30**	**225**	**675**	**900**
V	III	CC	96351	Dietetics II	T	4	6	25	75	100
		CC	96352	Community Nutrition	T	4	6	25	75	100
		CC	96353	Dietetics II – Practical	P	3	6	25	75	100
		DSE	96354A 96354B	Research Methodology/ Paediatric Dietetics	T	4	5	25	75	100
		DSE	96355A 96355B	Food Packaging and Marketing Management/ Traditional Herbs in Food Science	T	4	5	25	75	100
		Others		Library / /Yoga etc		-	2	-	-	-
VI	III			Total		**19**	**30**	**125**	**375**	**500**
		CC	96361	Bio-Process Technology	T	4	5	25	75	100
		CC	96362	Food Safety, Security and Ethics	T	4	5	25	75	100
		CC	96363	Bio-Process Technology – Practical	P	3	6	25	75	100
		DSE	96364A 96364B	Nutraceutical / Gender Studies	T	4	4	25	75	100
			96365A/ 96365B	Project/ Internship	PR/ I	8	10	25	75	100
				Total		**23**	**30**	**125**	**375**	**500**
			Grand Total			**140**	**180**	**1050**	**3150**	**4200**

T – Theory **1 cr = 1 hr**
P - Project/Field **1 cr = 2 hrs**
Minimum credit = 90

- MIL-Modern Indian Language, E – English
- CC-Core course –Core competency , critical thinking, analytical reasoning ,research skill &team work
- Allied / GEC -Exposure beyond the discipline
- AECC- -Ability Enhancement Compulsory Course (Professional English & EnvironmentalStudies) - Additional academic knowledge, psychology and problem solving etc.,
- SEC-Skill Enhancement Course - Exposure beyond the discipline (Value Education , Entrepreneurship Course, Computer application for Science, etc.,
- NME -Non Major Elective – Exposure beyond the discipline
- DSE – Discipline specific elective –Additional academic knowledge, critical thinking, and analytical reasoning-Student choice - either Internship or Theory papers or Project + 2 theory paper. If internship – Marks = Internal (150 (75+75) two midterm evaluation through Viva voce + Report 150+ External Viva voce 100 = 400, If Project Marks = Internal -25
  +Thesis -+ Viva voce = 75=100 and + 3 theory paper = 300 = 400

Extension activity & MOOCs – Voluntary basis

Program Outcome (POs)-On successful completion of the B.Sc. Nutrition & Dietetics Program (963)	
PO1	Provide nutrition counseling and education to individuals, groups, and communities throughout the lifespan using a variety of communication strategies.
PO2	Evaluate nutrition information based on scientific reasoning for clinical, community, and food service application.
PO3	Apply technical skills, knowledge of health behavior, clinical judgment, and decision-making skills when assessing and evaluating the nutritional status of individuals and communities and their response to nutrition intervention.
PO4	Implement strategies for food access, procurement, preparation, and safety for individuals, families, and communities.
PO5	Perform food management functions in business, health-care, community, and institutional arenas.
PO6	Practice state-of-the-art nutrition care in collaboration with other healthcare providers in interdisciplinary settings within the bounds of ethical, legal, and professional practice standards.
PO7	Provide culturally competent nutrition services for individuals and communities.
PO8	Accurately interpret data and research literature to solve complex problems.
PO9	Competence in the skills of assessment, planning, management and evaluation of food service, nutrition and dietetic services in institutional food, community nutrition, and clinical dietetics settings.
PO10	Students will utilize advanced principles of health literacy, including critical thinking skills, literature searches, data collection and interpretation, necessary for the implementation of food and nutrition services in professional settings.

Program Specific Outcome (PSOs)	
After the successful completion of the Nutrition program, the students are expected to	
PSO1	Understanding the role and functioning of dieticians and nutritionists in different health organizations like hospitals, clinics, nursing homes, gyms, corporate sectors, food industries, etc.
PSO2	Imbibing knowledge, skills and holistic understanding of the subject to be able to enter teaching profession at school/ college/ university level after higher studies in related field.
PSO3	Developing diet planning skills for healthy and diseased individuals in society for better health management and prevention of diseases. Sensitization and awareness about the hazards of poor hygiene and sanitation and its management.
PSO4	Inculcating an entrepreneur mindset to be able to have one's own established business in future.
PSO5	Developing research skills in nutrition field through Dissertation/Project.

I - Semester					
Core	**Course code: 96313**	**Food Science**	**T**	**Credits: 4**	**Hours: 5**
Pre-requisite	**Basic and Applied Science of Food**		**Syllabus revised**		**2022- 23**

Course Objectives

1. Obtain knowledge of different food groups and their nutritive value and role in day's diet.
2. Understand the principle underlying food preparation.
3. Develop skills and techniques in food preparation with conservation of nutrients and palatability.
4. Different methods of processing and cooking.
5. Obtain knowledge about the nutrients present in the foods.

Unit I	**Food Science:** Food, Nutrients, Nutritional Status, Malnutrition- under-nutrition, over-nutrition, Balanced diet. Hunger - Hollow Hunger, Hidden-hunger, Appetite, Satiety, Health, Meal, Menu. Food Groups: Basic five, Nutritional classification of foods – Energy yielding, Body building and protective foods. Cooking: Objectives, cooking methods - Moist and Dry heat methods of cooking, merits and demerits.
Unit II	Cereals and Cereal products: Structure and Nutritive value of rice and wheat, nutritional importance of millets – maize, jowar, ragi, bajra, Milling of rice and wheat, Parboiling of rice, Products of wheat and rice, Enrichment and fortification of cereals and flours, Batters and doughs; Malting of cereals. Pulses and Nuts: Nutritive value, factors affecting cooking quality of pulses, germination – process, advantages.
Unit III	Vegetables: Botanical classification, Nutritive value, Pigments- fat soluble, water soluble, selection of vegetables, cooking of vegetables - changes during cooking, nutrient loss, effect of cooking on the pigments Fruits: Classification, Nutritive value, changes during ripening of fruits, enzymatic browning and prevention, storage. Beverages - classification, nutritive value, and milk based beverages - methods of preparing tea and coffee, fruit based beverages and preparation of carbonated non alcoholic beverages.
Unit IV	Milk and Milk Products: Composition and Nutritive value, Different types of milk, pasteurization of milk, milk products - dry milk, cheese. Egg: Structure, Composition and Nutritive value. Measures of egg quality, role of egg in cookery. Meat - structure, composition, a list of different types of meat, cuts of meat, post mortem changes in meat, and tenderness of meat. Poultry - composition and classification. Fish - structure, composition, nutritive value, selection of fish.
Unit V	Fats and oils - composition processing and refining of fats, refined oils, plasticity, hydrogenation, winterization. Smoking point, factors that lower smoking point, absorption of fat during cooking. Sugar - nutritive value, sugar related products, stages of sugar cookery, crystallization, factors affecting crystallization. Spices and condiments - types and uses in Indian cookery, medicinal value.

References

Potter, N. and Hotchkiss, J.H. *Food Science*, 5th Ed., CBS Publications and Distributors, Daryaganji, New Delhi, 1998.

ShakuntalaManay, Shadaksharaswamy. M (2000) *Foods, Facts and Principles*, New Age International Pvt Ltd Publishers, 2nd Edition

Usha Chandrasekhar, *Food Science and Application in Indian Cookery*, Phoenix Publishing House P. Ltd., New Delhi, 2002.

Srilakshmi, B. *Food Science*, New Age International Publishers, New Delhi, 2010

Swaminathan, M, *Hand Book of Food Science and Experimental Foods*, BAPPCO, Bangalore, 1992

Related online content (MOOC, Swayam, NPTEL, Website etc.)

www.fda. gov-vegetables

http://www.eatforhealth.gov.au- flesh foods, egg & milk

Course Outcomes		**Knowledge level**
CO-1	Knowledge on food groups and its function, nutritional classification of foods and understanding cooking methods.	K2
CO-2	Knowledge on nutritive value and understand the cookery concepts involved in cereals, pulses and nuts.	K2
CO-3	Clear ideas about nutritional classification and understand the changes in pigments of vegetables apply knowledge on preparation of beverages.	K3
CO-4	Overview of the composition, structure, nutritive value and develop skills in the preparation of milk, egg, meat and fish.	K3
CO-5	Understand about fat & oils, sugar cookery and uses of spices and condiments.	K2

Course designed by **Sinisha Anto**

Mapping Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M (2)	L(1)	S (3)	S (3)	L(1)	L(1)	L(1)	L(1)	L(1)	L(1)
CO2	L(1)	L(1)	S (3)	M(2)	L(1)	L(1)	L(1)	L(1)	L(1)	L(1)
CO3	L (2)	L (1)	M (2)	M (2)	L (1)	L (1)	L (1)	L (1)	L (1)	L(1)
CO4	M(2)	L(1)	M(2)	S (3)	L (1)	L (1)	L (1)	L (1)	L (1)	L(1)
CO5	L(1)	M(2)	M(2)	M (2)	L (1)	L (1)	L (1)	L (1)	L (1)	L(1)
W.AV	**1.4**	**1.2**	**2.4**	**2.4**	**1.0**	**1.0**	**1.0**	**1.0**	**1.0**	**1.0**

S –Strong (3), M-Medium (2), L- Low (1)

Mapping Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M(2)	M(2)	M(2)	L(1)	L(1)
CO2	M(2)	M(2)	M(2)	L(1)	L(1)
CO3	L (2)	M(2)	L (1)	L(1)	L(1)
CO4	M(2)	M(2)	M(2)	L(1)	L(1)
CO5	L(1)	M(2)	L(1)	L(1)	L(1)
W.AV	**1.6**	**2.0**	**1.6**	**1.0**	**1.0**

S –Strong (3), M-Medium (2), L- Low (1)

I - Semester					
Core	**Course code: 96314**	**Food Chemistry**	**T**	**Credits: 4**	**Hours: 5**
Pre-requisite	**Basic Knowledge of Chemistry of Foods**		**Syllabus revised**		**2022- 23**
Course Objectives	1. To gain knowledge in major and minor components of foods. 2. To know composition and properties of foods. 3. To understand the changes that takes place during cooking. 4. To understand experiment the hydration. 5. To develop cooking skills.				
Unit I	**Physico-chemical properties of foods:** Moisture in Foods - Hydrogen Bonding, - Bound Water - Water Activity in Foods - Determination of Moisture Content in Foods. True Solutions - Dispersions - Sols - Gels - Foams - Colloids and Emulsions. Energy Value of Food. Hydration – dehydration and hyperhydration.				
Unit II	**Chemistry of Starch and Sugars:** Components of Starch - Swelling of Starch Granules - Gel Formation – Retro gradation - Syneresis. Effect of Sugar - Acid, Alkali, Fat and Surface Active Agents on Starch. Stages of Sugar Cookery - Crystal Formation and factors affecting it. Types of Candies - Action of Acid, Alkali and Enzymes. Chemistry of Milk Sugar - Non Enzymatic Browning. Digestion, Absorption, Metabolism and utilization of Carbohydrates.				
Unit III	**Chemistry of Proteins:** Components of Wheat Proteins – 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 Proteins during Heating Action of Heat - Acid, Alkalis on Vegetables Proteins and Animal Proteins. Digestion, Absorption, Metabolism and utilization of Proteins.				
Unit IV	**Chemistry of Fats and Oils:** Physical and Chemical Properties of Fats 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. Digestion, Absorption, Metabolism and utilization of Fats.				
Unit V	**Chemistry of Pectic Substances, Plant Pigments, Spices and condiments:** Pectins - Phenolic Components - Enzymatic Browning in Fruits and Vegetables. Volatile Compounds from Cooked Vegetables - Different Types of Plant Pigments – Water and Fat Soluble Pigments. Properties and Active Principles of Spices and Condiments.				

References

ShakuntalaManay, Shadaksharaswamy. M (2000) *Foods, Facts and Principles*, New Age International Pvt Ltd Publishers, 2nd Edition.

Chandrasekhar, U. *Food Science and applications in Indian Cookery* (2002) Phoenix Publishing House, New Delhi.

Swaminathan, M. *Food Science*, (2005) *Chemistry and Experimental Foods*, Bappco Publishers, Bangalore.

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

Paul, P.C. and Palmer, H.H. *Food Theory and Applications* (2000) JohnWiley and Sons, New York, (Revised Edition).

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

Related online content (MOOC, Swayam, NPTEL, Website etc.)

https://pubmed.ncbi.nlm.nih.gov

https://iiwbr.icar.gov.in/

Course Outcomes		**Knowledge level**
CO-1	Understand physical and chemical properties and reactions in food.	K2
CO-2	Gain knowledge on colloidal system, gel formation and its uses.	K1
CO-3	Gain knowledge and evaluate the browning reaction in food.	K5
CO-4	An overview on various properties of water.	K1
CO-5	Knowledge on various methods of heat transfer	K3

Course designed by **Athira Antony**

Mapping Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	L (1)	L (1)	M (2)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)
CO2	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)
CO3	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)
CO4	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)
CO5	L (1)	M (2)	M (2)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)
W.AV	**1**	**1.2**	**1.4**	**1**	**1**	**1**	**1**	**1**	**1**	**1**

S –Strong (3), M-Medium (2), L- Low (1)

Mapping Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L (1)	S (3)	L (1)	M (2)	L (1)
CO2	L (1)	S (3)	L (1)	L (1)	L (1)
CO3	L (1)	S (3)	L (1)	L (1)	L (1)
CO4	L (1)	S (3)	L (1)	L (1)	L (1)
CO5	L (1)	S (3)	L (1)	S (3)	L (1)
W.AV	**1**	**3**	**1**	**1.6**	**1**

S –Strong (3), M-Medium (2), L- Low (1)

I - Semester					
Core	**Course code: 96315**	**Food Microbiology**	**T**	**Credits: 4**	**Hours: 4**
Pre-requisite	**Basic Knowledge of Microbiology in Food**		**Syllabus revised**		**2022- 23**

Course Objectives	1. To familiarize basic information about Microbiology. 2. To provide knowledge about the factors affecting microbial growth. 3. To learn the food types according to spoilage. 4. To learn the beneficial effects of microorganisms. 1. To learn about food borne diseases.
Unit I	**Introduction to Microbiology:** Definition and history of microbiology. General morphology of microorganisms - bacteria, fungi, algae, yeast and virus.
Unit II	**Factors affecting microbial growth in food:** Intrinsic factors- nutrient content, pH, redox potential, antimicrobial barrier and water activity. Extrinsic factors - relative humidity, temperature and gaseous atmosphere.
Unit III	**Microbiology of Perishable Foods:** Spoilage and Preservation of vegetables and fruits, milk and milk products and canned foods, meat and meat products, egg and poultry.
Unit IV	**Microbiology of Nonperishable Foods:** Spoilage and preservation of cereal and cereal products and sugar and sugar products.
Unit V	**Beneficial Effects of Microorganisms And Microbial Diseases:** Fermented Foods – Curd, Cheese, Sauerkraut, Meat, Soy Based Foods, Alcoholic Beverages, Vinegar and Microbial Biomass. Food borne infections and food-borne diseases–Food poisoning, Cholera, Typhoid, diarrhea, Salmonellosis, Botulism and Shigellosis.

References

Frazier, W.C.(2014)*FoodMicrobiology*,TataMcGrawHillsPublishingCompanyLimited,Chennai.

Ananthanarayan.R&PanikerC.K.J.: *TextbookofMicrobiology*, UniversitiesPress; Tenthedition2017.

Jay M.J (2015) *Modern Food Microbiology*, Fourth Edition, CBS Publishers and Distributors, New Delhi.

