



VIRUDHUNAGAR HINDU NADARS' SENTHIKUMARA NADAR COLLEGE
(An Autonomous Institution Affiliated to Madurai Kamaraj University)
Virudhunagar – 626 001.

Course Name: **Bachelor of Vocational**
 Discipline: **Food Safety & Quality Management**
(FOR THOSE WHO JOIN IN 2022 AND AFTER)
 Duration of the Course: **Three Years**
COURSE SCHEME:

III year B.Voc. Food Safety and Quality Management

Semester	Part	Subject	Hour	Credit			Int + Ext= Total	Local	Regional	National	Global	Professional Ethics	Gender	Human Values	Environment & Sustainability	Employability	Entrepreneurship	Skill Development	Subject Code	Focus on Employability/ Entrepreneurship/ Skill Development	Revised/ New/ No Change/ Interchanged If Revised % of Change
				Theory	Skill	Total															
V	Core- 10	Food Safety and Quality Management Systems	6	4	2	6	25+75=100			✓									B24FSC51	Skill Development	Credit Change
	Core 11	Food Toxicology	6	3	3	6	25+75=100			✓									B24FSC52	Skill Development	25 % change
	Core 12	International Food Legislations & Standards	6	3	2	5	25+75=100			✓									B24FSC53	Skill Development	40 % change
	Core 13 Lab	LAB: Food Safety and Quality Management Systems	5	0	3	3	40+60=100											✓	B24FSCP51	Focus on Employability	50 % change
	Core 14 Training	Apprenticeship at Any Food Industry for Food Safety and Quality Management systems	3	0	3	3	100 (Internal)									✓			B19FSC54	Entrepreneurship	No change



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	Core 15	Preservation of Fruits and Vegetables	4	2	2	4	25+75=100		✓									B24FSC55	Skill Development	30 % change
		Industrial Visit & Report (Minimum 2 trips)	0	0	3	3	100 (Internal)											B24FSIV51	Focus on Employability	Credit Change
		Total	30	12	18	30														
VI	Core 16	Medicinal Plants Compounds Separation and Quality Control	6	4	2	6	25+75=100		✓									B24FSC61	Skill Development	20 % change
	Core 17	Hygienic Designs of Food Processing Equipment.	6	3	3	6	25+75=100		✓									B24FSC62	Skill Development	Title Change
	Core 18	Food Analysis and Adulteration Testing (FAAT)	5	3	2	5	25+75=100		✓									B24FSC63	Skill Development	10 % change
	Core 19 Lab	LAB :Food Adulteration Testing	5	0	3	3	40+60=100											B24FSCP61	Focus on Employability	30 % change
	Core20 Training	Apprenticeship at Any Food Industry for Food Analysis And Adulteration testing.	3	0	3	3	100 (Internal)											B19FSC64	Entrepreneurship	No change
	Core 21	Food Packaging of Processed Milk Products	4	2	2	4	25+75=100											B24FSC65	Skill Development	20 % change
		Industrial Visit Report	0	0	2	2	100 (Internal)											B19FSIV6	Focus on Employability	No change
		Total	30	12	17	29														



Semester – V

Core 10 – FOOD SAFETY AND QUALITY MANAGEMENT SYSTEMS

Contact Hours per week: 6

Credits: 6 (4 Theory + 2 Skill)

Contact Hours per semester: 90 (60Theory + 30 Skill)

Subject Code: B24FSC51

Course Outcome

Students will be able to understand

CO 1: Know the principles involving food management systems and food standardization.

CO 2: Explain the principles and current practices of International Standard Organizations.

CO 3: Describe the basic principles and practices followed in food testing laboratories

CO 4: Identify the requirements of International and national food standardization.

Section- A: Theory

Unit I

(12 Hrs)

International Standardization Organization (ISO), Joint FAO/WHO Food Standards Program. Codex Alimentarius Commission (CAC), Other International Organizations Active in Food Standard Harmonization. Advantages of Utilizing International Standards. Rapid Alert system.

