Semester	Course Code	Course Category	Hours /Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
III	24UNDVAC1	VALUE ADDED COURSE-I	30	-	-	100	100
Course Title	MILK PROCESSING TECHNIQUES						

SYLLABUS		
Unit	**Contents**	**Hours**
I	**Milk –** Definition, Composition of milk – Major & Minor components of milk. Factors influencing the composition of milk- Breed, stage of lactation, age, feed and vaccination of the cow. Nutritive Value of milk, Properties of milk. Sensory evaluation of raw milk.	**6**
II	**Milk Procurement –**Market milk – market milk industry in India – Source of milk procurement –collection, different mode of transportation of milk, milk reception-unloading, sampling, testing – organoleptic tests, Clot on boiling test, weighing and recording.	**6**
III	**Processing of Milk –** Straining**,** filtration, Clarification. **Chilling of Milk**- Can immersion, In can Cooling, Surface Cooler, Tubular Cooler, Plate Chiller, Bulk Milk Cooler. Principles of HACCP in milk industry.	**6**
IV	**Thermal Processing of Milk -** Homogenization, Sterilization – In bottle sterilization, Ultra High Temperature Short time (UHTST) process, Pasteurization – In bottle Pasteurization, Batch Pasteurization – Low Temperature Long Time (LTLT), Flash Pasteurization – High Temperature Short Time (HTST) , Ultra High Temperature Pasteurization (UHT) and Vacuum Pasteurization. Evaporation of milk.	**6**
V	**Microbiological Quality Evaluation of Milk** – Microflora of pasteurized milk, Thermoduric microflora, Thermophilic microflora and Psychrotropic microflora. **Packaging of milk –** Aseptic packaging and storing. **Types of Milk and milk products in the market –** Toned milk, Double toned milk, Standardized milk, Recombined milk, Reconstituted milk, Filled milk, Chocolate milk, Homogenized milk, Flavoured milk, Fermented milk, yogurt, curd, cheese and icecream.	**6**

Text Book(s):

1.Megh R. Goyal, Ashok K. Agrawal (2017), Processing Technologies for Milk and Milk Products, Apple Academic Press, India.
2. D.K.Thompkinson (2012), Quality Milk Production & Processing Technology, NIPA Publishers, India.
3. Robinson (1986), Modern Dairy Technology, Vol.I, Advances in milk processing, Chapman and Hall India, Madras.

Reference Book(s):

1.Robinson, Trevor Britz (2008), Advanced Dairy Science and Technology, Wiley Publication, New York City.

Web Resource(s):

1. www.geocities.com/Heartland, cottage/1288/intro/Intro.htm
2.www.purifymind.com/CheeseRennet.htm

Course Outcomes		
At the end of the course, students will be able to		
CO No.	**CO Statement**	**Cognitive Level (K-Level)**
CO1	Understand the composition and nutrient content of milk	**K2**
CO2	Apply knowledge to understand the process of procurement and transportation of milk	**K3**
CO3	Explain the different processing techniques of milk	**K4**
CO4	Develop knowledge on thermal processing of milk	**K6**
CO5	Evaluate the microbiological quality of milk and types of milk available in the market.	**K5**

Course Coordinator: Dr.J.Harine Sargunam

Semester	Course Code	Course Category	Hours	Credits	Marks for Evaluation		
					CIA	ESE	Total
V	24UNDVAC2	Value Added Course-II	30	-	-	100	100

Course Title	IMMUNONUTRITION

SYLLABUS		
Unit	**Contents**	**Hours**
I	**INTRODUCTION TO IMMUNITY** Immunity-Definition, Types-Innate immunity and acquired immunity. Immune response, Immune modulation (concept only). Genetic and environmental modifiers of immune function, Immunization schedule for Indians.	6
II	**IMMUNONUTRITION IN HEALTH**. Importance and scope of Immunonutrition in health. **Organs and Immune functions**- muscle and immune functions, Gut and Brain health connection to immunity	6
III	**ROLE OF AMINO ACIDS, FATTY ACIDS, VITAMINS, TRACE ELEMENTS AND ENZYMES IN IMPROVING IMMUNITY:** Definition of Immunonutrition and Immunonutrients. **Role of Immunonutrients**: Amino acids- arginine, glutamine, Fatty acids-omega 3-fatty acids; vitamins- vitamin C, vitamin E, Beta-carotene; Trace elements-selenium and zinc; enzymes -Superoxide dismutase (SOD), glutathione peroxidase (GSH)	6
IV	**INFLAMMATION AND DISEASE CONDITIONS** Cellular lipids and inflammations. Inflammations in Auto immune diseases, Type II Diabetes, Heart diseases, Inflammatory bowel diseases, Rheumatoid arthritis, cancer.	6
V	**IMMUNONUTRITION IN DIET THERAPY:** **Immune boosting foods**- Green Leafy Vegetables-spinach, moringa; Root and Tubers-Sweet potato, garlic; Fruits: Amla. lemon; Spices-Turmeric, ginger. **Immune boosting recipes**-spinach and moringa soup, golden milk (Turmeric milk), lemon rasam, ginger tulsi tea. Planning of Immuno modulating diet (IMD) by using five food groups. Immunonutrition in Critical response (special feeding-enteral and parenteral)	6