Adams, MR and Moss, MO (2015) *Food Microbiology*, New Age International (P) Ltd.,

NewWilleyJ, Sherwood.L, Woolverton J.C, *Prescott's Microbiology***,** McGraw-Hill Education, IX Edition,2013

Salle. A. J :*Fundamental Principles of Bacteriology* – ReadBooks,2007

Related online content (MOOC, Swayam , NPTEL, Website etc.)

https://aggie-horticulture.tamu.edu/food-technology/food-processing-entrepreneurs/microbiology-of-food/

https://www.cdc.gov/foodsafety/foodborne-germs.html

Course Outcomes		**Knowledge level**
CO-1	Understand the basic knowledge about microbiology.	K2
CO-2	Analyze the role of microorganisms in food.	K4
CO-3	Understand and the nature of microorganisms involved in food spoilage.	K4
CO-4	Acquire knowledge of beneficial microbes.	K2
CO-5	Analyze the importance of food borne pathogens.	K5

Course designed by **Janisha I**

Mapping Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)
CO2	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)
CO3	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)
CO4	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)
CO5	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)
W.AV	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**

S –Strong (3), M-Medium (2), L- Low (1)

Mapping Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L (1)	L (1)	L (1)	L (1)	L (1)
CO2	L (1)	M (1)	L (1)	L (1)	L (1)
CO3	L (1)	M (2)	M (2)	L (1)	M (1)
CO4	L (1)	L (1)	L (1)	L (1)	L (1)
CO5	L (1)	L (1)	L (1)	L (1)	M (2)
W.AV	**1**	**1.4**	**1.4**	**1**	**1.4**

S –Strong (3), M-Medium (2), L- Low (1)

I - Semester					
Core	**Course code: 96316**	**Food Chemistry, Microbiology and Food Science - Practical**	**P**	**Credits: 2**	**Hours: 4**
Pre-requisite	**Basic Practical Knowledge**		**Syllabus revised**		**2022- 23**
Course Objectives	1. To gain knowledge about the chemistry, properties and reactions of various food components. 2. To enable the students to study the Physico-chemical changes in food occur during cooking. 3. To provide instructions in the general Principles of food microbiology. 4. To understand the concept of food selection based on nutrient sources. 5. To understand methods of measuring ingredients and demonstration of cooking methods.				
Unit I	**Food Microbiology:** 1.General Laboratory Rules and Regulations. 2. Demonstration of different parts of microscope and accessories – their Use and care. 3. Examination of microorganisms through Hanging Drop. 4. Examination of microorganisms by Simple Staining Method. 5. Examination of microorganisms by Differential Staining Method. 6. Preparation of culture media – Streak and Pour Plate method, Total Count.				
Unit II	**Chemistry of Starch and Sugar:** Gelatinization of Starch - Microscopic Examination of uncooked and gelatinized Starch - Retro gradation and Syneresis - Gluten Formation - Stages of Sugar Cookery - Preparation of Fondant – Fudge and Toffee - Scum formation in milk.				
Unit III	**Chemistry of Proteins:** Gluten Formation Effect of Soaking, germination and fermentation of Pulses - Coagulation of egg white and egg yolk - Boiled Egg, Poached Egg, Omelets, and Custards, Cake and Mayonnaise - Coagulation and precipitation of milk proteins. Changes observed in Cooking Meat, Fish and Poultry - Testing the Tenderness of meat. **Chemistry of Fats and Oils:** Smoking Temperature of Different Fats - Factors Affecting Absorption of Fats.				
Unit IV	**Preparation with Cereals, pulses & vegetables:** **Cereals** – Preparation of rice by steaming, absorption method, Straining and Pressure cooking. Batters and dough Preparation of Idli, Dosa, Upma, Kichadi, Chapathi, Poori, Fried Rice, Briyani and variety rice. **Pulses** – Factors affecting the cooking quality of pulses. Preparation of Sambar, Sundal, Bholi, Mysore-pak, Vada, Channa Masala, Thuvaiyal, Green gram payasam, Besan omlette, Sprouted salad and koottu. **Vegetables** – Selecting, cleaning, coring, pitting and chopping of fruits and vegetables. Avial, porriyal, pugath, stew, kuruma, cutlet, fry, chips, podimas, pachadi, stuffed chapathi, koottu.				
Unit V	**Preparation with Fruit, milk & egg:** **Fruits** – Fritters, Halwa, Salad, Stuffed items, Jelly, Payasam, Thokku, Sauce and Jams. **Milk** – Cottage Cheese, Paneer, Phirnee, Payasam, Ice cream, kova, Buttermilk curry, Basanthi and Jamun. **Egg** – Boiled, Scrambled, Poached, Curry, Masala, Omelet.				
References					
Related online content (MOOC, Swayam, NPTEL, Website etc.)					

Course Outcomes		**Knowledge level**
CO-1	Develop skills on various cooking methods and medium of cooking.	K3
CO-2	Develop culinary skills to satisfy sensory and nutrient needs.	K3
CO-3	Acquire knowledge in the composition of food groups, factors influencing changes in the cooking quality.	K1
CO-4	Gain sufficient knowledge about the chemistry of starch, protein, fat &oils, Pectic substances.	K1
CO-5	Explain the significance and activities of microorganism in food.	K2

Course designed by **Sinisha Anto & Janisha I**

Mapping Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M (2)	M (2)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)
CO2	L (1)	M (2)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)
CO3	M (2)	M (2)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)
CO4	L (1)	M (2)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)
CO5	S (3)	M (2)	L (1)	S (3)	L (1)	M (2)	L (1)	L (1)	L (1)	L (1)
W.AV	**1.8**	**2**	**1**	**1.4**	**1**	**1**	**1**	1	1	**1**

S –Strong (3), M-Medium (2), L- Low (1)

Mapping Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L (1)	S (3)	M (2)	L (1)	L (1)
CO2	L (1)	S (3)	M (2)	L (1)	L (1)
CO3	L (1)	S (3)	M (2)	L (1)	L (1)
CO4	L (1)	S (3)	M (2)	L (1)	L (1)
CO5	L (1)	S (3)	M (2)	S (3)	L (1)
W.AV	**1**	**3**	**2**	**1.4**	**1**

S –Strong (3), M-Medium (2), L- Low (1)

I - Semester					
Allied	**Course code: 96317**	**Fundamentals of Biochemistry**	**T**	**Credits: 4**	**Hours: 4**
Pre-requisite	**Basic Knowledge of Biomolecules**		**Syllabus revised**		**2022- 23**
Course Objectives	1. To familiarize the basics of biochemistry. 2. To learn about structures of biomolecules. 3. To learn the basics of enzymology. 4. To educate the functions of biomolecules. 1. To provide knowledge in basics of genetic material.				
Unit I	**Introduction To Biochemistry:** Biomolecules – Introduction to Carbohydrates, Lipids, Proteins, Nucleic acids. Water – Properties, non – covalent interactions (Hydrogen Bond, Vander wall's forces, Ionic bond). Acids, Bases. PH & Buffers.				
Unit II	**Carbohydrates & Lipids:** Carbohydrates - Basic Structure, Classification, functions and properties. Monosaccharide, Disaccharides, Oligosaccharides and Polysaccharides. Lipids –Classification, Functions and properties. Fatty acids, Triglycerides and Phospholipids.				
Unit III	**Amino Acids And Proteins:** Amino acids – Introduction, Structure, Classification, functions and properties. Proteins – Structure (primary and secondary only) Classification, functions and properties.				
Unit IV	**Nucleic Acids:** Nucleotides and Nucleosides Basic Structure, functions and properties of DNA & RNA. Double helical structure of DNA. Introduction to replication and transcription.				
Unit V	**Enzymes:** Introduction – properties and Classification. Specificity, Active sites, Substrate binding theories – Lock and key and induced fit hypothesis. Factors affecting the enzyme activity. Application of Enzymes in food industry.				

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https://www.kau.edu.sa

Course Outcomes		**Knowledge level**
CO-1	Understand the fundamental concepts of biochemistry.	K2
CO-2	Understand the significance of biomolecules.	K4
CO-3	Analyze the structures of biomolecules.	K4
CO-4	Understand basics of molecular biology.	K2
CO-5	Analyze Application of biological compounds in food industry.	K4

Course designed by **Rahila M P**

Mapping Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)
CO2	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)
CO3	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)
CO4	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)
CO5	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)
W.AV	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**

S –Strong (3), M-Medium (2), L- Low (1)

Mapping Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L (1)	L (1)	L (1)	L (1)	L (1)
CO2	L (1)	L (1)	L (1)	L (1)	L (1)
CO3	L (1)	L (1)	M (2)	L (1)	L (1)
CO4	L (1)	L (1)	L (1)	L (1)	L (1)
CO5	L (1)	L (1)	L (1)	L (1)	M (2)
W.AV	**1**	**1**	**1.2**	**1**	**1.2**

S –Strong (3), M-Medium (2), L- Low (1)

II - Semester					
CC	**Course code: 96323**	**Principles of Nutrition**	**T**	**Credits: 4**	**Hours: 5**
Pre-requisite	**Basic Knowledge of Nutrients**		**Syllabus revised**		**2023- 24**
Course Objectives	1. Acquire an understanding of nutrition science for health promotion and disease prevention 2. Gain knowledge on functions, metabolism, requirements and effects of deficiency of nutrients. 3. Gain scientific knowledge about the vital link between nutrition and health of individuals. 4. Understand the interrelationship of the various nutrients. 5. Get insight into the role of nutrients in maintaining health of the individual and community				
Unit I	**Energy**: (a) Energy – Definitions, Energy units, Determination of energy value of foods by direct and indirect calorimetry and physiological Energy Value of foods. (b) BMR – Definitions, Determinations, Factors affecting the BMR; Energy requirements for physical activity – Factorial method, Energy requirement and sources. (c) General principles of deriving RDA, Factors affecting RDA				
Unit II	**Carbohydrates and proteins**:(a) Carbohydrates – Definition, Nutritional classification, Functions, Requirements and Sources, digestion, absorption, glycemic index and metabolism.(b) Dietary Fibre – Definition, Classification, Role of Fibre in Preventing disease and sources.(c)Proteins – Definition, Composition, Nutritional classification of protein and amino acids, Functions of Proteins and amino acids, Sources and Requirements, Deficiency; Evaluation of Protein quality – PER, BV, NPU and chemical score.				
Unit III	**Lipids & Water** (a) Lipids – Definition, Composition, Nutritional classification, Functions, Sources digestion, absorption, metabolism and requirements; Essential fatty acids – Definition, Functions, Sources and effects of deficiency.(b) Water – Distribution of water and electrolytes , functions , requirements, sources, water balance				
Unit IV	**Minerals**: (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. (c) Micro Minerals – Iron, Iodine, Copper, Flourine and Zinc – Functions, Requirements, Sources and Effect of Deficiency				
Unit V	**Vitamins**: a) Vitamins – Deficiency, Classification and General Functions. (b) Fat Soluble Vitamins – Vitamin A, D, E and K – Functions, Requirements, Sources and Effect of deficiency. (c) Water soluble vitamins – Thiamine, Riboflavin, Niacin, Ascorbic acid, Folic acid, Vitamin B6 and B12 – Functions, Requirements, Sources and Effects of deficiency				

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Course Outcomes		**Knowledge level**
CO-1	Understand basic physiology and biochemistry of nutrients	K2
CO-2	Gain knowledge on the role of nutrient in growth and maintenance of physical structure and metabolism of the body	K1
CO-3	Comprehend the various nutritional disorders and curing the effect of malnutrition	K2
CO-4	Evaluate nutrition information based on scientific reasoning for clinical and community application	K3
CO-5	Understand the importance of food and meaning of nutrition and familiarize them with RDA and Recommendations and guidelines	K2

Course designed by **Sinisha Anto**

Mapping Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M(2)	L(1)	L(1)	L(1)	L(1)	L(1)	L(1)	L(1)	L(1)	L(1)
CO2	L(1)	L(1)	L(1)	L(1)	L(1)	L(1)	L(1)	L(1)	L(1)	L(1)
CO3	L(1)	L(1)	L(1)	L(1)	L(1)	L(1)	L(1)	L(1)	L(1)	L(1)
CO4	L(1)	L(1)	L(1)	L(1)	L(1)	L(1)	L(1)	L(1)	L(1)	L(1)
CO5	L(1)	L(1)	L(1)	L(1)	L(1)	L(1)	L(1)	L(1)	L(1)	L(1)
W.AV	**1.2**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**

S –Strong (3), M-Medium (2), L- Low (1)

Mapping Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M(2)	L(1)	L(1)	L(1)	L(1)
CO2	L(1)	M(2)	L(1)	L(1)	L(1)
CO3	M(2)	L(1)	L(1)	L(1)	L(1)
CO4	M(2)	L(1)	L(1)	L(1)	L(1)
CO5	M(2)	L(1)	L(1)	L(1)	L(1)
W.AV	**1.8**	**1.2**	**1**	**1**	**1**

S –Strong (3), M-Medium (2), L- Low (1)

II - Semester					
CC	**Course code: 96324**	**Nutrition through Life Cycle**	**T**	**Credits: 4**	**Hours: 5**
Pre-requisite	**Basic Knowledge on health at different ages**		**Syllabus revised**		**2023- 24**

Course Objectives	1. To familiarize basic information about health the changes in different periods of life 2. To provide technical knowledge in diet planning for infancy 3. To educate on the changes in the body during adolescence, pregnancy, lactation 4. To understand the need of nutrients for body functions 5. To illustrate RDA for Indians and to evaluate the nutritional need of adults
Unit I	**Basic principles of meal planning** - RDA, food allowance for different age groups, factors influencing nutritional requirements for all age groups**.** **Nutrition during pregnancy –** stages of pregnancy, physiological changes, and weight gain in pregnancy, complications, and factors influencing the outcome of pregnancy, nutritional requirements and diet planning for pregnant women.
Unit II	**Nutrition for lactating women** – Physiology of lactation, hormonal control, colostrum – composition, composition of breast milk, factors affecting the volume and composition of breast milk, nutritional requirements of a nursing mother, diet planning, factors responsible for lactation failure.
Unit III	**Nutrition in infancy –** birth weight of infants, rate of growth, milestones in development (only stages), immunization schedule, nutritional requirements, process of breast feeding, superiority of breast milk, advantages of breast feeding, comparison of human milk with cow's milk, artificial feeding, weaning, feeding problems. **Nutrition in preschool age –** growth and development, nutritional requirements, factors affecting nutritional status, food requirement, low cost supplementary foods, nutrition related problems in childhood, diet planning for the preschool child.
Unit IV	**Nutrition in the school age children –** growth in school children, nutritional and food requirement, packed lunch – factors to be considered, sample menu, feeding problems, diet plan for the school children. **Nutrition in adolescence -** growth and development, body composition, puberty, secondary sexual characteristics, psychological changes, nutritional requirements, nutritional problems, eating disorders and diet plan.
Unit V	**Nutrition in adult hood –** reference man and reference women, nutritional requirements of an adult man and women, body composition, nutrition and health issues, planning diet to suit different income levels. **Nutrition in elderly –** definition of geriatrics, physiological changes, psychological and socio- economic factors in relation to food intake, nutritional requirement, modification of diet in old age.

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Course Outcomes		**Knowledge level**
CO-1	Understand the nutritional demands of different phases of life.	K2
CO-2	Discuss the process of growth and development of life cycle with reference to immunization.	K4
CO-3	Analyze the nutritional requirements of preschool and adolescents by body changes.	K4
CO-4	Acquire knowledge of planning a diet for various changes in the body during reproduction.	K2
CO-5	To understand hormonal control and relaxation during lactation and lactation failure.	K2

Course designed by **Athira Antony**

Mapping Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S (3)	S (3)	M (2)	M (2)	M (2)	M (2)	M (2)	L (1)	M (2)	M (2)
CO2	S (3)	M (2)	M (2)	M (2)	M (2)	S (3)	M (2)	L (1)	L (1)	L (1)
CO3	S (3)	S (3)	M (2)	M (2)	S (3)	M (2)	L (1)	L (1)	M (2)	M (2)
CO4	S (3)	S (3)	S (3)	M (2)	S (3)	M (2)	L (1)	L (1)	M (2)	M (2)
CO5	M (2)	M (2)	M (2)	L (1)	L (1)	M (2)	L (1)	L (1)	M (2)	M (2)
W.AV	**2.8**	**2.6**	**2.2**	**1.8**	**2.2**	**2.2**	**1.4**	**1**	**1.8**	**1.8**

S –Strong (3), M-Medium (2), L- Low (1)

Mapping Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L (1)	M (2)	L (1)	L (1)	M (2)
CO2	M (2)	S (3)	M (2)	L (1)	M (2)
CO3	S (3)	S (3)	L (1)	L (1)	M (2)
CO4	S (3)	S (3)	L (1)	L (1)	M (2)
CO5	M (2)	S (3)	L (1)	L (1)	M (2)
W.AV	**2.2**	**2.8**	**1.2**	**1**	**2**

S –Strong (3), M-Medium (2), L- Low (1)

II - Semester					
CC	**Course code: 96325**	**Principles of Nutrition - Practical**	**P**	**Credits: 2**	**Hours: 4**
Pre-requisite	**Knowledge of the Fundamental concepts of nutrition & stages of Human development, Food & Nutritional Requirements**		**Syllabus revised**		**2023- 24**
Course Objectives	1. Apply knowledge of the fundamental concepts of nutrition 2. Plan and prepare healthy and nutritive recipes 3. The Explain nutritional requirements across lifespan in various physiological stages 4. Relate the nutritional needs to physical growth, development and changes during ageing 5. Describe the guidelines and the principles in planning a balanced diet across life cycle				

Unit I	**Macro and Micro nutrients** Planning and nutritive value calculation and preparation of macronutrient rich dishes a) carbohydrate b) protein c) fat Planning and nutritive value calculation and preparation of micronutrient rich dishes a) Vitamins - Vitamin A, Vitamin C, Thiamine, Riboflavin, Niacin b) Minerals – Calcium, iron, zinc, potassium, phosphorus
Unit II	**Estimation of Nutrients:** Test for monosaccharides, Test for disaccharides. Estimation of reducing sugar, test for proteins, estimation of calcium, estimation of ascorbic acid.
Unit III	**Nutrition in different age groups:** Diet Planning, nutritive value calculation & preparation in pregnancy, lactation, infancy- weaning food, pre-school, school going, adolescence, adult.
Unit IV	**Case study**: Elderly – Dietary recall and food habits.
Unit V	**Dissemination:** Dissemination of nutrition knowledge for the rural community.