Unit II

(12 Hrs)

European Committee for Standardization (CEN), PAN American Standards Commission (COPANT), Euro-Asian Council for Standardization, FDA, EPA, EU, ASEAN, EFSA (European Food Safety Authority)

Unit III

(12 Hrs)

Trends in Food Standardization, An Overview and structure of 9001:2000/2008, Clause wise Interpretation of ISO 9001:2000, Case Studies, An overview and Structure of 22000:2005, Clause wise Interpretation of ISO 22000:2005, Case Studies.

Unit IV

(12 Hrs)

An Overview and Requirement of ISO 17025-Requirements Specific to Food Testing Laboratories- Need and Importance of food testing lab- Physical and Chemical Parameters- Requirement Specific to Food Testing Laboratories-Biological Parameters- General Topics : Related to Food Testing Laboratories.

Unit V

(12 Hrs)

Introduction to HACCP and its management- BRC Food and BRC IOP Standards: An Overview – International Food Standard (IFS)- SQF: 1000 SQF: 2000- Global Gap and India Gap.

Text Books:

1. Sri lakshmi, (2024). Food science, 8th Edition, New Age international Publishers, Chennai.
2. Dziezak, J. D. 1987. Rapid methods for analysis of foods. Food Technol. 41(7): 56-73.



3. Johnson Green, Perry (2002). Diagnostic systems. In Introduction to Food Biotechnology, CRC Press, Florida.

Reference books:

1. Peppler, H. J., 1979, Microbial technology, Volumes I and II- Academic press, New York
2. Inteaz Alli. 2004. Food quality assurance - Principles & practices. CRC Press. New York.
3. Sara Mortimore and Carol Wallace. 2013. HACCP - A practical approach. Third edition. Chapman and Hall, London.
4. Roday, S. 1998. Food Hygiene and Sanitation, Tata McGraw-Hill Education.

Section –B Skill component

Contact Hours per semester: 30

Credits: 2

1. To ensure the quality and standards of food management systems.
2. To study the food quality standardization of ISO 9001-2000 series.
3. To study the food quality standardization of ISO 22000-2005 series.
4. To study the physical and chemical parameters followed in a food testing laboratory.
5. To collect the sample and ensure the quality by international standardization techniques

Core 11 - FOOD TOXICOLOGY

Contact hours per week: 6

Credits: 6 (3 Theory + 3 Skill)

Contact Hours per semester: 90 (60 Theory + 30 Skill)

Subject Code: B24FSC52

Course Outcome

Students after successful completion of course will be able to

- CO1:** Identify the important pathogens which cause toxicity in food and the conditions under which they will grow.
- CO2:** Identify the conditions under which the important pathogens are commonly inactivated, killed or made harmless in foods.
- CO3:** Utilize laboratory techniques to identify microorganisms in food.
- CO4:** Know the contamination of food borne pathogens with various environmental factors.

Section- A: Theory

Unit I

(12 Hrs)

Introduction to food toxicology: Scope, history and development of toxicology. Principles of food toxicology. Classifications: pesticides (atrazine), solvents (benzene), food additives (NutraSweet), metals, and war gases. Effects, e.g., carcinogen (benzo[a]pyrene), mutagen (methyl nitrosamine), and hepatotoxicant (CHCl₃) and divisions in Toxicology.

Unit II

(12 Hrs)

Natural toxicants present in foods: plants (alkaloids, glycosides and saponins), animal: (lathrogen, goitrin), marine (Ciguatoxin, shellfish toxins, tetrodotoxin and histamine) and microbial toxins (mycotoxins, *Clostridium botulinum*, *Streptococcus*, *Staphylococcus aureus*)
Types: neurotoxins, immunotoxins and obesogens and their effects on living organisms.



Unit III (12 Hrs)

Food-borne disease: fungi (Aspergillosis, keratitis), bacteria (Salmonellosis, Cholera), viruses (gastroenteritis, hepatitis B), and protozoa (cryptosporidiosis, giardiasis). Influence of water activity in pathogenicity- Screening and Identification of toxins

Unit IV (12 Hrs)

Environmental factors affecting microbial growth (Intrinsic/extrinsic) influencing growth of oxygenic microorganisms, Cultivation, identification and research of oxygenic microorganisms.