Text Book(s):

1. Bharat B. Aggarwal, David Heber,Immunonutrition-Interactions of Diet, Genetics, and Inflammation 2014, : CRC Press,Taylor and francis group,Baco Raton,New York, London. ISBN:9781466503861, 1466503866

Net references:

1.https://www.hsph.harvard.edu › nutritionsource › nutr...

2.https://www.up.ac.za › file › grandroundtopics (PPT)

3.https://clinicalnutritionespen.com › article › pdf

4.https://www.nin.res.in › downloads › Nutrition_Li.

Course Outcomes		
Upon successful completion of this course, the student will be able to:		
CO No.	**CO Statement**	**Cognitive Level (K-Level)**
CO1	Recall the concepts of the Immunity and Immunization schedule for Indians	**K1**
CO2	Outline the associations of muscle, gut and brain health with immunity	**K2**
CO3	Explain the role of Immunonutrients in Immunonutrition	**K5**
CO4	Categorize the Inflammations in various disease conditions	**K5**
CO5	Plan and aware about the importance of Immuno -Modulating diet and special feeds for Critical response	**K6**

Course Coordinator: Ms. B.RAJALAKSHM

Semester	Course Code	Course Category	Hours	Credits	Marks for Evaluation		
					CIA	ESE	Total
III	24PNDVAC1	Value Added Course-I	30	-	-	100	100

Course Title	Techniques in Food Analysis

SYLLABUS		
Unit	**Contents**	**Hours**
I	**General** **Preparation of samples for food Analysis**: Grinding dry materials, grinding moist materials, enzymatic and chemical treatment **General application and chemical Composition**: Determination of moisture – Air oven methods, Distillation methods, chemicals methods, physical methods Ash and minerals – Determination of ash, ashing procedures for elemental analysis	**6**
II	**Spectroscopic Instrumentation for food analysis – Principles and applications** **Spectroscopic Instruments** UV-Visible Spectroscopy, Atomic-Absorption Spectroscopy (AAS) Inductively Coupled Plasma – Optical Emission Spectrophotometry (ICP- OES/MS) , Mass spectroscopy, Nuclear Magnetic Resonance Spectroscopy (NMR) Fourier Transform Infrared Spectroscopy (FT-IR)	**6**
III	**Chromatographic techniques for food analysis – Principles and Applications**: Paper and thin layer chromatography, Column chromatography, HPLC, HPTLC, Gas – liquid chromatography, GC-MS, Extraction – Solid liquid extraction, Liquid-liquid extraction, Supercritical fluid Extraction	**6**
IV	**Rheological methods and instrumentation – Principles and applications** Rheological Properties, Rheological methods and instrumentation, Measuring the components of Food texture	**6**
V	**Reporting Results and reliability of analysis and Methods and Instrumentation**: Reporting Results, Reliability of analysis **Carbohydrates**: Determination of water soluble and water Insoluble solids, mono-oligosaccharides, hexamines, polysaccharides	**6**

Text Book(s):

1. Pomeranz. Y and Clifton E. Meloan, Food Analysis : Theory and Practice, 2004. 3rd Edition, , CBS Publishers & Distributors PVt, LTd.
2. S.Ranganna, Hand Book of Analysis and Quality Control for Fruit and Vegetable Products, TataMcGraw-HillPublishingCompanyLimited,New Delhi, 2004.
3. S.Sadasivam,A.Manickam,biochemicalmethods,NewAgeInternationalPublisher,NewDelhi, 2004.

Web Resource(s):

1.https://fssai.gov.in/upload/uploadfiles/files/Manual_Spices_25_05_2016(1).pdfhttps:/https://www.fssai.gov.in/upload/uploadfiles/files/MILK_AND_MILK_PRODUCTS.pdf

Course Outcomes		
Upon successful completion of this course, the student will be able to:		
CO No.	**CO Statement**	**Cognitive Level (K-Level)**
CO1	Understand the principles behind in analytical techniques	**K2**
CO2	Apply modern instrumental methods to analyse proximate composition of foods	**K3**
CO3	Analyse the nutrient content of food analysis by standard methods	**K4**
CO4	Evaluate the purposes and methods of food analysis in research, government and food industry	**K5**
CO5	Develop skills required in various industries ,food analytical labs and in the field of food	**K6**

Course Coordinator : **Dr. A. Sangeetha**