Course Outcomes		**Knowledge level**
CO-1	Understand the basic concept of meal management, meal planning for all age groups	K2
CO-2	Develop skills in planning balanced diet variety food preparation using five food groups a day	K3
CO-3	Apply the knowledge in preparing nutrients dense value-added foods	K3
CO-4	Developing competence in efficient production and cooking methods	K3
CO-5	Understand the role of a dietitian in diet planning and home maker in family meal planning	K2

Course designed by **Sinisha Anto**

Mapping Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M (2)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)
CO2	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)
CO3	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)
CO4	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)
CO5	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)
W.AV	**1.2**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**

S –Strong (3), M-Medium (2), L- Low (1)

Mapping Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M (2)	L (1)	L (1)	L (1)	L (1)
CO2	L (1)	M (2)	L (1)	L (1)	L (1)
CO3	M (2)	L (1)	L (1)	L (1)	L (1)
CO4	M (2)	L (1)	L (1)	L (1)	L (1)
CO5	M (2)	L (1)	L (1)	L (1)	L (1)
W.AV	**1.8**	**1.2**	**1**	**1**	**1**

S –Strong (3), M-Medium (2), L- Low (1)

II - Semester					
Allied	**Course code: 96326**	**Human Physiology**	**T**	**Credits: 4**	**Hours: 5**
Pre-requisite	**Basic Knowledge about functions of human body**		**Syllabus revised**		**2023- 24**
Course Objectives	1. To ensure students understand how the body works. 2. Understand and demonstrate the inter -relations of the organ system to each other. 3. Predict and explain the integrated responses of the organ systems of the body. 4. Explain the patho-physiology of common diseases related to the organ system of the body. 5. Basic concept and knowledge of structure and functioning of different systems in body.				
Unit I	**Introduction to physiology: Blood –** Composition and function of blood , WBC – types, RBC, Hemoglobin – functions, Erythropoiesis, Blood coagulation, Blood grouping (Abo, Rh)				
Unit II	**Nervous System:** Classification – Structure and function of neuron – Spinal cord – Cerebrum – Cerebellum – Medulla oblongata – Cranial nerves – Functional areas of cerebral cortex. **Sense Organs:** Structure of eye, ear, nose, tongue and skin – Sense of taste – Hearing – Vision – Smell – Olfactory pathway – Taste pathway – Auditory pathway – Visual Pathway – Structure and function of skin – Regulation of temperature.				
Unit III	**Respiratory System:** Structure of respiratory organs – Physiology of respiration – Pulmonary function test – Lung volumes and lung capacity, Gaseous exchange in lungs, Regulation of respiration. **Circulatory System:** Blood vessels, Structure of heart – internal and external, Cardiac cycle, Conducting system of heart, Arterial blood pressure, ECG.				
Unit IV	**Digestive System:** Structure and function of digestive organs – Mouth, Pharynx, Stomach, Large intestine, Small intestine, Liver, Pancreas, Saliva, Gastric Juice, Intestinal Juice, Pancreatic Juices. **Excretory System:** Structure of kidney and nephron – Juxtaglomerular apparatus – Physiology of urine formation, Micturition - Renin-angiotensin system.				
Unit V	**Reproductive System:** Anatomy of male and female reproductive organs – Oogenins – Spermatogenesis – Puberty – Menstrual Cycle – Ovarian Cycle – Fertilization- Pregnancy. **Endocrine System:** Structure and function of thyroid, Pituitary, Parathyroid adrenal, Pancreas – Action and regulation of hormones.				

References

Guyton and Hall textbook of medical physiology – John E Hall – 13th Edition – Elsevier Publications

Physiology textbook for medical students – Harminder Singh, Itika Singh, Mridul Yadav – 2nd Edition - Elsevier Publications

Textbook of anatomy and physiology for nurses – P R Ashalatha, G Deepa – Jaypee Publications

Textbook of physiology – A K Jain – 5th Edition – Avichal Publications

Comprehensive textbook of medical physiology – G K Pal – 3rd Edition – Jaypee Publications

Related online content (MOOC, Swayam , NPTEL, Website etc.)

www.medicalnewstoday.com

www.coursera.org

Course Outcomes		**Knowledge level**
CO-1	To understand the knowledge about blood donation.	K3
CO-2	To educate the process of ingestion, digestion, absorption and excretion.	K4
CO-3	To learn mechanism of respiration.	K4
CO-4	To understand the co-ordination of each body system.	K4
CO-5	Detail discussion about hormones and awareness for reproductive health.	K5

Course designed by **Dr.Shamna**

Mapping Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	L (1)	L (1)	M (2)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)
CO2	L (1)	L (1)	M (2)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)
CO3	L (1)	L (1)	M (2)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)
CO4	L (1)	L (1)	M (2)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)
CO5	L (1)	L (1)	M (2)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)
W.AV	**1**	**1**	**2**	**1**	**1**	**1**	**1**	**1**	**1**	**1**

S –Strong (3), M-Medium (2), L- Low (1)

Mapping Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L (1)	M (2)	L (1)	L (1)	L (1)
CO2	L (1)	M (2)	L (1)	L (1)	L (1)
CO3	L (1)	M (2)	L (1)	L (1)	L (1)
CO4	L (1)	M (2)	L (1)	L (1)	L (1)
CO5	L (1)	M (2)	L (1)	L (1)	L (1)
W.AV	**1**	**2**	**1**	**1**	**1**

S –Strong (3), M-Medium (2), L- Low (1)

III - Semester					
CC	**Course code: 96333**	**Basic Food Processing and Preservation**	**T**	**Credits: 4**	**Hours: 5**
Pre-requisite	**Basic Knowledge of on cooking methods and additives**		**Syllabus revised**		**2023- 24**
Course Objectives	1. To gain knowledge on cooking techniques 2. To understand the importance of preservation methods in each food preparation 3. To learn the skills to adjust the perishability of foods with the chemical change 4. To develop the knowledge on process of preserved foods 5. To understand the uses of various food preservatives				
Unit I	**Introduction to food processing and preservation -** Nature and properties of food, fluid and visco elastic behavior of foods, Principles of different food processing. Effect of food processing on nutritional properties of food. Importance of Food Preservation, Types of Spoilage, Basic Principles of Food Preservation.				
Unit II	**Processing of cereals and millets -** Milling products and by products of wheat, rice, corn, barley, oats, sorghum and other millets, whole wheat atta, blended flour, fortified flour, flaked, puffed and popped cereals, malted cereals, processed foods - bakery products, pasta products and value added products.				
Unit III	**Processing of milk and milk products -** Milk – manufacture of different types of milk, drying of whole and skim milk, cream separation, churning of butter, processing of different types of cheese, Probiotic milk products - yoghurt, curd and ice-cream, indigenous milk products -khoa, burfi, kalakhand, gulabjamun, rasagulla, srikhand, chhana, paneer, ghee, lassi				
Unit IV	**Preservation by the Use of Low and High Temperature** - Preservation by the Use of Low temperature- Refrigeration, freezing ,Refrigeration, Advantages, Methods of Freezing, freeze drying and freeze concentration **Preservation by the Use of High Temperature** - Drying, Dehydration, Sun Drying and Dehydration, Mechanical Dehydration, Spray drying, Canning, Pasteurization and Sterilization				
Unit V	**Preservation by Using Sugar Concentrates, preservatives and fermentation** Sugar Concentrates – Principles of Gel Formation Chemical Preservatives – Definition, Role of Preservation, c. Permitted Preservatives, FPO Specification Types of Fermentation, Common Fermented Foods, Wine making				

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2. Sivasankar B, Food Processing and Preservation, Prentice – Hall of India Private Ltd., New Delhi, 2002. Srilakshmi, B ., Food Science, New Age International Private Ltd., New Delhi, 2002.
3. Swaminathan, M., Food Science, Chemistry and Experimental Foods, Bappco Publishers, Bangalore, 2004.
4. Chandrasekhar, U, Food Science and Applications in Indian Cookery, Phoenix Publishing House Private Ltd., New Delhi, 2002
5. Fellow, P., Food Processing Technology – Principles and Practices, 3rd Edition, CRC Press Woodland Publishers, England, 2009

Related online content (MOOC, Swayam , NPTEL, Website etc.)

https://www.fao.org/dairy-production-products/products/types-and-characteristics/en/

http://ecoursesonline.iasri.res.in/mod/page/view.php?id=19776

Course Outcomes		**Knowledge level**
CO-1	To understand the process of preservation.	K2
CO-2	To analyze the quality of processed foods.	K3
CO-3	To Develop skills in various food processing techniques.	K4
CO-4	To understand the nature and properties of foods.	K2
CO-5	To understand the processing of various food groups based on its properties.	K2

Course designed by **Athira Antony**

Mapping Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M (2)	S (3)	M (2)	S (3)	S (3)	M (2)	M (2)	L (1)	M (2)	M (2)
CO2	M (2)	M (2)	S (3)	S (3)	M (2)	M (2)	M (2)	L (1)	M (2)	M (2)
CO3	M (2)	M (2)	S (3)	S (3)	M (2)	M (2)	M (2)	L (1)	M (2)	M (2)
CO4	M (2)	M (2)	S (3)	S (3)	S (3)	M (2)	M (2)	L (1)	L (1)	M (2)
CO5	M (2)	M (2)	S (3)	S (3)	S (3)	M (2)	M (2)	L (1)	L (1)	M (2)
W.AV	**2**	**2.2**	**2.8**	**3**	**2.6**	**2**	**2**	**1**	**1.6**	**2**

S –Strong (3), M-Medium (2), L- Low (1)

Mapping Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S (3)	S (3)	M (2)	S (3)	S (3)
CO2	M (2)	S (3)	M (2)	S (3)	M (2)
CO3	M (2)	S (3)	M (2)	S (3)	M (2)
CO4	M (2)	S (3)	S (3)	S (3)	M (2)
CO5	S (3)	S (3)	M (2)	S (3)	M (2)
W.AV	**2.4**	**3**	**2.2**	**3**	**2.2**

S –Strong (3), M-Medium (2), L- Low (1)

III - Semester					
CC	**Course code: 96334**	**Food Standards and Quality Control**	**T**	**Credits: 4**	**Hours: 5**
Pre-requisite	**Basic Knowledge on food standards**		**Syllabus revised**		**2023- 24**

Course Objectives	1. Know the importance of quality assurance in food industry. 2. Know the principles of quality control of food additives. 3. Know the standards for quality assessment and food safety against adulteration for various foods. 4. Familiarize with critical assessment and control points for quality assurance. 5. To understand the naturally occurring toxic substances in food.
Unit I	**Principles of Quality control - An Introduction:** Food Quality, Quality features of foods, quality checking of raw material & processed foods, quality deterioration, simple techniques of quality checking of raw food materials – cereals, pulses, vegetables, fruits, milk & milk products, non vegetarian foods.
Unit II	**Quality control Measures:** **Food specifications: -** Food specifications for various food products – starchy foods, milk and milk products, fruit products. **Food Additives & their specifications:-** Classification of food additives, usages and optimal level recommended for usage as specification
Unit III	**Quality evaluation of food** **Subjective evaluation:** Sensory characters of food, organs involved in assessment – physiological process, types of sensory tests, requirements to conduct sensory evaluation, Role and purpose , types of a panel member, essential qualities of a panel member, procedure of sensory evaluation. **Objective evaluation:** objectives, requirements, different tests, and instruments used for objective evaluation, advantages and limitations.
Unit IV	**Food contaminants and adulterants** **Food Toxins –** Mycotoxins – aflatoxins, aspergillus and pencillium species**,** mushroom poisoning, sea food toxins. Other toxins naturally occurring in foods – Lathyrogens, haemagglutinins, goitrogens. **Toxic minerals and other inorganic compounds in food and water**: selenium, fluorine, nitrates and Nitrites, oxalates and phytates. **Food adulteration** – Definition, Common food adulterants; tests for detecting food adulterants, contamination with toxic metals, pesticides and insecticides; effects of food adulteration and Contamination, measures to control food adulteration.
Unit V	**Food standards and Food laws** Prevention of food adulteration Act , International Food Standards and Codex Alimentarious , AGMARK and BIS ,FSSAI , HACCP

References

1. Srilakshmi, B. Food Science, New Age International Publishers, New Delhi, 2010
2. Potter, N. and Hotchkiss, J.H. Food Science, 5th Ed., CBS Publications and Distributors, Daryaganji, New Delhi, 1998.
3. M. Swaminathan – Hand Book of Food Science and Experimental Foods, BAPCO, Bangalore, 1995
4. EillianH.Mayer, Food Chemistry, Affiliated east West Press Pvt.Ltd., New Delhi, 1973.
5. ShakuntalaManay, Shadaksharaswamy. M (2000) Foods, Facts and Principles, New Age International Pvt Ltd Publishers,2nd Edition

Related online content (MOOC, Swayam , NPTEL, Website etc.)

http://ecoursesonline.iasri.res.in/mod/page/view.php?id=17102

https://www.fda.gov/food/natural-toxins-food/mycotoxins

Course Outcomes		**Knowledge level**
CO-1	Understand the principles of quality assurance systems in a food industry.	K2
CO-2	Apply quality management systems to food processing and evaluation.	K3
CO-3	Identify and understand issues pertaining to food safety and quality control.	K3
CO-4	Assessing the quality parameters during food product development.	K5
CO-5	Develop skills in food safety and food quality management.	K3

Course designed by **Athira Antony**

Mapping Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	L (1)	M (2)	L (1)	S (3)	S (3)	L (1)	M (2)	L (1)	L (1)	L (1)
CO2	L (1)	M (2)	L (1)	M (2)	M (2)	L (1)	L (1)	S (3)	M (2)	M (2)
CO3	M (2)	M (2)	M (2)	S (3)	S (3)	M (2)	M (2)	L (1)	M (2)	M (2)
CO4	L (1)	L (1)	L (1)	M (2)	S (3)	M (2)	L (1)	L (1)	L (1)	M (2)
CO5	S (3)	S (3)	M (2)	S (3)	S (3)	L (1)	L (1)	L (1)	L (1)	L (1)
W.AV	**1.6**	**2**	**1.4**	**2.6**	**2.8**	**1.4**	**1.4**	**1.4**	**1.4**	**1.6**

S –Strong (3), M-Medium (2), L- Low (1)

Mapping Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M (2)	M (2)	M (2)	M (2)	L (1)
CO2	M (2)	M (2)	L (1)	M (2)	M (2)
CO3	S (3)	S (3)	S (3)	S (3)	M (2)
CO4	S (3)	M (2)	M (2)	S (3)	M (2)
CO5	S (3)	S (3)	S (3)	S (3)	S (3)
W.AV	**2.6**	**2.4**	**2.2**	**2.6**	**2**

S –Strong (3), M-Medium (2), L- Low (1)

III - Semester					
CC	**Course code: 96335**	**Basic Food Processing and Preservation - Practical**	**P**	**Credits: 2**	**Hours: 4**
Pre-requisite	**Basic Knowledge** on **food production and chemical reactions in food while cooking**		**Syllabus revised**		**2023- 24**
Course Objectives	1. Understand the reactions of food while cooking. 2. Acquire knowledge on the methods of cooking. 3. Know the additives used for different food item. 4. Identify the food different methods of food processing. 5. Gain knowledge on preparation of food.				
Unit I	Stages in sugar cookery, sugar concentrate, Evaluation of pectin quality, pH and acid content (additives and their MRL). Preparation of jam, jelly, marmalades, preserves, candies, Tuttil fruity, Glazed, Crystallized fruits, Toffee.				
Unit II	Preparation of squashes, fruit juice and RTS. Preparation of Tomato sauce, Tomato ketchup.				
Unit III	Preparation of dehydrated cereal and pulse products (vadams) -Rice, Sago, Wheat, Maida, Rice flakes, black gram dhal, green gram dhal, Horse gram dhal.				
Unit IV	Preparation of pickles (oil, vinegar and salt based). Preparation of salted, dehydrated, vegetables preserves (vathals)				
Unit V	Visit to Fruits and Vegetable processing industry.				