Unit V (12 Hrs)

Toxicants formed in Processed Foods (food mutagens, carcinogens), Hazardous chemical compounds arising from processing and storing of foods. Heating and Chemical Changes. Changes occurring during Frying Food in Oil and Fats. Conservation. Radiation and Microwave Energy. Identification of toxins – Spectroscopy (UV & X-Ray), chromatography (PLC, TLC).

Text books:

1. Shibamoto, T. and Bjeldanes, L. 2009. Introduction to Food Toxicology, 2nd Ed. Elsevier Inc., Burlington, MA. -- (SB).
2. Stine, K. and Brown, T. 1996. Principles of Toxicology. CRC Press, Inc. Boca Raton, FL.
3. Manahan, Stanley. 1992. Toxicological Chemistry, 2nd Edition. Lewis Publishers, Inc. Chelsea, MI.
3. Dziezak, J. D. 1987. Rapid methods for analysis of foods. Food Technol. 41(7): 56-73.
4. Adams MR & Moss MO. Food Microbiology, New age international (P) Ltd publications, London.
5. Frazier WC & Westhoff DC, Food Microbiology 5 th edition, McGraw Hill publications, New York.

Reference books:

1. Jellifie, D.B.: Assessment of the nutritional status of the Community; World Health Organization.
2. Püssa, Tõnu. 2007. Principles of Food Toxicology. CRC Press, LLC. Boca Raton, FL.
5. Watson, David. 1998.

Section –B Skill component

Contact Hours per semester: 30

Credits: 3

1. To study the impact and classification of food toxicology
 2. To analyze the toxic substances in various living organisms.
 3. To study the food borne diseases caused by various types of microorganisms.
 4. To study the various environmental factors which influence the microbial growth.
 5. To learn the various hazardous substances causing different types of mutations.
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Core 12 - INTERNATIONAL FOOD LEGISLATIONS AND STANDARDS

Contact Hours per week: 6

Credits: 5 (3 Theory + 2 Skill)

Contact Hours per semester: 90 (60 Theory + 30 Skill)

Subject Code: B24FSC53

Course Outcome:

Students after successful completion of course will be able to

CO1: Be able to explore the history and basic ideas underlying quality management and have a detailed knowledge of the role of food laws and standards in modern management.

CO2: Demonstrate knowledge of food laws and standards systems, their implementation and the practical steps needed for implementation.

CO3: Know how to control and maintain a quality management system.

CO4: Be able to select and apply appropriate Regulations and Standards and evaluate data generated.

Unit I

(12 Hrs)

Standards: International and federal standards – Codex alimentarius, ISO Series: ISO 9001, ISO 14001 and ISO 45001. Food safety in USA - The Food Safety Modernization Act (FSMA), Food Safety and Applied Nutrition (CFSAN)

Unit II

(12 Hrs)

Legislation in Europe: European Parliament and the Council of the European Union Directives of the official journal of the EU, council regulations. Food legislation in UK: Food Information Regulations 2014 (FIR) and Regulation (EU) No 1169/2011 .

Unit III

(12 Hrs)

FSSAI and its role in Food Analysis- Regulating methods for food analysis, case studies. Enforcers of Food Laws Approval Process for Food Additives Nutritional Labeling

Unit IV

(12 Hrs)

Food laws and regulations: national food legislation, other food legislations/ authorities and their role- essential commodities act, 1955, standard of weight and measures act, 1976, export(quality control and inspection) act, 1963, voluntary based product certifications (ISI mark of BIS and Agmark),

Unit V

(12 Hrs)

International organization and agreements - Food and Agricultural Organization (FAO), World Health Organization (WHO), codex alimentarius, codex India, Joint FAO/WHO Expert Committee on Food Additives (JECFA), World Trade Organization (WTO), Sanitary and Phytosanitary Measures (SPS) and Technical Barriers to Trade (TBT), International Organization for Standardization (ISO)

Text books:

1. WHO, 1998 world health report life in the 21st century. Report of the director general of WHO Geneva.
2. FAO food and nutrition paper manual of food quality control – part 14/1 (1979), to 14/8 (1986) FAO of the United Nations.
3. Curriculum on food safety. Directorate general of health services. Ministry of health and family welfare. Government of India. Nirman Bhavan, New Delhi.
4. Graham, H.D. 1980: the safety of foods, AVI publishing company Inc. Westport.



Reference books:

1. Pepler, H. J., 1979, Microbial technology, Volumes I and II- Academic press, New York
2. Curricula on food safety. Directorate general of health services. Ministry of health and family welfare. Government of India. Nirman Bhavan, New Delhi.
3. Graham, H.D. 1980: the safety of foods, AVI publishing company Inc. Westport.

Section –B Skill component

Contact Hours per semester: 30

Credits: 2

1. Study of the impact of food legislations and international standards in India.
2. Study of the impact of food legislations and international standards in other countries.
3. Study of the violations in the food additives food laws.
4. Study of the food laws governing organizations in India.
5. Study of the food laws governing organizations in international level

Core 13 LAB: FOOD SAFETY AND QUALITY MANAGEMENT SYSTEMS

Contact Hours per week: 5

Credits: 3 (3 Skill)

Contact Hours per semester: 75

Subject Code: B24FSCP51

Section- A: Theory

Course Outcome:

Students after successful completion of the course will be able to

CO 1: Acquire knowledge on food factory and its practices

CO 2: Industrial visits offer a great source to gain practical knowledge

CO 3: To familiarize about various International organizations related to food

1. a) Identifying the key focus areas for GHP & GMP,
b) Identifying gaps in its implementation
c) Closure plans for identified gaps in a food factory/food outlet.
Exercise b and c shall be covered in Experiment
2. Determination of saponification value
3. Determination of Acid Value
4. Estimation of ascorbic acid
5. Estimation of phosphorus
6. Estimation of Iron
7. Estimation of Calcium
8. Effect of enzymatic browning in fruits and vegetables
9. Swab test for microbial examination in utensils

Text books:

1. Adams M.R. & Moss M.O. Food Microbiology, New Age International Private Ltd. Publications, London.
2. Frazier W.C. & Westhoff D.C. Food Microbiology, Fifth Edition, McGraw Hill Publications, New York.



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Reference Books:

1. Peppler H. J., 1979, Microbial Technology, Volumes I and II- Academic press, New York.
 2. Handbook of Laboratory quality Management system by WHO Pages: 1 – 246.
 3. Manual of food quality control in microbiological laboratory by FAO of United Nations Rome P.No. 1 – 172.
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Core – 14

**APPRENTICESHIP AT ANY FOOD INDUSTRY FOR FOOD SAFETY AND
QUALITY MANAGEMENT SYSTEMS**

Contact Hours per week: 3

Credits: 3 (3 Skill)

Subject Code: B19FSC54

Course Outcomes:

- CO1:** Students, after successful completion of the course, will be able to narrate and compile the information and data that is used to construct and assess about the company safety and risk management programs.
- CO2:** Introduction review on instrumentation, labors and processing. And predict the company future developments.

ACTIVITIES:

Industrial Training Report should be submitted by the students along with attendance record and evaluation sheet to the Department immediately after the completion of the training. The training Food Industries will be evaluated on the basis of the following criteria:

- Regularity in maintenance of the Food Industry.
 - Adequacy & quality of information recorded.
 - Drawings, sketches and data recorded.
 - Thought process and recording techniques used.
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PRESERVATION OF FRUITS AND VEGETABLES

Contact Hours per week: 4

Credits: 4 (2 Theory + 2 Skill)

Contact Hours per semester: 60 (45 Theory + 15 Skill)

Subject Code: B24FSC55

Course Outcome:

Students after successful completion of course will be able to

CO1: Identify the spoilage in fruits and vegetables and state the reason for the spoilage following safety precautions.

CO2: Identify and select fresh fruits and vegetables with the help of checklist.

CO3: Identify spices and food additives by visual inspection.

CO4: Prepare and pack perishables for storage and then store under refrigerated conditions with safety precautions.

CO5: Prepare fruit juices with juice extracting machines with safety precautions and preserve fruit juices with addition of preservatives and determine the acidity and TSS content.



UNIT I

(9 Hrs)

Current status of production and processing of fruits and vegetables, Scope of fruits and vegetables preservation in India: Product mix, availability of raw material, manpower, capital, lack of awareness, marketing facility, transport facility, availability of containers, publicity and role of government.