Course Outcomes		**Knowledge level**
CO-1	To understand the types of food preparations	K2
CO-2	To gain knowledge on use of different methods of cooking.	K1
CO-3	To evaluate the food with different sensory evaluation methods	K5
CO-4	To understand types of additives used in food preservation.	K2
CO-5	To know the methods of preservation techniques.	K1

Course designed by **Athira Antony**

Mapping Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M (2)	S (3)	M (2)	S (3)	S (3)	M (2)	M (2)	L (1)	M (2)	M (2)
CO2	M (2)	M (2)	S (3)	S (3)	M (2)	M (2)	M (2)	L (1)	M (2)	M (2)
CO3	M (2)	M (2)	S (3)	S (3)	M (2)	M (2)	M (2)	L (1)	M (2)	M (2)
CO4	M (2)	M (2)	S (3)	S (3)	S (3)	M (2)	M (2)	L (1)	L (1)	M (2)
CO5	M (2)	M (2)	S (3)	S (3)	S (3)	M (2)	M (2)	L (1)	L (1)	M (2)
W.AV	**2**	**2.2**	**2.8**	**3**	**2.6**	**2**	**2**	**1**	**1.6**	**2**

S –Strong (3), M-Medium (2), L- Low (1)

Mapping Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S (3)	S (3)	M (2)	S (3)	S (3)
CO2	M (2)	S (3)	M (2)	S (3)	M (2)
CO3	M (2)	S (3)	M (2)	S (3)	M (2)
CO4	M (2)	S (3)	S (3)	S (3)	M (2)
CO5	S (3)	S (3)	M (2)	S (3)	M (2)
W.AV	**2.4**	**3**	**2.2**	**3**	**2.2**

S –Strong (3), M-Medium (2), L- Low (1)

III - Semester					
Allied	**Course code: 96336**	**Nutrition for Health and Fitness**	**T**	**Credits: 4**	**Hours: 4**
Pre-requisite	**Basic Knowledge on fitness**		**Syllabus revised**		**2023- 24**
Course Objectives	1. Understand the importance of health and fitness 2. Know the different types of exercises 3. Appreciate the relationship between health and physical activity 4. Manage stress 5. The significance of food and exercise for good health				
Unit I	**Nutrition and Exercise**: Physical fitness- Principles, component (Speed, Strength, Endurance, Flexibility and Coordinative Abilities), Types of Physical fitness (Health related Physical Fitness - Performance Related Physical Fitness, Cosmetic fitness), Fitness Balance. Exercise and health related fitness- Principles and types of exercise, Role of exercise in health promotion, guidelines for healthy eating, and benefits of diet.				
Unit II	**Nutrition for Physical Activity**: Introduction -Food Groups, My Pyramid (FAO/WHO, 2005), Adequate Diet. Role of Macro and Micro nutrients – Carbohydrates, Proteins, Fats, Vitamin D, Calcium, Iron, Optimum Nutrition and Hydration for Health				
Unit III	**Physical Activity Training :** Aerobic and anaerobic training, Benefits of Fitness training and Gadgets for measuring PA – Motorized Treadmill, (aerobic Fitness), Functional Trainer, Fluid Rower (Upper body), Elliptical Bicycle and Bicycle Ergometer (Lower body), Stretch Trainer (Whole body)				
Unit IV	**Diseases due to Faulty Food Habits and Physical Inactivity :** Life Style related diseases/disorders Non communicable Disease conditions- Underweight, Obesity, Diabetes mellitus, Hypertension, Cancer, Cardiovascular Disease, Anaemia, eating disorders(bulimia and anorexia nervosa)				
Unit V	**Oxidative stress and antioxidant requirements in athletes :** Oxidative stress, Relaxation Techniques, Yoga and Meditation for Health antioxidant defense, oxidative stress in exercise, importance of antioxidants in a diet, stress management techniques, High Altitude Nutrition -Acclimatization, hydration, nutritional problems, altitude Sickness and dietary management				

References

1. Werner W. K Hoejer (1989), Life time Physical Fitness and Wellness, Morton Publishing Company, Colorado.
2. Mishra, S. C (2005) Physiology in Sports. Sports Publication, New Delhi
3. Greenberg, S. J and Pargman, D (1989) Physical Fitness – A Wellness Approach Prentice Hall International (UK) Limited, London
4. Swaminathan T, (2008) Essentials of Food and Nutrition Bangalore Printing Publishing Co.
5. 5. Mahan, K and Stump, E. S (1996) Krause Food and Nutrition and Diet Therapy W.B Saunders Company, USA.

Related online content (MOOC, Swayam , NPTEL, Website etc.)

https://www.ncbi.nlm.nih.gov/books/NBK299049/

https://www.eufic.org/en/healthy-living/article/the-difference-between-aerobic-and-anaerobic-exercise

Course Outcomes		**Knowledge level**
CO-1	Understand the Principles of exercise and fitness.	K2
CO-2	Explain the nutrition aspects in exercise.	K2
CO-3	Summarize oxidative stress and antioxidant requirements in athletes.	K3
CO-4	Interpret Nutrition and regulation of bodyweight.	K2
CO-5	Enumerate. Physical fitness and lifestyle management.	K3

Course designed by **Sinisha Anto**

Mapping Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	L (1)	L (1)	M (2)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)
CO2	L (1)	L (1)	M (2)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)
CO3	L (1)	L (1)	M (2)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)
CO4	L (1)	L (1)	M (2)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)
CO5	L (1)	L (1)	M (2)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)
W.AV	**1**	**1**	**2**	**1**	**1**	**1**	**1**	**1**	**1**	**1**

S –Strong (3), M-Medium (2), L- Low (1)

Mapping Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S (3)	S (3)	M (2)	L (1)	M (2)
CO2	S (3)	M (2)	M (2)	L(1)	M (2)
CO3	S (3)	M (2)	M (2)	L (1)	M (2)
CO4	S (3)	M (2)	M (2)	L (1)	M (2)
CO5	S (3)	M (2)	M (2)	L (1)	M (2)
W.AV	**3**	**2.2**	**2**	**1**	**2**

S –Strong (3), M-Medium (2), L- Low (1)

IV - Semester					
CC	**Course code: 96343**	**Dietetics - I**	**T**	**Credits: 4**	**Hours: 4**
Pre-requisite	**Basic Knowledge of Diet management and Role of Dietician**		**Syllabus revised**		**2023- 24**

Course Objectives	1. Comprehend the feeding techniques. 2. Know the corrective measures in malnutrition. 3. Develop skills and techniques in the planning and preparation of therapeutic diets for febrile conditions and gastrointestinal disorders. 4. Develop diet formulations for **t**he liver, gall bladder and exocrine pancreas diseases. 5. Understand the inborn errors of metabolism and the nutritional needs of special children.
Unit I	**Diet therapy and the Dietician**: Objectives of diet therapy - principles of diet preparation, Nutrition Care Process, Portion control, food Exchange list md counseling. Hospital Routine diet - liquid, semi liquid, light, soft diet, bland diet and regular diet. Nutrition Care process. Different types of feeding - Basic concepts of oral feeding, tube feeding, IV feeds, gastrostomy feeding. Dietitian – Classification role and Responsibilities of Specific Dietitians.
Unit II	**Diet in Fever and Malnutrition**: a) Dietary modification, diet planning, and preventive measures for- PEM, Iron deficiency anaemia and Vitamin A deficiency. b). Causes, risk factors, pathogenesis, dietary modifications, diet planning and counselling measures for febrile conditions- fevers of long duration and short duration
Unit III	**Diet in gastrointestinalDiseases :**Causes, pathogenesis, dietary modification and diet planning for i. Gastritis ii. Peptic ulcer iii.Diarrheoea, dysentery iv. Constipation, haemorrhoids, GERD
Unit IV	**Diseases of the liver, gall bladder and exocrine pancreas :** pathogenesis, causes, signs and symptoms, dietary modification and diet planning for i. Liver- fatty liver, hepatitis, cirrhosis, hepatic coma ii. Gall bladder – cholecystitis, cholelithiasis iii. Pancreas – pancreatitis b) Nutritional care for the patients with inborn errors of metabolism- prognosis, symptoms, dietary management - phenylketonuria, galactosemia
Unit V	**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

References

1. . Srilakshmi, B. Dietetics New Age International P. Ltd., New Delhi, 2011
2. Dietary Guidelines of Indians – A Manual, National Institute of Nutrition, Hyderabad, 2011
3. Garg, M. Diet, Nutrition and Health, ABD Publishers,2006
4. 4.Corinne H.Robinson, M.R.Lawber, W.L.Chenoweth and A.E.Garwick, Normal and Therapeutic Nutrition, MacMillan Publishing CO, New York, 1982
5. 5.Krause, M.V. and Mahan, L.K. Food, Nutrition and Diet Therapy, 9th Ed., W.B. Saunders Company, Philadelphia, 2009

Related online content (MOOC, Swayam , NPTEL, Website etc.)

https://www.niddk.nih.gov/health-information/liver-disease/cirrhosis/all-content

https://www.cdc.gov/ncbddd/autism/facts.html

Course Outcomes		**Knowledge level**
CO-1	Explain the principles of diet therapy, nutrition care, Process and different types of feeding the patients.	K2
CO-2	Identify the signs, symptom, causes and dietary recommendation for fever and malnutrition.	K3
CO-3	Identify the signs, symptom, causes and nutritional recommendations for the diseases of the gastrointestinal diseases.	K3
CO-4	Identify the signs, symptom, causes and nutritional recommendations for the diseases of the liver, gall bladder and exocrine pancreas.	K3
CO-5	Identify the signs, symptom, causes and nutritional recommendations for the children with special needs.	K3

Course designed by **Sinisha Anto**

Mapping Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S (3)	S (3)	S (3)	S (3)	L (1)	L (1)	L (1)	L (1)	S (3)	L (1)
CO2	S (3)	S (3)	S (3)	S (3)	L (1)	L (1)	L (1)	L (1)	S (3)	L (1)
CO3	S (3)	S (3)	S (3)	S (3)	L (1)	L (1)	L (1)	L (1)	S (3)	L (1)
CO4	S (3)	S (3)	S (3)	S (3)	L (1)	L (1)	L (1)	L (1)	S (3)	L (1)
CO5	S (3)	S (3)	S (3)	S (3)	L (1)	L (1)	L (1)	L (1)	S (3)	L (1)
W.AV	**3**	**3**	**3**	**3**	**1**	**1**	**1**	**1**	**3**	**1**

S –Strong (3), M-Medium (2), L- Low (1)

Mapping Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S (3)	S (3)	S (3)	L (1)	S (3)
CO2	S (3)	S (3)	S (3)	L (1)	S (3)
CO3	S (3)	S (3)	S (3)	L (1)	S (3)
CO4	S (3)	S (3)	S (3)	L (1)	S (3)
CO5	M (2)	S (3)	S (3)	L (1)	S (3)
W.AV	**2.8**	**3**	**3**	**1**	**3**

S –Strong (3), M-Medium (2), L- Low (1)

IV - Semester					
CC	**Course code: 96344**	**Food Service Management**	**T**	**Credits: 3**	**Hours: 4**
Pre-requisite	**Basic Knowledge on food production and service**		**Syllabus revised**		**2023- 24**

Course Objectives	1. Understand the management of food service industry. 2. Acquire knowledge on the methods of pricing techniques. 3. Know the practices to be followed for ensuring safety in food industry. 4. Identify the financial management of an organization. 5. Gain knowledge on personnel management.
Unit I	**Introduction to food service -** Classification of food service according to Method of Processing. Types of food service systems: Conventional systems, Commissary system, ready prepared system and assembly – service system. Styles of Service: Service of food-self-service, tray service, Waiter – Waitress Service and portable service. Menu: Definition, why menu Planning Types of menu, techniques in writing menu card.
Unit II	**Quantity Food Purchasing and Storage** **Purchasing**: Purchasing officer, duties, purchasing procedure, selection of supplier, methods of purchasing, purchase specifications **Receiving**: Procedure and forms **Storing and issuing:** Objectives, types of store records, and problems in stores **Quantity Food Production and Service:** Standardizations of recipes ,Portion control , left over foods , types of food service equipment and their selection
Unit III	**Management and organization** **Management**: Definition, principles, types and theories of management, Functions and tools of management, qualities of a good leader, styles of leadership. **Organization**: Definition, types and theories of organization. Legal responsibilities of a food service manager.
Unit IV	**Personnel management:** Definition, Sources of personnel, Criteria for selection of personnel , performance appraisal of employees, Labour laws governing food service establishments, **Financial management:** Definition, cost concepts, book keeping and accounting systems of book keeping, books of account and inventory control, methods of pricing items
Unit V	**Sanitation and Safety:** Sanitation of Plant and Kitchen Hygiene, Pest control, waste disposal, GHP, GMP in food industry, Personal Hygiene, First aid principles and practice, Health and Safety at work.

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2. West, B.B., Wood, L., Hager, V.F., and Shugart, G., Food Services in institutions, John Wiley and Sons, New York, 1987.
3. Bhushan, V.K., Business Organization and Management, Sultan Chand & Co., 1973.
4. Longree, K. and Balaker, B.C., Sanitary Techniques in Food Service, Johy Wiley and Sons, New York, 1979.
5. Sudhir Andrews,Food and Beverage Service: A Training Manual, Tata McGraw Hill, 2013

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http://www.jiwaji.edu/pdf/ecourse/tourism/Type%20of%20service%2012%20april.pdf

http://ecoursesonline.iasri.res.in/mod/page/view.php?id=110598

Course Outcomes		**Knowledge level**
CO-1	To understand the types of food service industry and their functioning	K2
CO-2	To gain knowledge on quantity food production and standardization of food items	K1
CO-3	To evaluate the financial management of food service industry	K5
CO-4	To understand safety and hygienic practices in food production and service	K2
CO-5	To know the legal aspects of food service	K1

Course designed by **Athira Antony**

Mapping Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S (3)	S (3)	M (2)	S (3)	M (2)	M (2)	L (1)	L (1)	M (2)	M (2)
CO2	M (2)	S (3)	S (3)	M (2)	M (2)	M (2)	M (2)	L (1)	M (2)	M (2)
CO3	L (1)	M (2)	M (2)	M (2)	S (3)	M (2)	M (2)	L (1)	L (1)	L (1)
CO4	S (3)	S (3)	M (2)	S (3)	S (3)	M (2)	M (2)	L (1)	M (2)	L (1)
CO5	L (1)	M (2)	L (1)	M (2)	M (2)	L (1)	L (1)	L (1)	L (1)	L (1)
W.AV	**2**	**2.6**	**2**	**2.4**	**1.8**	**1.8**	**1.6**	**1**	**1.6**	**1.4**

S –Strong (3), M-Medium (2), L- Low (1)

Mapping Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S (3)	S (3)	L (1)	S (3)	L (1)
CO2	M (2)	L (1)	L (1)	S (3)	L (1)
CO3	L (1)	L (1)	L (1)	S (3)	M (2)
CO4	M (2)	L (1)	S (3)	S (3)	M (2)
CO5	M (2)	L (1)	L (1)	S (3)	L (1)
W.AV	**2**	**1.4**	**1.4**	**3**	**1.4**

S –Strong (3), M-Medium (2), L- Low (1)

IV - Semester					
CC	**Course code: 96345**	**Food Product Development and Marketing Strategy**	**T**	**Credits: 3**	**Hours: 4**
Pre-requisite	**Basic Knowledge Marketing and product development**		**Syllabus revised**		**2023- 24**
Course Objectives	1. Develop new marketable, nutritionally and economically viable food products. 2. Develop entrepreneurship skills for setting up small scale food industries. 3. Understand packaging of different food products. 4. Understand cost calculation of different food products. 5. To know about recipe development.				
Unit I	**Food Consumption Pattern:** Trends in Food Consumption pattern. Economical, Psychological and Sociological Dimensions of Food Consumption patterns. Trends in Social Change as a Base for New Product Development.				
Unit II	**Introduction To Food Processing And Product Development:** Food Components, Types of Food Processing, Status of Food Processing Industry in India and Scope of Growth in Future ,Principles and Purpose of New Product Development, Product Design and Specifications.				
Unit III	**Recipe Development:** Traditional Foods, Weaning Foods, Convenience Foods, RTE, RTS, Extruded foods, IMF Foods, Speciality Products, Health foods, Nutritional Supplements, Functional Foods, Nutraceuticals and Designer Foods, Sports Foods, Foods for Defence Services, Space foods.				
Unit IV	**Testing, Evaluation And Packaging Of Products**: Standardization, Portion size, Portion Control, Quantity Cooking, Shelf Life Evaluation- Sensory and Microbial Testing of Processed Foods, Nutrient Analysis. Suitable Packaging Materials for Different Foods, SWOT Analysis.				
Unit V	**Financial Management And Marketing Of Food Products:** Institutional Support (Training and Finance) for Entrepreneurship Development. Financial Institutions (Central and State Government) banks/Funding Agencies, Financial Accounting Procedures, Book Keeping, Market Research, Marketing Strategies, Cost Calculation, Advertising Methods, Role of Advertisement and Technologies in promotion of new products. Product sales, Product License, Legal specifications, Consumer Behaviour and Food Acceptance.				

References

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

Related online content (MOOC, Swayam , NPTEL, Website etc.)

https://foodsystemprimer.org/food-nutrition/food-marketing-and-labeling

https://hmhub.in/developing-new-recipes-product-research-development/

Course Outcomes		**Knowledge level**
CO-1	Learn the trends and dimensions in food consumption pattern	K1
CO-2	Understand and apply the principles in food product development and design	K2
CO-3	Gain knowledge on different steps involved in food testing, evaluation and packaging	K2
CO-4	Develop entrepreneurship skills and to plan financial and marketing strategies	K3
CO-5	Gain knowledge about sensory analysis ,microbial analysis	K1

Course designed by **Sinisha Anto**

Mapping Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	L (1)	L (1)	L (1)	M (2)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)
CO2	L (1)	L (1)	L (1)	M (2)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)
CO3	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)
CO4	L (1)	L (1)	L (1)	M (2)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)
CO5	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)
W.AV	**1**	**1**	**1**	**1.6**	**1**	**1**	**1**	**1**	**1**	**1**

S –Strong (3), M-Medium (2), L- Low (1)

Mapping Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M (2)	L (1)	M (2)	M (2)	L (1)
CO2	M (2)	M (2)	L (1)	S (3)	M (2)
CO3	L (1)	L (1)	L (1)	L (1)	L (1)
CO4	M (2)	M (2)	M (2)	M (2)	M (2)
CO5	L (1)	L (1)	L (1)	L (1)	L (1)
W.AV	**1.6**	**1.4**	**1.4**	**1.8**	**1.4**

S –Strong (3), M-Medium (2), L- Low (1)

IV - Semester					
CC	**Course code: 96346**	**Dietetics – I - Practical**	**P**	**Credits: 2**	**Hours: 4**
Pre-requisite	**Basic Knowledge of Therapeutic diet management**		**Syllabus revised**		**2023- 24**
Course Objectives	1. Understand the basic principles in diet planning. 2. Gain knowledge on different disease conditions which requires dietary recommendations. 3. Develop skills and techniques in planning and preparation of therapeutic diets for various disease conditions. 4. Understand the calculations of nutritive value for the planned and prepared diet. 5. Plan and prepare healthy and nutritive recipes.				
Unit I	**Therapeutic Diet:** Diet planning, nutritive value calculation & preparation of Clear fluid diet**,** Full fluid diet **&** Soft diet.				
Unit II	**Diet for malnutrition:** Diet planning, nutritive value calculation & preparation of PEM**,** Vitamin A deficiency **&** Aneamia.				
Unit III	**Diet in weight management:** Diet planning, nutritive value calculation & preparation of Obesity **&**Under weight. **Diet in fever:** Typhoid **&** Tuberculosis.				
Unit IV	**Diet in gastrointestinal diseases:** Diet planning, nutritive value calculation & preparation of Peptic ulcer**,** Diarrhoea **&** Constipation.				
Unit V	**Diet for different diseases:** Cirrhosis, Galactosemia **&** Autism.				

Course Outcomes		**Knowledge level**
CO-1	Understand the application of the principles of nutrition in basic dietetics.	K2
CO-2	Develop the ability to plan and prepare diets for therapeutic conditions.	K3
CO-3	Apply knowledge of nutrition and health assessment and interpretation in comprehensive patient management.	K3
CO-4	Acquire practical knowledge of therapeutic diet to meet the requirement	K3
CO-5	Plan and prepare diets to meet out the quality and quantity requirements for specific disease conditions.	K2

Course designed by **Sinisha Anto**

Mapping Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S (3)	S (3)	S (3)	S (3)	L (1)	L (1)	L (1)	L (1)	S (3)	L (1)
CO2	S (3)	S (3)	S (3)	S (3)	L (1)	L (1)	L (1)	L (1)	S (3)	L (1)
CO3	S (3)	S (3)	S (3)	S (3)	L (1)	L (1)	L (1)	L (1)	S (3)	L (1)
CO4	S (3)	S (3)	S (3)	S (3)	L (1)	L (1)	L (1)	L (1)	S (3)	L (1)
CO5	S (3)	S (3)	S (3)	S (3)	L (1)	L (1)	L (1)	L (1)	S (3)	L (1)
W.AV	**3**	**3**	**3**	**3**	**1**	**1**	**1**	**1**	**3**	**1**

S –Strong (3), M-Medium (2), L- Low (1)

Mapping Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S (3)	S (3)	S (3)	L (1)	S (3)
CO2	S (3)	S (3)	S (3)	L (1)	S (3)
CO3	S (3)	S (3)	S (3)	L (1)	S (3)
CO4	S (3)	S (3)	S (3)	L (1)	S (3)
CO5	M (2)	S (3)	S (3)	L (1)	S (3)
W.AV	**2.8**	**3**	**3**	**1**	**3**

S –Strong (3), M-Medium (2), L- Low (1)

IV - Semester					
Allied	**Course code: 96347**	**Bakery and Confectionary**	**T**	**Credits: 3**	**Hours: 3**
Pre-requisite	**Basic Knowledge of bakery and confectionery products**		**Syllabus revised**		**2023- 24**
Course Objectives	1. Understand the Science and technology of baking and confectionery. 2. Understand the principles, role of various ingredients involved in baking and confectionery 3. Develop skills and responsibility for setting up bakery and confectionery units. 4. To identify and differentiate the equipment used in baking industry. 5. Understand the importance of sensory evaluation during preparation and after storage				
Unit I	**Introduction to bakery:** Baking industry and their scope in India. Structure and Composition of the Wheat Kernel, Steps and By Products of Wheat Milling, Enrichment of Flour and Bread. Methods of making batters and doughs. Principles of Baking, Classification of Baked Foods. Physical and chemical changes during baking.				
Unit II	**Baking ingredients:** Role of Ingredients – Flour, Water, Yeast, Sugar, Milk, Egg, Butter, Salt, Chemical Leavening Agents, Spices, Flavorings, Fruits and Nuts, Food Colors, Setting Materials, Cocoa and Chocolate. Recipe balance. Properties and types of flour. Storage of baked products. Selection of packaging materials.				
Unit III	**Factors for Setting up a Bakery Unit:** Factors to be considered for Setting up a Bakery Unit. Types of ovens – construction and working of conventional and modern ovens. Equipment required to start a small bakery unit – classification of major & minor equipment – description, types, materials, usage of each. Maintenance of major and minor equipment and tools. Hygiene and sanitation.				
Unit IV	**Preparation and Decoration of Baked Foods:** Bread Making – Steps, Methods and role of ingredients. Bread Varieties. Qualities of a Good Loaf and bread Faults. Cake Making – Functions of Ingredients, Cake Mixing Methods, Types of Cakes, Cake Judging, Cake Faults. Remedies- Biscuit Making, Cookie Making and Pastry Making. Types and techniques of Icing, Frosting and fillings. Sensory evaluation of baked products- objective and subjective methods. Food costing.				
Unit V	**Confectionery:** Processing of Raw Materials-Cocoa and Chocolate. Making of Toffee, Chocolates, Fruit Drops, Hard Boiled Candies(clear, hard, pulled, grained, filled), Soft candies (basic fondant, modified fondant like toffee, fudge, marshmallows, gums, jellies, chocolates),Bars and chewing Gums. Role of major components and factors affecting quality of the product.				

References

1. Dubey, S.C. (2002), Basic Baking IV Edition. The Society of Indian Bakers, New Delhi.
2. Bakers Handbook on Practical Baking (1998) Compiled and Published by US Wheat Associates, New Delhi.
3. NIR Board. The Complete Technology Book on Bakery Products, National Institute of Industrial Research, New Delhi.
4. Fellows, J.P. (1998), Food Processing Technology – Principles and Practice, Ellis Horword Limited, London.
5. Avantina Sharma, (2006), Text Book of Food Science and Technology, International Book Distributing Co., Chaman Studio Building, Charbagh,Lucknow, UP.

Related online content (MOOC, Swayam , NPTEL, Website etc.)

http://www.chifss.in/pdf/FSMS-Guidance-Documents-Biscuits-Breads-Cakes-Draft-V6-for-website.pdf

https://fostac.fssai.gov.in/doc/Bakery%20Level%201.pdf

Course Outcomes		**Knowledge level**
CO-1	Overview of baking industry and baking chemistry	K2
CO-2	Knowledge on baking ingredients and storage	K2
CO-3	An clear idea for setting up a bakery unit	K3
CO-4	Clear explanation on preparation and decoration procedure of baked products	K3
CO-5	Knowledge on processing different confectionery products	K3

Course designed by **Riya**

Mapping Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	L (1)	M (2)	L (1)	L (1)	S (3)	M (2)	M (2)	L (1)	M (2)	M (2)
CO2	M (2)	M (2)	M (2)	S (3)	M (2)	S (3)	L (1)	L (1)	M (2)	M (2)
CO3	L (1)	L (1)	L (1)	M (2)	S (3)	M (2)	L (1)	L (1)	L (1)	M (2)
CO4	L (1)	L (1)	M (2)	S (3)	S (3)	M (2)	M (2)	L (1)	L (1)	L (1)
CO5	M (2)	L (1)	L (1)	M (2)	S (3)	M (2)	M (2)	L (1)	M (2)	L (1)
W.AV	**1.4**	**1.4**	**1.4**	**2.2**	**2.8**	**2.2**	**1.6**	**1**	**1.6**	**1.6**

S –Strong (3), M-Medium (2), L- Low (1)

Mapping Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M (2)	S (3)	M (2)	S (3)	S (3)
CO2	S (3)	S (3)	S (3)	M (2)	S (3)
CO3	L (1)	S (3)	S (3)	S (3)	L (1)
CO4	S (3)	M (2)	L (1)	S (3)	L (1)
CO5	M (2)	S (3)	M (2)	S (3)	M (2)
W.AV	**2.8**	**2.8**	**2.2**	**2.8**	**3**

S –Strong (3), M-Medium (2), L- Low (1)

IV - Semester					
DSE	**Course code: 96348A**	**Computers in Food Science**	**T**	**Credits: 3**	**Hours: 3**
Pre-requisite	**Basic Knowledge Learn essential computer technology skills that are relevant to the field of food science**		**Syllabus revised**		**2023- 24**

Course Objectives	1. To teach the basics of computer hardware and software, internet, and networking terminology for personal use. 2. To acquire a solid understanding of computer basics and develop proficiency in operating system navigation, investing time and effort in learning these fundamental concepts is imperative. 3. Use advanced tools and technology to process and analyze food for safety. 4. The goal of technology is to meet human needs by expanding our vision of the world. 5. The ability to analyze the feasibility of an existing experimental scheme and evaluate it is present.
Unit I	**Fundamentals of Computers:** Computers – Introduction, Advantages, Disadvantages, Applications Generations of Computers Types of Computers Computer Architecture
Unit II	**Hardware and Software:** Introduction – Classifications Peripheral Devices and Their Functions Operating System – Introduction – Classification MS Windows – Basic Concepts and Operations
Unit III	**Introduction to MS Office:** Word Processing - Basic Concepts – Features - Mail Merge Introduction of MS Office - Applications - Introduction to MS Word – Basic Concepts – Formatting - Menus Introduction to MS Excel – Basic Concepts – Calculations, Operations, Introduction to MS PowerPoint – Basic Concepts – Animations, Transitions, Slideshow
Unit IV	**Internet & Anti-virus:** Introduction to the Internet: Basic concepts of Internet, History, WWW. Introduction to Networks: Basic Concept, Types, Topologies, Data Communication. Introduction to Virus & Anti-Virus: Types of Viruses, Prevention of Virus Infection.
Unit V	**Role of Computers in Food Science:** Software used in the Food Industry - Food Manufacturing Software & ERP Software Applications and Software Used in Health Assessment Application of Artificial Intelligence in the Food Industry. Computer-based technology in the medical field - Applications

References

1. Computer Fundamentals - Priti Sinha, Pradeep K. Sinha
2. Computers In Medicine: Applications and Possibilities - Jonathan Javitt
3. Fundamentals Of Computers - E.Balagurusamy
4. Computers Made Easy – Jonathan Brook
5. Mastering MS Office: Computer Skill Development - Be Future Ready - Bittu Kumar
6. Microsoft Office For Beginners - M.L. Humphrey Computer Networks – Tanenbaum, Wetherall
7. Introduction To Data Communication and Networking – Tomasi

Related online content (MOOC, Swayam , NPTEL, Website etc.)

https:// www.softwareconnect.com/food-manufacturing/

https://www.netguru.com/blog/healthcare-software-types/

Course Outcomes		**Knowledge level**
CO-1	Understand the fundamentals of Computers.	K2
CO-2	Understand the Peripheral Devices and Networks.	K2
CO-3	Analyze the role of Computers in the Medical Field.	K4
CO-4	Learn Word Processing and Prepare Assessments using MS Office.	K3
CO-5	Gain Ideas about Current Resources of Food Technology and the role of AI	K2

Course designed by **Joel Jaison**

Mapping Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	L (1)	M (2)	S (3)	L (1)	L (1)	L (1)	L (1)	S (3)	M (2)	S (3)
CO2	L (1)	M (2)	S (3)	L (1)	L (1)	L (1)	L (1)	S (3)	M (2)	S (3)
CO3	L (1)	M (2)	S (3)	L (1)	L (1)	L (1)	L (1)	S (3)	M (2)	S (3)
CO4	L (1)	M (2)	S (3)	L (1)	L (1)	L (1)	L (1)	S (3)	M (2)	S (3)
CO5	L (1)	M (2)	S (3)	L (1)	L (1)	L (1)	L (1)	S (3)	M (2)	S (3)
W.AV	**1**	**2**	**3**	**1**	**1**	**1**	**1**	**3**	**2**	**3**

S –Strong (3), M-Medium (2), L- Low (1)

Mapping Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L (1)	S (3)	M (2)	M (2)	S (3)
CO2	L (1)	S (3)	M (2)	M (2)	S (3)
CO3	L (1)	S (3)	M (2)	M (2)	S (3)
CO4	L (1)	S (3)	M (2)	M (2)	S (3)
CO5	L (1)	S (3)	M (2)	M (2)	S (3)
W.AV	**1**	**3**	**2**	**2**	**3**

S –Strong (3), M-Medium (2), L- Low (1)

IV - Semester					
DSE	**Course code: 96348B**	**Sports Nutrition**	**T**	**Credits: 3**	**Hours: 3**
Pre-requisite	**Basic Knowledge on exercise and sports**		**Syllabus revised**		**2023- 24**

Course Objectives

1. Understand the nutritional requirements of athelete
2. Understand the ergogenic aids used in sports to improve performance
3. Know the principles of planning diets for sports people.
4. Identify the nutritional disorders in atheletes
5. Understand the production of supplements for sports nutrition.

Unit I	Introduction to sports nutrition - Meaning, importance ,definition and History of Sports nutrition, Relationship between diet and performance.
Unit II	Exercise and diet - Types of exercises, body metabolism in exercise,pre-competition and Post-competition nutrition. Diet plan for different sports athletes.
Unit III	Diet supplements and ergogenic aids - Definition, types, examples ,uses and adverse effect on health , legal consequences.
Unit IV	Athletes with nutrition related disorders - problems of athletes with Diabetes, osteoporosis, anemia,food allergies,gastro intestinal disorders, dehydration problems, medical nutrition therapy.
Unit V	Fluids & electrolytes - Water requirements, Functions of water in exercise, Role of electrolytes during exercise, fluid and electrolyte replacements.