UNIT II

(9 Hrs)

Juice extraction: juice, history of juicing, types of juices, process flow diagram for fruit juice production, juice extraction process- fruit selection, methods of juice preservation, causes of juice spoilage.

UNIT III

(9 Hrs)

Canning: Introduction, can manufacture, canning process - types of canning: pressure canning and water bath canning; common causes of spoilage in canning of fruits and vegetables.

UNIT IV

(9 Hrs)

Minimally processed fruits and vegetables: Introduction, Principles, types & Packaging. Modified atmosphere packaging (MAP): factors affecting MAP, graphical representation, application of MAP, effect of MAP on shelf-life, and controlled atmosphere packaging (CAP): Introduction, gases used in CAP, factors affecting CAP- Temperature control, humidity control and gas control, advantages and disadvantages.

UNIT V

(9 Hrs)

Statutory Provisions for Quality Control in India: Prevention of Food Adulteration act, Fruit Product Order act, AGMARK act, Vegetable Oil Product order; Food Standardization and regulatory agencies in India: Central Committee for Food Standards, Central and state food departments, State Food Laboratories.

Reference books/ Text books

1. R. P. Srivastava & Sanjeev Kumar Fruit and Vegetable Preservation: Principles & Practices International book distributing Co. Lucknow.
2. Giridhari Lal, G.S. Siddappa & G.L. Tondon Preservation of Fruits and Vegetables CFTRI, ICAR, New Delhi -12.
3. Y. H. Hui, S. Ghazala, D.M. Graham, K.D. Murrell & W.K. Nip Handbook of Vegetable Preservation and Processing Marcel Dekker (2003)

INDUSTRIAL VISIT & REPORT

Contact Hours per week : Nil

Credits: 3 (3 Skill)

Contact Hours per semester: Nil

Subject Code: B24FSIV51

Course Outcome:

Students, after successful completion of the course, will be able to

CO1: Industrial visits offer a great source to gain practical knowledge.

CO2: Students can observe and learn as to how theatrical concepts are put to into action, thereby aiding their practical learning.

CO3: Students are exposed to real working environment and shown how things are done in an organization.



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Keeping this objective at hand, the department organizes excursion tours cum industrial visits which are within the framework of the curriculum. The excursions and industrial visits are for the academic year students which are relevant to the stream of study of the programme.

SEMESTER –VI

CORE – 16 MEDICINAL PLANTS COMPOUNDS SEPARATION AND QUALITY CONTROL

Contact Hours per week: 6

Credits: 6 (4Theory + 2 Skill)

Contact Hours per semester: 90 (60 Theory + 30 Skill)

Subject Code: B24FSC61

Course Outcome:

Students will be able to understand at the end of the course

CO1: It constructs the fundamental methodology to prepare different strength of solutions.

CO2: It facilitates the fellow pupil to predict the sources of mistakes and errors.

CO3: It helps to develop the fundamentals of volumetric analytical skills.

CO4: It peculates the basic knowledge in the principles of electrochemical analytical techniques.

CO5: The student interpretation skills will be improved by the course content in terms of choice of analytical techniques to perform the estimation of different category drugs.

Unit I (12 Hrs)

Ethnobotany - Concept, scope and importance; principles and methods for conservation of medicinal and aromatic plants : *in situ* conservation (biosphere reserves and National Parks) and *ex situ* conservation (zoological parks, botanical gardens and cryopreservation).

Unit II (12 Hrs)

Diversity of medicinal and aromatic plants, assessment of diversity; Chemical composition of medicinal plants – *Azadiracta indica*, *Asparagus racemosus*, *Aloe vera*, *Withania somnifera*, *Andrographis paniculata*.

Unit III (12 Hrs)

Principle, techniques and types of chromatography (PLC, TLC, HPLC) and spectroscopy (UV, NMR). Basic water, juices and analytical methods applicable

Unit IV (12 Hrs)

Metabolites - Metabolic reactions - Primary and Secondary metabolites – concept and importance, chemical structure and uses.

Unit V (12 Hrs)

Concept of quality control and its methods, quality assurance & total quality controls. Quality control of raw materials & finished products. Documentation concepts of statistical quality control.