References

1. B. Srilakshmi, W. Suganthi, C. Kalaivani Ashok, Exercise physiology fitness and Sports Nutrition, New Age international publishers, 2016
2. International Life Sciences Institute, Sports Authority of India and National Institute of Nutrition (2009), "Nutrition and Hydration guidelines for Excellence in Sports Performance", hyderabad; ILSI, SAI & NIN
3. McArdle, W.D; Katch, F.I and Katch,V.L (2009), "Exercise Physiology-Energy, Nutrition and Human Performance",Philadelphia; Lippincott Williams and Wilkins, 5th edition
4. Williams, M.H (2005), "Nutrition for Health, Fitness and Sport", Boston; MacGraw-Hill Higher Education
5. Jamison D.T, Breman J.G, Measham A.R, et al., editors: The International Bank for Reconstruction and Development / The World Bank; Washington DCNew York: Oxford University Press; 2006

Related online content (MOOC, Swayam , NPTEL, Website etc.)

https://www.ncbi.nlm.nih.gov/books/NBK209034/#:~:text=Ergogenic%20aids%20are%20generally%20classified,frame%20on%20a%20racing%20bike

https://www.ijrar.org/papers/IJRAR19J1466.pdf

Course Outcomes		**Knowledge level**
CO-1	To understand the nutritional requirements of athletes.	K2
CO-2	To gain knowledge on different types of exercises and physical activity.	K1
CO-3	To evaluate the nutritional disorders and allergy related problems in athletes.	K5
CO-4	To understand the ergogenic aids.	K2
CO-5	To know the functions of different nutrients in physically active bodies.	K1

Course designed by **Athira Antony**

Mapping Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S (3)	M (2)	S (3)	L (1)	M (2)	L (1)	L (1)	L (1)	M (2)	L (1)
CO2	S (3)	S (3)	L (1)	L (1)	L (1)	M (2)	L (1)	L (1)	L (1)	M (2)
CO3	S (3)	L (1)	M (2)	L (1)	L (1)	L (1)	L (1)	L (1)	M (2)	L (1)
CO4	S (3)	S (3)	M (2)	L (1)	L (1)	M (2)	M (2)	L (1)	M (2)	L (1)
CO5	S (3)	S (3)	M (2)	L (1)	M (2)	L (1)	L (1)	L (1)	M (2)	L (1)
W.AV	**3**	**2.4**	**2**	**1**	**1.4**	**1.4**	**1.2**	**1**	**1.8**	**1.2**

S –Strong (3), M-Medium (2), L- Low (1)

Mapping Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S (3)	S (3)	L (1)	L (1)	S (3)
CO2	S (3)	S (3)	M (2)	L (1)	M (2)
CO3	S (3)	S (3)	S (3)	L (1)	S (3)
CO4	S (3)	S (3)	S (3)	L (1)	S (3)
CO5	S (3)	M (2)	M (2)	L (1)	M (2)
W.AV	**3**	**2.8**	**2.2**	**1**	**2.6**

S –Strong (3), M-Medium (2), L- Low (1)

V - Semester					
CC	**Course code: 96351**	**Dietetics - II**	**T**	**Credits: 4**	**Hours: 6**
Pre-requisite	**Basic Knowledge of Dietary management of various disease conditions**		**Syllabus revised**		**2023- 24**

Course Objectives	1. Understand the pathology of metabolic diseases, Cardiovascular and renal diseases and their dietary modification. 2. The importance of nutrition care process for allergy. 3. Develop diet formulations for HIV and Cancer. 4. Practice diet counseling. 5. To learn about Nutraceuticals and their effect on various Conditions.
Unit I	**Dietary management in Diabetes Mellitus and cardiovascular diseases**:. Pathogenesis, symptoms, causes, types, diagnostic tests, complications, dietary modifications and diet planning for the diseases of the endocrine pancreas i. Diabetes mellitus- IDDM, NIDDM b. Diseases of the cardiovascular system – Hypertension, atherosclerosis, hyperlipidemia, acute and chronic cardiac diseases, congestive cardiac failure.
Unit II	**Diet in diseases of Kidneys**: a. Pathogenesis, symptoms, causes, nutritional modification, diet planning and dialysis for kidney diseases i. Nephritis ii. Nephrosis iii. Urinary calculi iv. Renal failure – acute and chronic
Unit III	**Nutritional care in diseases of the musculoskeletal system** – arthritis, osteoporosis, gout, dental caries b. Nutritional care for patients having gastro intestinal surgery and burns. c. Allergies – food allergy and intolerance – mechanism, factors influencing, symptoms, tests for allergy, nutritional care and elimination diet.
Unit IV	**Nutritional care for patients with cancer and HIV**- definition, causes, types, grades, normal cell to cancer cell, nutritional requirement, nutritional problems of cancer therapy. b. Nutritional care in HIV – Pathophysiology, aetiology, stages of HIV infection, ART, opportunistic infections, women and HIV, nutritional management
Unit V	**Nutraceuticals**- definition, types, use of nutraceuticals in the prevention and treatment of – obesity, diabetes mellitus, cardiovascular diseases, cancer b. Dietary counseling – clients and counselors, client responsibility, attributes of a successful counselor, steps in counseling process, counseling guidelines

References

1. Srilakshmi,.B Dietetics New Age International P. Ltd., New Delhi, 2011
2. 2.Dietary Guidelines of Indians – A Manual, National Institute of Nutrition, Hyderabad, 2011.
3. Corinne H.Robinson, M.R.Lawber, W.L.Chenoweth and A.E.Garwick, Normal and Therapeutic Nutrition, MacMillan Publishing CO, New York, 1982
4. 4.MaimunNisha, Diet Planning for Diseases, Kalpaz Publishers, 2006.
5. 5.Krause, M.V. and Mahan, L.K. Food, Nutrition and Diet Therapy, 9th Ed., W.B. Saunders Company, Philadelphia, 2009

Related online content (MOOC, Swayam , NPTEL, Website etc.)

https://www.who.int/news-room/fact-sheets/detail/cardiovascular-diseases-(cvds)

https://www.cdc.gov/hiv/basics/whatishiv.html

Course Outcomes		**Knowledge level**
CO-1	Understand the principles behind various diets in Prevention and treatment of diseases.	K2
CO-2	Gain Core knowledge and skills to enable individuals to work in public health and health Promotion.	K3
CO-3	Gain experience on planning and preparation of various therapeutic diets.	K3
CO-4	Develop Capacity and aptitude for taking up dietetics as a profession.	K4
CO-5	Acquire knowledge on the importance of neutraceuticals for the maintenance of the Health.	K2

Course designed by **Sinisha Anto**

Mapping Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S (3)	S (3)	S (3)	S (3)	L (1)	L (1)	L (1)	L (1)	S (3)	L (1)
CO2	S (3)	S (3)	S (3)	S (3)	L (1)	L (1)	L (1)	L (1)	S (3)	L (1)
CO3	S (3)	S (3)	S (3)	S (3)	L (1)	L (1)	L (1)	L (1)	S (3)	L (1)
CO4	S (3)	S (3)	S (3)	S (3)	L (1)	L (1)	L (1)	L (1)	S (3)	L (1)
CO5	S (3)	S (3)	S (3)	S (3)	L (1)	L (1)	L (1)	L (1)	S (3)	L (1)
W.AV	**3**	**3**	**3**	**3**	**1**	**1**	**1**	**1**	**3**	**1**

S –Strong (3), M-Medium (2), L- Low (1)

Mapping Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S (3)	S (3)	S (3)	L (1)	S (3)
CO2	S (3)	S (3)	S (3)	L (1)	S (3)
CO3	S (3)	S (3)	S (3)	L (1)	S (3)
CO4	S (3)	S (3)	S (3)	L (1)	S (3)
CO5	M (2)	S (3)	S (3)	L (1)	S (3)
W.AV	**2.8**	**3**	**3**	**1**	**3**

S –Strong (3), M-Medium (2), L- Low (1)

V - Semester					
CC	**Course code: 96352**	**Community Nutrition**	**T**	**Credits: 4**	**Hours: 6**
Pre-requisite	**Basic Knowledge of Nutrition improvement in India**		**Syllabus revised**		**2023- 24**
Course Objectives	1. Gain insight into the national nutritional problems and their implications. 2. Appreciate the national and international contribution towards nutrition improvement in India. 3. Understand the importance of nutrition education. 4. Develop skills in organizing and evaluating nutrition projects in the community. 5. Develop advocacy skills to improve nutritional status of vulnerable group.				
Unit I	**Nutrition and National Development:** Ecology of malnutrition. Relation of nutrition to national development in terms of socio economic, industrial and agricultural development. Consequences of malnutrition - reduced physical work capacity and mental efficiency, cost of wastage due to malnutrition in pregnancy, childhood etc. IMR, NMR,MMR and prevalence of common nutritional problems - PEM, Vitamin A Deficiency Diseases, Anaemia, Iodine Deficiency Disorders and Fluorosis. Ecological factors leading to malnutrition such as income, size of families, dietary pattern, occupation, customs food fads, fallacies, ignorance and other factors. Synergism between malnutrition and infection.				
Unit II	**Strategies to overcome malnutrition:** Measures to overcome malnutrition - increased agricultural production and animal husbandry with emphasis on nutritious foods and nutrition gardens, food technology, food fortification and enrichment. Assessment of nutritional status of the community – direct and indirect method – nutritional anthropometry, diet surveys, clinical and bio chemical assessment. Environmental sanitation and health. Empowering women towards improving the nutritional status of the family, community and nation at large.				
Unit III	**Nutrition Intervention programmes:** Genesis objectives and operation of nutrition intervention programmes in India – School Lunch Programme, CMNMP, ICDS, TINP organized by government for vulnerable sections of the population. National Nutritional Anaemia Prophylaxis Programme, National Prophylaxis Programmeagainst Vitamin A Deficiency Diseases, Goitre Control Programme. National Nutrition policy- National food security, National nutrition policy- thrust areas and implementation at national level, Impact of National Nutrition policy.				
Unit IV	**National International Organizations to Combat Malnutrition:** National Organization concerned with food and nutrition – ICMR, NIN, NNMB CFTRI, DFRL and NIPCCD. International Organization concerned with Food and Nutrition- FAO, WHO, UNICEF & World Bank.				
Unit V	**Nutrition Education:** Meaning, nature and importance of Nutrition education to the community and lessons to be taught. Methods of education- use of audio visual aids. Use of computers to impart nutrition education – power point presentation &E learning. Organization of Nutrition education programmes - Principles of planning, executing and evaluating nutrition education programmes & problems of nutrition education programmes.				

References

1. Swaminathan, M., Essentials of Food and Nutrition. An Advanced Textbook Vol.I. The Bangalore Printing and Publishing Co. Ltd, Bangalore, 2007.
2. Srilakshmi, B., Nutrition Science, New Age International Publication, New Delhi, 2010.
3. Park, A. Park‟s Textbook of Preventive and Social Medicine, XIX Edition M/S Banarasidas, Bharat Publishers, 1167, Prem Nagar, Jabalpur, 428 001(India), 2007.
4. Bamji M.S, PrahladRao N, Reddy V., Textbook of Human Nutrition, II Edition, Oxford and PBH Publishing Co. Pvt. Ltd, New Delhi, 2004. 3. Bhatt D.P, Health Education, KhelSahitya Kendra, New Delhi, 2008.
5. Gibney, M.J., Margetts, B.M., Kearney, J.M., Arab, L., Public Health Nutrition, Blackwell Publishing Co. UK, 2004.

Related online content (MOOC, Swayam, NPTEL, Website etc.)

https://www.fao.org/3/x0172e/x0172e08.html

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4367032/

Course Outcomes		**Knowledge level**
CO-1	Discuss on the nutritional problems of India.	K2
CO-2	Explanation on the strategies and methods for alleviating nutritional problems	K3
CO-3	Knowledge on the National nutritional programme and policies	K3
CO-4	Knowledge on the National and International organization concerned with nutrition	K3
CO-5	Clear explanation on the nutritional education	K2

Course designed by **Riya**

Mapping Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S (3)	S (3)	S (3)	M (2)	S (3)	L (1)	L (1)	L (1)	M (2)	L (1)
CO2	S (3)	M (2)	S (3)	M (2)	S (3)	L (1)	L (1)	M (2)	S (3)	M (2)
CO3	S (3)	M (2)	S (3)	S (3)	M (2)	M (2)	M (2)	L (1)	M (2)	L (1)
CO4	M (2)	M (2)	S (3)	S (3)	M (2)	M (2)	M (2)	L (1)	M (2)	L (1)
CO5	S (3)	M (2)	M (2)	M (2)	L (1)	L (1)	L (1)	M (2)	S (3)	S (3)
W.AV	**2.8**	**2.2**	**2.8**	**2.2**	**2.2**	**1.4**	**1.4**	**1.4**	**2.2**	**1.4**

S –Strong (3), M-Medium (2), L- Low (1)

Mapping Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M (2)	S (3)	S (3)	M (2)	S (3)
CO2	S (3)	S (3)	S (3)	M (2)	S (3)
CO3	M (2)	M (2)	S (3)	S (3)	S (3)
CO4	S (3)	M (2)	S (3)	M (2)	S (3)
CO5	S (3)	S (3)	M (2)	L (1)	S (3)
W.AV	**2.6**	**2.6**	**2.8**	**2**	**3**

S –Strong (3), M-Medium (2), L- Low (1)

V - Semester					
CC	**Course code: 96353**	**Dietetics - II - Practical**	**P**	**Credits: 3**	**Hours: 6**
Pre-requisite	**Basic Knowledge of**		**Syllabus revised**		**2023- 24**

Course Objectives	1. Gain knowledge on different disease conditions which requires dietary recommendations. 2. Apply knowledge on the continued development of advanced practice in medical nutrition therapy. 3. Acquire practical knowledge of therapeutic diet to meet the requirement. 4. Plan and prepare diets to meet out the quality and quantity requirements for specific disease conditions. 5. Understand the calculations of nutritive value for the planned and prepared diet.
Unit I	**Diet in Diabetes mellitus:** Planning, nutritive value calculation and preparation of diets for a) IDDM b) NIDDM
Unit II	**Diet in Cardiovascular diseases** a) Hypertension b) Atherosclerosis c) Coronary heart disease
Unit III	**Diet in renal diseases** a) Glomerulonephritis b) Nephrosis c) Renal calculi
Unit IV	Diet in musculo skeletal system a) Osteoporosis b) gout
Unit V	**Nutrition education:** Importance of dietary management in different disease condition to the suspected subjects

Course Outcomes		**Knowledge level**
CO-1	Develop the ability to plan and prepare diets for critically ill patients.	K3
CO-2	Apply and integrate principles of medical nutrition therapy for some complications in Diabetes Mellitus.	K3
CO-3	Develop competency and skills in planning, preparation and evaluation of different types of cancers.	K3
CO-4	Plan and prepare diets to meet out the quality and quantity requirements for specific disease conditions.	K2
CO-5	Understand the application of principles of nutrition in cardiac patients.	K2

Course designed by **Sinisha Anto**

Mapping Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S (3)	S (3)	S (3)	S (3)	L (1)	L (1)	L (1)	L (1)	S (3)	L (1)
CO2	S (3)	S (3)	S (3)	S (3)	L (1)	L (1)	L (1)	L (1)	S (3)	L (1)
CO3	S (3)	S (3)	S (3)	S (3)	L (1)	L (1)	L (1)	L (1)	S (3)	L (1)
CO4	S (3)	S (3)	S (3)	S (3)	L (1)	L (1)	L (1)	L (1)	S (3)	L (1)
CO5	S (3)	S (3)	S (3)	S (3)	L (1)	L (1)	L (1)	L (1)	S (3)	L (1)
W.AV	**3**	**3**	**3**	**3**	**1**	**1**	**1**	**1**	**3**	**1**

S –Strong (3), M-Medium (2), L- Low (1)

Mapping Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S (3)	S (3)	S (3)	L (1)	S (3)
CO2	S (3)	S (3)	S (3)	L (1)	S (3)
CO3	S (3)	S (3)	S (3)	L (1)	S (3)
CO4	S (3)	S (3)	S (3)	L (1)	S (3)
CO5	M (2)	S (3)	S (3)	L (1)	S (3)
W.AV	**2.8**	**3**	**3**	**1**	**3**

S –Strong (3), M-Medium (2), L- Low (1)

V - Semester					
DSE	**Course code: 96354A**	**Research Methodology**	**T**	**Credits: 4**	**Hours: 5**
Pre-requisite	**Basic Knowledge on Research Techniques**		**Syllabus revised**		**2023- 24**

Course Objectives	1. To familiarize basic information about research methodology. 2. To make the students with basic features of research design. 3. To impart skills by preparing a research. 4. To make them awareness of report writing. 5. To impart information about data collection methods.
Unit I	**Research Methodology –** Introduction – Meaning of research – Objectives of research – Types of research – Criteria of good research – Research process.
Unit II	**Defining the Research Problem** – Selecting the problem – Techniques involved in defining problem – Processing and analysis of data – Processing operation – Types of analysis – Testing of hypothesis – Chi-square test.
Unit III	**Research Design** – Meaning of research design – Need for research design – Features of a good design – Different research design – Basic principles of experimental design – Sampling design – Census and sample survey – Characteristics of a good sample design – Different types of sample designs.
Unit IV	**Data Collection -** Methods of data collection – Collection of primary data – Observation method – Interview method – Collection of data through questionnaire – Collection of data through schedule – Difference between questionnaire and schedule – Collection of secondary data.
Unit V	**Interpretation and Report writing –** Meaning of interpretation – Technique of interpretation – Significance of report writing – Different steps in writing report – Layout of the research report – Types of report.