Text Books / Reference:

1. Themaiya, S.K. 1999. *Standard Methods of Biochemical Methods*. Kalyani Publishers, New Delhi.
2. Sadashivam, S. and Manikam, A. 2005. *Biochemical methods*. New Age International (P) Ltd. Publishers, New Delhi.

Section –B Skill component

Contact Hours per semester: 30

Credits: 2

1. To study the principles and conservative methods of aromatic compounds.
 2. To analyze the diversity of microorganisms in various medicinal plants.
 3. To study the principles and methods of various chromatography and spectroscopy.
 4. To evaluate the chemical structure and importance of secondary metabolites.
 5. To study the quality control and quality assurance of finished products.
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Core 17 - HYGIENIC DESIGN OF FOOD PROCESSING EQUIPMENT

Contact Hours per week: 6

Credits: 6 (3 Theory + 3 Skill)

Contact Hours per semester: 90 (75 Theory + 15 Skill)

Subject Code: B24FSC62

Course Outcome

The student will know about

- CO1:** The detailed interpretation pattern for the organic substances
- CO2:** Theoretical aspects of the various instrumental techniques
- CO3:** Practical aspects and troubleshooting techniques various instrumental techniques
- CO4:** Knowledge and skills in advanced instrumentation techniques for drug analysis
- CO5:** Theoretical aspects of hyphenated analytical techniques
- CO6:** Critical analysis of analytical problem and selection of appropriate analytical tool for the quantification of chemicals and excipients

Section- A: Theory

Unit I

(15 Hrs)

Microbiologically safe continuous pasteurization of liquid foods, method for the assessment of in-line sterilizability of food processing equipment, Method for the assessment of bacteria - tightness of food processing equipment.

Unit II

(15 Hrs)

Hygienic equipment design criteria: Hygienic design of closed equipment for the processing of liquid food, Hygienic design of equipment for open processing.

Unit III

(15 Hrs)

Hygienic pipe couplings, Hygienic design of pumps, homogenisers and dampening devices, Passivation of stainless steel, method for assessing the bacterial impermeability of hydrophobic membrane filters.



Unit IV (15 Hrs)

General hygienic design criteria for the safe processing of dry particulate materials, Production and use of food grade lubricants, prevention and control of *Legionella* spp. (incl Legionnaires Disease) in Food Factories.- Food labeling and its importance

Unit V (15 Hrs)

Safe Storage and Distribution of Water in Food Factories, Safe and hygienic water treatment in food factories, Packing systems for solid foodstuffs, Air Handling in the Food Industry, Hygienic Engineering of fluid bed and spray dryer plants, Materials of construction for equipment in contact with food.

Text books/ References:

1. Ahvenainen R. 2001. Novel Food Packaging Techniques. CRC.
2. Mahadeviah M & Gowramma R. 1996. Food Packaging Materials. Tata McGraw Hill.
3. Stanley S & Roger CG. 1998. Food Packaging. AVI Publ.
4. AACC. 2004. Storage of Cereal Grains and their Products.
5. Mahajan & Goswami. 2005. Food and Process Engineering.
6. Ojha TP & Michael AM. 2006. Principles of Agricultural Engineering. Jain Brothers.

Section – B: Skill Component

Contact Hours per semester: 30

Credits: 3

1. To study and analyze the food processing equipments.
2. To analyze the hygienic properties of food and food producing equipments.
3. To study about hygienic properties of pump, homogenizers and hydrophobic membrane filters.
4. To study the hygienic design criteria of lubricants and materials in food producing factory.
5. To study the safe storage, water treatments and packing system of foodstuffs.

Core 18 - FOOD ANALYSIS AND ADULTERATION TESTING (FAAT)

Contact Hours per week: 5

Credits: 5 (3 Theory + 2 Skill)

Contact Hours per semester: 75 (60 Theory + 15 Skill)

Subject Code: B24FSC63

Course Outcome:

- CO1:** Be able to explore the history and basic ideas underlying quality management and have a detailed knowledge of the role of food laws and standards in modern management.
- CO2:** Demonstrate knowledge of food laws and standards systems, their implementation and the practical steps needed for implementation.
- CO3:** Know how to control and maintain a quality management system.
- CO4:** Be able to select and apply appropriate Regulations and Standards and evaluate data generated.

Unit I (12 Hrs)

Standard units of measurement – Basic SI unit of length, volume and weight, temperature, relative density and pH – Physical and chemical properties of food – Boiling point,



evaporation, melting point, smoke point, surface tension, osmosis, humidity, freezing point and specific gravity.

Unit II (12 Hrs)

Constituents of food, stability of colloidal system type of colloidal system in food – Sol, gel, emulsion, foam health food, ethnic food, organic food, nutraceuticals, fabricated foods, convenience foods, genetically modified foods and space foods.

Unit III (12 Hrs)

Food additives – emulsifiers, stabilizers and thickening agents – Bleaching and maturing agent – Sweeteners, humectants and anti caking agents – Coloring and flavoring substance – Food adulteration: types of adulterants – Intentional and incidental adulterants – Methods of detection.

Unit IV (12 Hrs)

Population and sample methods of sampling – Sensory evaluation methods- Simple random sampling, systematic sampling, stratified random sampling summary measures - Measures of central tendency – Arithmetic mean, Geometric mean, Harmonic mean, Median and Mode.

Unit V (12 Hrs)

Food safety and quality assurance – Definition evaluation of food – Subjective and objective food standards – PFA, BIS, AGMARK, FPO.

Text Books / References:

1. Sri Sri lakshmi,(2024). Food science,8th Edition, New Age International Publishers, Chennai.
2. Dziezak, J. D. 1987. Rapid methods for analysis of foods. Food Technol. 41(7): 56-73.
3. Johnson Green, Perry (2002). Diagnostic systems. In Introduction to Food Biotechnology, CRC Press, Florida.

Section –B Skill component

Contact Hours per semester: 30

Credits: 2

1. To study about the physical and chemical properties of food.
2. To analyze the constituents and nutraceuticals of a food.
3. To study about the food additives, adulterants and detective methods.
4. To study about the food sampling methods and sampling measures.
5. To study the objective and subjective food standards in various food products.

Core 19 – LAB: FOOD ADULTERATION TESTING

Contact Hours per week: 5

Credits: 3 (3 Skill)

Contact Hours per semester: 75

Subject Code: B24FSCP61

Course Outcome:

CO1: Analyze and communicate issues relevant to food processing technology and food quality management systems.



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CO2: Perform experiments assessing the effect of processing conditions on quality parameters.

CO3: Communicate the science and technology involved in food processing and quality assurance through IT implemented reports and presentations.

CO4: Review and report upon the latest scientific literature pertaining to the areas of Food Processing and Quality Assurance.

Experiments:

1. Detection of Vanaspati in Ghee/Butter
2. Detection of Khesari flour in besan
3. Detection of Metanil yellow in turmeric/coloured sweet products
4. Detection of Argemone oil in edible oil
5. Detection of artificial colour / foreign matter in tea (dust/leaves)
6. Detection of sodium bicarbonate in jaggery.
7. Detection of rhodamine B in sweet potato.
8. Grading and quality evaluation of egg.
9. Effect of Processing on meat.
10. Phytochemical analysis – Phenol, Alkaloids, Flavonoids, Glycosides and Tannins.

Reference:

1. A treatise on Analysis of Food, Fats and Oils: A. R. Sen, N.K. Pramanik and S.K. Roy.

Section –B Skill component

Contact Hours per semester: 30

Credits: 3

1. To study about the toxic substances are added to food, or some valuable nutrients are removed from food items
2. To analyze the adulterated food is generally defined as impure, unsafe, or unwholesome food.
3. To study about the Food adulteration may be done intentionally or unintentionally.
4. To analyze the traders or manufacturers who want to make a quick economic profit sell adulterated food intentionally.
5. To analyze the unintentional adulteration happens when people are not aware of the rules, regulations and methods of preparing wholesome food.

Core – 20

APPRENTICESHIP AT ANY FOOD INDUSTRY FOR FOOD ANALYSIS AND ADULTERATION TESTING

Contact hours per week: 3

Credits: 3

Subject Code: B19FSC64

Course outcomes:

CO1: Students, after successful completion of the course, will be able to narrate and compile the information and data that is used to construct and assess about the company safety and risk management programs.