References

Research methodology – C R Kothari – 2004
Research methodology: A step by step guide for beginners – Renjith Kumar – 5th edition
Research design: qualitative, quantitative and mixed methods approaches - Jhon W Creswell, J David Creswell
Research methods for beginners – Dr. R Naveen Kumar
Research Methodology – Lakshmi Narain Agarwal

Related online content (MOOC, Swayam , NPTEL, Website etc.)

https://research-methodology.net/

Course Outcomes		**Knowledge level**
CO-1	Understand the basic concepts in research methodology.	K2
CO-2	Analyze the methods of data collection.	K4
CO-3	Acquire the knowledge of report writing.	K2
CO-4	Acquire the knowledge of research design.	K2
CO-5	Evaluate the difference between questionnaire and schedule.	K5

Course designed by **Mini M V**

Mapping Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M (2)	M (2)	M (2)	L (1)	L (1)	L (1)	L (1)	S (3)	L (1)	S (3)
CO2	M (2)	M (2)	M (2)	L (1)	L (1)	L (1)	L (1)	S(3)	L (1)	S(3)
CO3	M (2)	M (2)	M (2)	L (1)	L (1)	L (1)	L (1)	S (3)	L (1)	S (3)
CO4	M (2)	M (2)	M (2)	L (1)	L (1)	L (1)	L (1)	S (3)	L (1)	S (3)
CO5	M (2)	M (2)	M (2)	L (1)	L (1)	L (1)	L (1)	S (3)	L (1)	S (3)
W.AV	**2**	**2**	**2**	**1**	**1**	**1**	**1**	**3**	**1**	**3**

S –Strong (3), M-Medium (2), L- Low (1)

Mapping Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L (1)	M (2)	L (1)	L (1)	S (3)
CO2	L (1)	M (2)	L (1)	L (1)	S(3)
CO3	L (1)	M (2)	L (1)	L (1)	S (3)
CO4	L (1)	M (2)	L (1)	L (1)	S (3)
CO5	L (1)	M (2)	L (1)	L (1)	S (3)
W.AV	**1**	**2**	**1**	**1**	**3**

S –Strong (3), M-Medium (2), L- Low (1)

V - Semester					
DSE	**Course code: 96354B**	**Paediatric Dietetics**	**T**	**Credits: 4**	**Hours: 5**
Pre-requisite	**Basic Knowledge on infant nutrition**		**Syllabus revised**		**2023- 24**
Course Objectives	1. Relate the growth and development of infants. 2. Understand the nutritional requirements during infancy. 3. Know the principles of selection of weaning foods. 4. Identify the pediatric health issues and their dietary management. 5. Understand the production of infant formulae.				
Unit I	**Nutritional care of Infants**: growth and development charts , advantages of breast feeding, Artificial feeding, food and nutritional requirements for infants, weaning and supplementary foods for infants and immunization.				
Unit II	**Growth and Development:** Development of gastrointestinal system , infant nutrient assimilation ,intestinal microbiota in the infants, assessment of growth of infants ,Birth weight, low birth weight conditions, Preterm infants, complications.				
Unit III	**Malnutrition:** Primary and secondary malnutrition, micronutrients deficiencies in children.				
Unit IV	**Mental health of infants in relation to growth:** autism, ADHD, eating disorders, cognitive and developmental disorders.				
Unit V	**Disorders in infants:** Inborn errors of metabolism in infants, food intolerance and allergy, Allergy prevention through early nutrition.				

References

1. B Srilakshmi, Dietetics, 8th edition,new age international publishers, 2019
2. Kleinman, Ronald E, Greer, Frank R., Pediatric Nutrition ,7th edition ,Association of American Publishers ,2013
3. Berthold Koletzko ,et al., Pediatric Nutrition in practice,2 nd revised edition, Karger publishers, India,2015
4. Madhu Sharma, Pediatric Nutrition in health and sciences,Jaypee brothers medical publishers ,2019
5. Suraj Gupte ,et al, Recent Advances in pediatrics ,child nutrition in practice,Jaypee brothers medical publishers,2019

Related online content (MOOC, Swayam , NPTEL, Website etc.)

https://www.genome.gov/Genetic-Disorders/Inborn-Errors-of-Metabolism

https://main.mohfw.gov.in/sites/default/files/24545352106148966387 3.pdf

Course Outcomes		**Knowledge level**
CO-1	To understand the nutritional care and requirements of infants	K2
CO-2	To gain knowledge on growth and development of infants	K1
CO-3	To evaluate the nutritional disorders and allergy related problems in infants	K5
CO-4	To understand the mental health disorders of infants	K2
CO-5	To know the weaning techniques for feeding	K1

Course designed by **Athira Antony**

Mapping Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S (3)	L (1)	S (3)	M (2)	L (1)	L (1)	L (1)	M (2)	M (2)	M (2)
CO2	S (3)	M (2)	S (3)	L (1)	L (1)	L (1)	L (1)	L (1)	S (3)	M (2)
CO3	S (3)	S (3)	S (3)	M (2)	S (3)	M (2)	L (1)	L (1)	S (3)	S (3)
CO4	S (3)	M (2)	S (3)	L (1)	L (1)	L (1)	L (1)	L (1)	S (3)	M (2)
CO5	S (3)	S (3)	M (2)	S (3)	M (2)	L (1)	L (1)	L (1)	S (3)	M (2)
W.AV	**3**	**2.2**	**2.8**	**1.8**	**1.6**	**1.2**	**1**	**1.2**	**2.8**	**2.2**

S –Strong (3), M-Medium (2), L- Low (1)

Mapping Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S (3)	S (3)	S (3)	L (1)	S (3)
CO2	S (3)	S (3)	M (2)	L (1)	S (3)
CO3	S (3)	S (3)	S (3)	L (1)	S (3)
CO4	S (3)	S (3)	S (3)	S (3)	S (3)
CO5	S (3)	S (3)	S (3)	S (3)	M (2)
W.AV	**3**	**3**	**2.8**	**1.8**	**2.8**

S –Strong (3), M-Medium (2), L- Low (1)

V - Semester					
DSE	**Course code: 96355A**	**Food Packaging and Marketing Management**	**T**	**Credits: 4**	**Hours: 5**
Pre-requisite	**Basic Knowledge on food packaging materials and labelling requirements**		**Syllabus revised**		**2023- 24**
Course Objectives	1. Acquire knowledge on the methods of packaging used for different food items. 2. Know the advanced technologies followed in food packaging 3. Understand the nutritional labelling requirements. 4. Gain knowledge on new regulations and updates in food industry marketing. 5. Enhance the awareness on handling food packages in different stages of processing.				

Unit I	**Packaging**: Definition, types of packaging, functions of packaging materials for different foods, characteristics of packaging material. Food packages bags, pouches, wrappers, tetra packs-applications.
Unit II	**Packaging materials** - Introduction, purpose, requirements, types of containers. Modern packaging materials and forms-Glass containers, metal cans, composite containers, aerosol containers, rigid plastic packages, semi rigid packaging, and flexible packaging.
Unit III	**Packages of radiation stabilized foods -** rigid containers, flexible containers, general methods for establishing radiation stabilization. Radiation- measurement of radiations. Biodegradable packaging material-biopolymer based edible film.
Unit IV	**Packages of dehydrated products -** Orientation, metallization, co-extrusion of multilayer films, stretch, package forms and techniques. Aspectic packaging, retortable containers, modified and controlled atmosphere packaging, skin, strink and cling film packaging, micro-ovenable containers, other package forms and components of plastics.
Unit V	**Packaging of finished goods -** Weighing, filling, scaling, wrapping, cartoning, labeling, marking. **Labelling and Marketing** - Standards, purpose, description types of labels, labeling regulation barcode, nutrition labeling, health claims, and mandatory labeling provision(consumer rights) , marketing strategies used in packaging and labelling , current trends in marketing.

References

1. Vijaya Khader. Text book of food science and technology, Indian council of Agricultural research New Delhi, 2001
2. Stainley Sacharous. Roger C Griffin. Principles of food packaging 2nd Ed. Avi pub Co. Westport.
3. F.A. & Paine, H.Y. Leonard hill. A hand book of food packaging. Blackie Sons Ltd London.
4. Sucharows. S. Handbook of packaging materials. Avi Pub Co. Westport.
5. Croshy N.T. Food packaging materials. Applied Science pub Ltd. London

Related online content (MOOC, Swayam , NPTEL, Website etc.)

http://ecoursesonline.iasri.res.in/mod/page/view.php?id=6197

https://nifst.org/wp-content/uploads/2015/10/DR-OKAFOR-STORAGE-PRINCIPLES-Workshop-Paper-sent.pptx

Course Outcomes		**Knowledge level**
CO-1	To understand the types of food packaging and their functions.	K2
CO-2	To gain knowledge on quantity food labelling procedures and customer rights.	K1
CO-3	To develop skills in handling foods packages without creating health hazards.	K5
CO-4	To understand safety and hygienic practices in food production.	K2
CO-5	To know the legal aspects of food manufacturing and marketing.	K1

Course designed by **Athira Antony**

Mapping Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	L (1)	M (2)	S (3)	S (3)	S (3)	M (2)	L (1)	L (1)	M (2)	M (2)
CO2	L (1)	M (2)	S (3)	S (3)	S (3)	M (2)	L (1)	L (1)	L (1)	L (1)
CO3	M (2)	S (3)	M (2)	S (3)	S (3)	S (3)	M (2)	L (1)	M (2)	M (2)
CO4	M (2)	S (3)	S (3)	S (3)	S (3)	M (2)	M (2)	L (1)	M (2)	L (1)
CO5	L (1)	M (2)	L (1)	M (2)	S (3)	L (1)	M (2)	L (1)	M (2)	L (1)
W.AV	**1.4**	**2.4**	**2.4**	**2.8**	**3**	**2**	**1.6**	**1**	**1.8**	**1.4**

S –Strong (3), M-Medium (2), L- Low (1)

Mapping Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M (2)	S (3)	M (2)	S (3)	M (2)
CO2	L (1)	M (2)	L (1)	S (3)	L (1)
CO3	M (2)	S (3)	S (3)	S (3)	M (2)
CO4	M (2)	S (3)	S (3)	S (3)	S (3)
CO5	L (1)	M (2)	S (3)	S (3)	L (1)
W.AV	**1.6**	**2.6**	**2.4**	**3**	**1.8**

S –Strong (3), M-Medium (2), L- Low (1)

V - Semester					
DSE	**Course code: 96355B**	**Traditional Herbs in Food Science**	**T**	**Credits: 4**	**Hours: 5**
Pre-requisite	**Basic Knowledge of Traditional herbs and spices involved in food science**		**Syllabus revised**		**2023- 24**
Course Objectives	1. Know the importance of herbs in food. 2. Understand the traditional medicine and herbs. 3. Gain insight in to the various usages of herbal plants. 4. Develop the skill to cultivation of traditional herbal plants. 5. Understand and develop skills to make innovative idea in food and beverages.				
Unit I	**Historical background** – meaning of herbs, popular herbs in India and Scope of herbal plants.Traditional medicines and herbs – types, role of herbal medicine in traditional healing and various forms of herbal preparations. Herbal nutraceuticals – meaning, advantages and disadvantages.				
Unit II	**Pharmacognosy:** definition, purpose and scope. Identification of herbs - Taxonomic evidences of herbal plants – Exomorphic characters – Endomorphic characters – Anatomical, Cytological and Palynological evidences in identification of Medicinal herbs.				
Unit III	**Extraction of herbs:**methods - Detection methods of Alkaloids, Glycosides, Tannins, Volatile oils and gums and other phytochemicals in extracts by colour tests and TLC. Major functions of these substances in the body.				
Unit IV	**Cultivation:** Conventional methods (Reproductive and Vegetative) of cultivation of herbs. Standardization of cultivation protocols of five selected herbs. Harvesting and processing - Collection, Stabilization, Drying and Preservation of herbs.				
Unit V	**Herbs and grains used in brewery industries:** herbal fermented beverages- Process involved in herbal extraction, important grains used in brewery and their roles. kombucha– preparation technique, benefits and role of ingredients. Herbs and spices used to colour and flavor the food and beverages – role of spice and herbs in beverages, colour extraction techniques used in beverages (brief explanation).				

References

1. Harborne, J. B.*Phytochemical methods*.
2. Iyangar, M. A.*Pharmacognosy of crude drugs*.
3. Sukumar, E. 1987.*Phytochemistry and Pharmacology of some Indian medicinal plants*,Vivekananda Kendra Patrika.
4. Sumner, J and Plotkin, M. 2000. *The natural history of medicinal plants*.
5. Swaminathan, M. 2007.*Essentials of Food and Nutrition*. An Advanced Textbook. The Bangalore Printing and Publishing Co. Ltd, Bangalore.

Related online content (MOOC, Swayam , NPTEL, Website etc.)

https://agritech.tnau.ac.in/gap_gmp_glp/gap_medicinal%20crops.html

https://www.fao.org/3/ad420e/ad420e.pdf

Course Outcomes		**Knowledge level**
CO-1	Basic knowledge on herbs and their role in daily life	K2
CO-2	Knowledge on pharmacognosy and its characteristics	K2
CO-3	Basic knowledge on herbal extraction technique and its medicinal value	K3
CO-4	Clear explanation on cultivation, harvesting and preservation of selected herbs	K2
CO-5	Discuss on herbal beverages and its advantages in brewery industry	K3

Course designed by **Riya**

Mapping Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M (2)	L (1)	M (2)	L (1)	M (2)	L (1)	M (2)	L (1)	L (1)	M (2)
CO2	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	M (2)
CO3	L (1)	L (1)	M (2)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)
CO4	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	M (2)
CO5	M (2)	L (1)	L (1)	M (2)	M (2)	M (2)	M (2)	L (1)	L (1)	L (1)
W.AV	**1.4**	**1**	**1.4**	**1.2**	**1.4**	**1.2**	**1.4**	**1**	**1**	**1.6**

S –Strong (3), M-Medium (2), L- Low (1)

Mapping Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S (3)	S (3)	S (3)	S (3)	S (3)
CO2	M (2)	M (2)	M (2)	M (2)	M (2)
CO3	S (3)	S (3)	M (2)	S (3)	S (3)
CO4	L (1)	L (1)	M (2)	S (3)	S (3)
CO5	M (2)	S (3)	M (2)	S (3)	M (2)
W.AV	**2.2**	**2.4**	**2.2**	**2.8**	**2.6**

S –Strong (3), M-Medium (2), L- Low (1)

VI - Semester					
CC	**Course code: 96361**	**Bio-Process Technology**	**T**	**Credits: 4**	**Hours: 5**
Pre-requisite	**Basic Knowledge of Process and application of Bio process and fermentation technology**		**Syllabus revised**		**2023- 24**
Course Objectives	1. Understand the concept and application of bio process and fermentation technology. 2. Gain insight on the importance of modern technology in food industry. 3. Understand the basic awareness about the operation principles of machinery in food industry. 4. Attain basic ideas about chemical changes of food and its importance. 5. Gain ability to develop innovative ideas in food process industry.				
Unit I	**Introduction to bioprocess:** Importance. An overview of traditional and modern applications of biotechnological process, integrated bioprocess and the various (Upstream and downstream) unit operations involved in bioprocesses.				
Unit II	**Fermentation processes:** General requirements of fermentation processes, main parameters to be monitored and controlled in fermentation processes, aerobic an anaerobic fermentation processes and their application in the Nutraceutical industry. Fermenter – Types – Bubble column, Fluidized bed reactor, Plug flow reactor, Plant and animal cell Bioreactors.				
Unit III	**Enzymatic bioconversion processes:** Kinetics and thermodynamics of enzyme – catalyzed reactions, basic design and configuration of bioreactors. Media design and sterilization for fermentation processes - Medium requirements for fermentation processes and for industrial fermentation.				
Unit IV	**Metabolic stoichiometry and energetics:** Stoichiometry of cell growth and product fermentation, elemental balances, degrees of reduction of substrate and biomass, yield coefficients of biomass and product formation, maintenance coefficients energetic analysis of microbial growth and product formation.				
Unit V	**Production of milk products:** Cheese, Yogurt and other milk products. Bread making. Production of fermented beverages, vinegar production, Single cell protein production and mushroom cultivation.				

References

1. Shuler, M.L. and Kargi, F. 2008. Bioprocess engineering – Basic concepts. Pearson Education.
2. Pauline M. Doran. 2009.Bioprocess Engineering Principles. Academic Press Inc.,
3. M.L. Srivastava. 2010. Fermentation Technology, Narosa Publications.
4. El-Mansi& Bryce C.F.A.2007.Fermentation Microbiology and Biotechnology. 2nd edition, Taylor and Francis Publishing.
5. Kalaichelvan, P.T and Arul, P. I.2007. Bioprocess Technology, MJP Publishers

Related online content (MOOC, Swayam , NPTEL, Website etc.)

https://dairyprocessinghandbook.tetrapak.com/chapter/fermented-milk-products

https://www.futurebridge.com/industry/perspectives-food-nutrition/bioprocessing-for-nutritional-products/

Course Outcomes		**Knowledge level**
CO-1	Basic knowledge on bio processing technology	K2
CO-2	Basic knowledge on fermentation process and technology	K2
CO-3	Explanation on process involved in bio conversion	K3
CO-4	Knowledge on chemical changes during bio processing	K3
CO-5	Discuss on the fermented food products, beverages and mushroom cultivation	K3

Course designed by **Riya**

Mapping Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	L (1)	L (1)	S (3)	M (2)	L (1)	S (3)	L (1)	L (1)	L (1)	S (3)
CO2	M (2)	L (1)	S (3)	M (2)	M (2)	S (3)	M (2)	L (1)	L (1)	S (3)
CO3	L (1)	L (1)	L (1)	L (1)	L (1)	M (2)	L (1)	L (1)	L (1)	M (2)
CO4	L (1)	L (1)	M (2)	M (2)	L (1)	M (2)	L (1)	L (1)	L (1)	M (2)
CO5	M (2)	L (1)	M (2)	M (2)	M (2)	M (2)	M (2)	L (1)	L (1)	M (2)
W.AV	**1.4**	**1**	**2.2**	**1.8**	**1.4**	**2.4**	**1.4**	**1**	**1**	**2.4**

S –Strong (3), M-Medium (2), L- Low (1)

Mapping Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S (3)	S (3)	M (2)	S (3)	S (3)
CO2	S (3)	S (3)	M (2)	S (3)	S (3)
CO3	M (2)	M (2)	L (1)	L (1)	L (1)
CO4	M (2)	M (2)	L (1)	L (1)	M (2)
CO5	M (2)	S (3)	M (2)	M (2)	S (3)
W.AV	**2.4**	**2.4**	**1.6**	**2**	**2.4**

S –Strong (3), M-Medium (2), L- Low (1)

VI - Semester					
CC	**Course code: 96362**	**Food Safety, Security and Ethics**	**T**	**Credits: 4**	**Hours: 5**
Pre-requisite	**Basic Knowledge on food safety and hygienic practices**		**Syllabus revised**		**2023- 24**

Course Objectives	1. Know the importance of quality assurance in food industry. 2. Know the principles of quality control of food additives. 3. Know the standards for quality assessment and food safety against adulteration for various foods. 4. Familiarize with critical assessment and control points for quality assurance. 5. Know the importance of temperature control in relation with prevention of food borne illness.
Unit I	**Introduction to food safety:** Definition of food safety and hygiene, nature of food item in terms of raw, cooked or under cooked meal. The importance of optimal temperature control for food safety and hygiene. Advantages and disadvantages of temperature control measures in food industry.
Unit II	**Food safety hazards –** primary sources, characteristics, adverse health effects, implicated foods and control measures.
Unit III	**Food safety risks** – definition, types of risks, risk management steps- risk assessment and risk analysis.
Unit IV	**Food safety standards** – Food safety and standards authority of India (FSASAI), ISI, AGMARK, ISO and others.
Unit V	**Ethics in food industry** - Food adulteration and Prevention, Food Preservation, Storage temperature. Ethics – code of ethics in food safety, legal and ethical issues, and patient's rights, medical waste management, Medical record management.

References

1. HOBBS BC and Roberts. D; Food poisoning and food Hygiene. Edward Amold (A diceision of Hodder and Stoughton), London.

2. Roday.S. (1999) Food Hygiene And Sanitation, Tata McGraw-Hill Publishing Co. Ltd, New Delhi.

3. Lawley, R., Curtis L. and Davis,J.(2004) The Food Safety Hazard Guidebook , RSC publishing.

4. De Vries. (1997) Food Safety and Toxicity, CRC, New York.

5. Srilakshmi, B. Food Science, New Age International Publishers, New Delhi, 2010

Related online content (MOOC, Swayam , NPTEL, Website etc.)

http://ecoursesonline.iasri.res.in/mod/page/view.php?id=111846#:~:text=Food%20standards%3AA%20body%20of,for%20distribution%20or%20for%20sale

https://www.fao.org/3/w4982e/w4982e.pdf

Course Outcomes		**Knowledge level**
CO-1	Understand the nature of foods.	K2
CO-2	Apply risk management techniques in food safety.	K3
CO-3	Identify and understand issues pertaining to food safety.	K3
CO-4	Assessing the food safety hazards and their impact on health.	K5
CO-5	Develop skills in food safety risk management.	K3

Course designed by **Athira Antony**

Mapping Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S (3)	S (3)	M (2)	S (3)	M (2)	M (2)	L (1)	L (1)	M (2)	M (2)
CO2	M (2)	S (3)	S (3)	M (2)	S (3)	L (1)	L (1)	L (1)	M (2)	M (2)
CO3	L (1)	S (3)	M (2)	S (3)	S (3)	M (2)	M (2)	L (1)	M (2)	L (1)
CO4	S (3)	M (2)	M (2)	L (1)	S (3)	S (3)	M (2)	M (2)	L (1)	M (2)
CO5	L (1)	M (2)	M (2)	M (2)	M (2)	M (2)	L (1)	L (1)	L (1)	L (1)
W.AV	**2**	**2.6**	**2.2**	**2.2**	**2.6**	**2**	**1.4**	**1.2**	**1.6**	**1.6**

S –Strong (3), M-Medium (2), L- Low (1)

Mapping Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S (3)	S (3)	L (1)	S (3)	L (1)
CO2	S (3)	S (3)	S (3)	S (3)	S (3)
CO3	M (2)	M (2)	S (3)	S (3)	M (2)
CO4	S (3)	S (3)	S (3)	S (3)	S (3)
CO5	M (2)	M (2)	S (3)	M (2)	M (2)
W.AV	**2.6**	**2.6**	**2.6**	**2.8**	**2.2**

S –Strong (3), M-Medium (2), L- Low (1)

VI - Semester					
CC	**Course code: 96363**	**Bio – Process Technology - Practical**	**P**	**Credits: 3**	**Hours: 6**
Pre-requisite	**Basic Knowledge of bioreactors and microorganisms**		**Syllabus revised**		**2023- 24**
Course Objectives	1. Know the importance of microorganisms in food industry. 2. Understand the principles of fermentation. 3. Know the production of different types of fermentated foods. 4. Familiarize with the laboratory skills. 5. Know the importance of maintenance of factors that influence fermentation process.				
Unit I	Introduction to Bioprocessing – Fermenter – Part and design – Production of Biomass and its estimation (dry weight).				
Unit II	Types of Fermenter / Bioreactor.				
Unit III	Production of fermented herbal beverages using baker‟s yeast – wine.				
Unit IV	Isolation of lactic acid bacteria, Isolation of yeast from fermented honey.				
Unit V	Demonstration of vinegar production and bread making.				

Course Outcomes		**Knowledge level**
CO-1	Understand the types of microbes used in food processing and production industries.	K2
CO-2	Apply theoretical knowledge on fermentation process by demonstration.	K3
CO-3	Identify and understand the risks involved in fermentation.	K3
CO-4	Assessing the level of possibility of isolation of different microorganisms from fermented foods.	K5
CO-5	Develop skills in isolation of microorganisms from fermentated foods.	K3

Course designed by **Athira Antony**

Mapping Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	L (1)	L (1)	S (3)	M (2)	L (1)	S (3)	L (1)	L (1)	L (1)	S (3)
CO2	M (2)	L (1)	S (3)	M (2)	M (2)	S (3)	M (2)	L (1)	L (1)	S (3)
CO3	L (1)	L (1)	L (1)	L (1)	L (1)	M (2)	L (1)	L (1)	L (1)	M (2)
CO4	L (1)	L (1)	M (2)	M (2)	L (1)	M (2)	L (1)	L (1)	L (1)	M (2)
CO5	M (2)	L (1)	M (2)	M (2)	M (2)	M (2)	M (2)	L (1)	L (1)	M (2)
W.AV	**1.4**	**1**	**2.2**	**1.8**	**1.4**	**2.4**	**1.4**	**1**	**1**	**2.4**

S –Strong (3), M-Medium (2), L- Low (1)

Mapping Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S (3)	S (3)	M (2)	S (3)	S (3)
CO2	S (3)	S (3)	M (2)	S (3)	S (3)
CO3	M (2)	M (2)	L (1)	L (1)	L (1)
CO4	M (2)	M (2)	L (1)	L (1)	M (2)
CO5	M (2)	S (3)	M (2)	M (2)	S (3)
W.AV	**2.4**	**2.4**	**1.6**	**2**	**2.4**

S –Strong (3), M-Medium (2), L- Low (1)

VI - Semester					
DSE	**Course code: 96364A**	**Nutraceutical**	**T**	**Credits: 4**	**Hours: 4**
Pre-requisite	**Basic Knowledge on Nutrients and Non Nutrients**		**Syllabus revised**		**2023- 24**
Course Objectives	1. To obtain knowledge on functional foods 2. To understand the importance of phytochemicals in daily diet. 3. To learn the skills to plan diets for disease prevention. 4. To develop the knowledge quality control measures in nutraceuticals. 5. To understand the uses of various food compounds.				
Unit I	**Definitions** - non Nutrititve substances, functional foods phyto chemicals, Nutraceuticals, types,sources of Nutraceuticals and their functions , free radicals, antioxidants biomarkers of common diseases (cancer, diabetes, lipdemia , atherosclerosis,organ damages).				
Unit II	**Functional Foods :** Sources , their role in Nutraceuticals, Active Ingredients and their Origin, Extraction and Processing of active Ingredients ,Nutraceuticals and Disease control.				
Unit III	**Quality control and quality assurance -** Food Quality Assurance in Nutraceuticals, Laws and Regulation Standards in Nutraceutical Industries.				
Unit IV	**Probiotics and prebiotics** - definition, sources , probiotics and symbiotic role in nutraceuticals , factors to be considered before intake.				
Unit V	**Supplement Market** - Nutraceutical Products in the Indian market, Entrepreneurship Development in Nutraceutical Industry,Practitioner Case Studies, natural health products.				

References

1. Pradnya Wadekar, Papat Dr. Kiran A Wadekar Dr. Vijay A. Salunkhe, Dietary Supplements & Nutraceuticals edition 1, Technical publications,Pune,2022
2. Srilakshmi, B., Dietetics, New Age International (P) Ltd., New Delhi, 2013.
3. Rao Muralidhar , Nutraceuticals -occurance, Benefit, and regulations., Notion press -publishers, Chennai ,2023
4. Maywrika Goel,Nutraceuticals in Human Heals., The energy and Resources Institute publications,TERI,2022
5. Yashwant Pathak,Handbook of Nutraceuticals Volume I, Ingredients, formulation, and Applications,CRC press , Florida,2016

Related online content (MOOC, Swayam , NPTEL, Website etc.)

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4336979/

https://foodprocessingindia.gov.in/sectors/Nutraceuticals

Course Outcomes		**Knowledge level**
CO-1	Understand the importance of Nutraceuticals in the changing lifestyle.	K2
CO-2	Develop and improve health and reduce disease risk through prevention.	K3
CO-3	Acquire knowledge on basic biomarkers to detect diseases..	K4
CO-4	Acquire knowledge of planning a diet with phytochemicals.	K2
CO-5	To understand the quality control measures of Nutraceuticals industry.	K2

Course designed by **Athira Antony**

Mapping Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M (2)	M (2)	L (1)	L (1)	L (1)	L (1)	L (1)	M (2)	L (1)	L (1)
CO2	M (2)	M (2)	M (2)	L (1)	L (1)	M (2)	L (1)	L (1)	L (1)	M (2)
CO3	S (3)	L (1)	S (3)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	M (2)
CO4	M (2)	L (1)	M (2)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	M (2)
CO5	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	M (2)	L (1)
W.AV	**2**	**1.4**	**1.8**	**1**	**1**	**1.2**	**1**	**1.2**	**1.2**	**1.6**

S –Strong (3), M-Medium (2), L- Low (1)

Mapping Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L (1)	S (3)	L (1)	M (2)	S (3)
CO2	M (2)	S (3)	S (3)	M (2)	M (2)
CO3	S (3)	S (3)	M (2)	L (1)	L (1)
CO4	L (1)	M (2)	L (1)	L (1)	L (1)
CO5	L (1)	L (1)	M (2)	L (1)	L (1)
W.AV	**1.6**	**2.4**	**1.8**	**1.4**	**1.6**

S –Strong (3), M-Medium (2), L- Low (1)

VI - Semester					
DSE	**Course code: 96364B**	**Gender Studies**	**T**	**Credits: 4**	**Hours: 4**
Pre-requisite	**Basic Knowledge of concepts in Gender**		**Syllabus revised**		**2023- 24**
Course Objectives	1. To impart the concept of gender studies in students. 2. To make them aware of policies concerning women. 3. To familiarize the students with the information of areas of gender discrimination. 4. To impart the students about various women's movements in India. 5. To understand the discrimination on the basis of their gender.				
Unit I	**Introduction and concepts in gender studies:** Introduction – Basic Concepts – Gender equality – Gender roles – Gender Stereotypes – Gender relations – Femininity – Masculinity – Positive peace – Patriarchy – Violence – Gender discrimination – Gender main streaming – Harassment – Dowry – Sex – Gender – Occupational stress – Sustainable peace building.				
Unit II	**Policy initiative concerning women's studies:** Protection of women from domestic violence act – Commission of sati (prevention) act – Sexual harassment of women at work place – Immoral traffic prevention act – The indecent representation of women prohibition act – Dowry prohibition act – Equal remuneration act – Pre-natal diagnostic techniques act.				
Unit III	**Areas of gender disc** Household inequality – Inequality in workplace, schools, public etc. **Gender Issues:** Unequal in education – Child-sex ratio – Unequal pay – Sexual harassment – Health – Nutrition – Violence.				
Unit IV	**Women in development and gender in development:** Policies for women's development and child development in India – Constitutional laws for women – Labour law – Property right – Education and gender rights – Rights in marriage and divorce.				
Unit V	**Women's movement in India:** Narmada Bachao Andolan – Chipko movement – Prohibition movement – Anti-liquor movement in Andra pradesh – Anti-dowry movement – Nirbhaya movement – Triple talaq – Green belt movement – Gulabi gang – Shah bano case – Movement against khap panchayt – Mitti bachao movement.				

References

Chup – Breaking the silence about India's women – Deepa Narayan.

Law and gender inequality: The politics of women's rights in India – Flavia agnes.

Gender studies – N Manimekalai – S Suba-Sree-Ramya offset printers.

What is patriarchy – Kamala Bhasin.

Seeing like a feminist – Nivedita Menon.

Lifting the veil – Ismat Chughtai.

Related online content (MOOC, Swayam , NPTEL, Website etc.)

Course Outcomes		**Knowledge level**
CO-1	Define and evaluate gender as a social construct.	K5
CO-2	Knowledge about gender discrimination.	K2
CO-3	Understand the policies for women's development.	K2
CO-4	Analyze the concept of women's movement.	K4
CO-5	Understand how gender affects society.	K2

Course designed by **Mini M V**

Mapping Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)
CO2	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)
CO3	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)
CO4	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)
CO5	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)
W.AV	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**

S –Strong (3), M-Medium (2), L- Low (1)

Mapping Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L (1)	L (1)	L (1)	L (1)	L (1)
CO2	L (1)	L (1)	L (1)	L (1)	L (1)
CO3	L (1)	L (1)	L (1)	L (1)	L (1)
CO4	L (1)	L (1)	L (1)	L (1)	L (1)
CO5	L (1)	L (1)	L (1)	L (1)	L (1)
W.AV	**1**	**1**	**1**	**1**	**1**

S –Strong (3), M-Medium (2), L- Low (1)