CO2: Introduction review on instrumentation and predict the company future developments.



ACTIVITIES:

Industrial Training Report should be submitted by the students along with attendance record and evaluation sheet to the Department immediately after the completion of the training. The training Food Industries will be evaluated on the basis of the following criteria:

- Regularity in maintenance of the Food Industry.
 - Adequacy & quality of information recorded.
 - Drawings, sketches and data recorded.
 - Thought process and recording techniques used.
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Core - 21

FOOD PACKAGING OF PROCESSED MILK PRODUCTS

Contact Hours per week: 4

Credits: 4 (2 Theory + 2 Skill)

Contact Hours per semester: 60 (45 Theory + 15 Skill)

Subject Code: B24FSC65

Course Outcome:

CO1: The learner will be able to understand the current status of dairying, market milk industry, cooperative movement and operation flood (OF) programme in India.

CO2: The learner will be able to understand the food and nutritive value of milk, milk carbohydrate (Lactose), milk Fat, milk Protein, vitamins & minerals and milk Enzymes.

CO3: The learner will be able to understand the genetic factor and external factor.

CO4: At the end of this module the learner will be able to understand the Milk processing and dairy plant requirements and its management.

Unit I (9 Hrs)

Food packaging: Introduction, Importance of Packaging, Packaging materials, a) Characteristics of basic packaging materials: Paper (paper board, corrugated paper, fibre board). Characteristics of Glass and Metal, Characteristics of Plastics, Foils and laminates.

Unit II (9 Hrs)

Packaging of milk and dairy products such as pasteurized milk, fat rich products-ghee and butter, Coagulated and desiccated indigenous dairy products and their sweet mead products.

Unit III (9 Hrs)

Modern Packaging Techniques; Vacuum Packaging, Eco-friendly packaging, Principles and methods of package sterilization, Coding and Labelling of milk product packages.

Unit IV (9 Hrs)

Aseptic Packaging (AP), Scope of AP and pre-requisite conditions for AP, Description of equipment (including aseptic tank) and machines, Package conditions and quality assurance aspects of AP.

Unit V (9 Hrs)

Microbiological aspects of packaging materials, Disposal of waste package materials, Packaging Systems, Hazards from packaging materials in milk products.



VIRUDHUNAGAR HINDU NADARS' SENTHIKUMARA NADAR COLLEGE
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Virudhunagar – 626 001.

Text Books / References:

1. Outlines of Dairy Chemistry, De S; Oxford.
2. Milk Processing and Technology by A Q Khan, Allahabad Publication.
3. Milk & Milk Processing; Herrington BL; 1948, McGraw-Hill Book Company.
4. Modern Dairy Products, Lampert LH; 1970, Chemical Publishing Company.

Section –B Skill component

Contact Hours per semester: 30

Credits: 2

1. To analyze the Visit to shop floor outfit and generate general ideas about the work atmosphere trade.
2. To study about the identify safety signs for danger, warning, caution & personal safety message and hygiene.
3. To analyze the use of personal protective equipment (PPE).
4. To study about the importance of cleanliness, hygiene, sanitation in self life and milk product.
5. To study of familiar Dairy Products and visit to market.
6. To analyze the visit to Milk Co-Op Society.
7. To study of packaging equipments and machinery used in dairy industry.
8. To analyze the collection of various types of packaging material used for the packaging of dairy products.
9. To analyze the Need and importance of packaging methods and storage conditions of dairy products.

INDUSTRIAL VISIT & REPORT

Contact Hours per week : Nil

Credits: 2 (2 Skill)

Contact Hours per semester: Nil

Subject Code: B19FSIV6

Course Outcome:

Students, after successful completion of the course, will be able to

CO1: Industrial visits offer a great source to gain practical knowledge.

CO2: Students can observe and learn as to how theatrical concepts are put to into action, thereby aiding their practical learning.

CO3: Students are exposed to real working environment and shown how things are done in an organization.

Keeping this objective at hand, the department organizes excursion tours cum industrial visits which are within the framework of the curriculum. The excursions and industrial visits are for the academic year students which are relevant to the stream of study of the programme.
