



St. George's
College *Aruvithura*

Estd. 1965

OBE HANDBOOK

Department of Food Science
& Technology

LEARNING OUTCOMES

PO, PSO & CO





ST. GEORGE'S COLLEGE ARUVITHURA
DEPARTMENT OF FOOD SCIENCE AND TECHNOLOGY

OBE HANDBOOK

LEARNING OUTCOMES

PO, PSO & CO



INDEX

| | |
|--------------------------------|---|
| PROGRAMME OUTCOMES (PO) | 6 |
|--------------------------------|---|

B.SC FOOD SCIENCE & QUALITY CONTROL

| | |
|---------------------------------------|---|
| PROGRAM SPECIFIC OUTCOME (PSO) | 7 |
|---------------------------------------|---|

| CO Code | Title | Page No. |
|-------------------|--|----------|
| SEMESTER 1 | | |
| CH1CMT01 | Basic Theoretical and Analytical Chemistry (Complementary) | 8 |
| MM1CMT01 | Partial Differentiation Matrices, Trigonometry and Numerical Methods (T) (Complementary) | 8 |
| ZY1CMT01 | Non-Chordate Diversity (Complementary) | 8 |
| FS1CRT01 | Basic Nutrition (core) | 8 |
| FS1CRT02 | Basic Food Chemistry (core) | 9 |
| FS1CRT03 | Methodology in the Discipline of Food Science (core) | 9 |
| SEMESTER 2 | | |
| CH2CMT02 | Basic Organic Chemistry (T) (Complementary) | 9 |
| CH2CMP01 | Volumetric Analysis (P) (Complementary) | 10 |
| MM2CMT01 | Integral Calculus and Differential Equations (T) (Complementary) | 10 |
| ZY2CMT02 | Chordate Diversity (T) (Complementary) | 10 |
| ZY2CMPO1 | Non-Chordate Diversity, Chordate Diversity (p) (Complementary) | 10 |
| FS2CRT04 | Food Commodities (Core) | 11 |
| FS2CRT05 | Food Preservation (Core) | 11 |
| FS2CRT06 | Food Microbiology, Sanitation and Hygiene (Core) | 11 |
| FS2OJP07 | Industrial Training (Core) | 11 |
| SEMESTER 3 | | |
| CH3CMT04 | Inorganic and Organic Chemistry (Complementary) | 12 |
| MM3CMT03 | Vector Calculus, Analytic Geometry and Abstract Algebra (Complementary) | 12 |
| ZY3CMT03 | Physiology and Immunology (T) (Complementary) | 12 |
| FS3CRT08 | Processing Technology of Animals Foods (Core) | 13 |
| FS3CRT09 | Sensory Evaluation (Core) | 13 |



| | | |
|-------------------|--|----|
| FS3CRT10 | Food Packaging Materials & Testing (Core) | 13 |
| SEMESTER 4 | | |
| CH4CMT06 | Advanced Bio-Organic Chemistry (Complementary) | 14 |
| CH4CMP03 | Organic Chemistry (P) (Complementary) | 14 |
| MM4CMT04 | Fourier Series, Laplace Transform and Complex Analysis (Complementary) | 14 |
| ZY4CMT04 | Applied Zoology (T) (Complementary) | 14 |
| ZY4CMP02 | Physiology and Immunology, Applied Zoology (P) (Complementary) | 14 |
| FS4CRT11 | Processing Technology of Plant foods (Core) | 15 |
| FS4CRT12 | Analytical Instrumentation (Core) | 15 |
| FS4CRT13 | Food Safety & Quality Assurance (Core) | 15 |
| FS4OJP14 | Industrial Training (Core) | 16 |
| SEMESTER 5 | | |
| FS5CRT15 | Food Analysis (T) (Core) | 16 |
| FS5CRT16 | Food Toxicology (Core) | 16 |
| FS5CRT17 | Environmental studies and Human Rights (Core) | 17 |
| FS5CRP21 | Basic Microbiology (P) (Core) | 17 |
| FS5CRP22 | Food Analysis & Adulteration testing (P) (Core) | 17 |
| FS5CRP23 | Food Chemistry Practical (Core) | 17 |
| SEMESTER 6 | | |
| FS6CRT24 | Entrepreneurship Development & Management in food Industry (Core) | 18 |
| FS6CRT25 | Food Adulteration & Testing (Core) | 18 |
| FS6CBT27 | Basic Food Engineering (Core) | 18 |
| FS6CRP29 | Advanced Food Microbiology (P) (Core) | 18 |
| FS6CRP30 | Food Analysis & Adulteration testing - Practical II (Core) | 19 |
| FS6CRP31 | Advanced Food Chemistry Practical (Core) | 19 |
| FS6DSP32 | Project/Dissertation (Core) | 19 |

B.VOC FOOD TECHNOLOGY & ANALYSIS

| | |
|---------------------------------|----|
| PROGRAM SPECIFIC OUTCOME | 20 |
|---------------------------------|----|

| CO Code | Title | Page No. |
|-------------------|--|----------|
| SEMESTER 1 | | |
| BOVG101 | Basic Theoretical and Analytical Chemistry | 21 |
| BOVS101 | General Mathematics and Statistics | 21 |
| BOVS102 | Food Chemistry | 21 |
| BOVS103 | Food Chemistry Practical | 22 |



| SEMESTER 2 | | |
|-------------------|--|----|
| BOVG201 | Basic Organic Chemistry | 22 |
| BOVG202 | Nutritional Biochemistry | 22 |
| BOVS201 | Food Preservation | 23 |
| BOVS202 | Dairy Technology | 23 |
| BOVS203 | Internship - Dairy Industry | 23 |
| SEMESTER 3 | | |
| BOCG301 | Principles of Management | 23 |
| BOVG301 | Bio Organic Chemistry | 24 |
| BOVG302 | Packaging Technology | 24 |
| BOVS301 | Post Harvest Technology I | 24 |
| BOVS302 | Food Additives and Food Safety Standards | 24 |
| BOVS303 | Food Additives Practical | 25 |
| SEMESTER 4 | | |
| BOCG401 | Soft Skills and Personality Development | 25 |
| BOVG401 | Advanced Bio Organic Chemistry | 25 |
| BOVG402 | Post Harvest Technology II | 25 |
| BOVS401 | Food Microbiology | 26 |
| BOVS402 | Food Microbiology Practical | 26 |
| BOVS403 | Internship II | 26 |
| SEMESTER 5 | | |
| BOCG501 | Environmental Studies | 26 |
| BOVG501 | Analytical Instrumentation | 27 |
| BOVG502 | Sensory Analysis of Food | 27 |
| BOVS501 | Food Toxicology | 27 |
| BOVS502 | Food Analysis 1 | 27 |
| BOVS503 | Food Analysis Practical 1 | 28 |
| SEMESTER 6 | | |
| BOCG601 | Entrepreneurship Development | 28 |
| BOVG601 | Food Engineering | 28 |
| BOVG602 | Food Safety Management Systems | 28 |
| BOVS601 | Food Analysis 2 | 29 |
| BOVS602 | Food Analysis Practical 2 | 29 |
| BOVS603 | Internship III – Project Work | 29 |



M.SC FOOD TECHNOLOGY & QUALITY ASSURANCE

| | |
|---------------------------------------|----|
| PROGRAM SPECIFIC OUTCOME (PSO) | 30 |
|---------------------------------------|----|

| CO Code | Title | Page No. |
|-------------------|---|----------|
| SEMESTER 1 | | |
| FQ010101 | Introduction to Food Science and Technology | 31 |
| FQ010102 | Basic Biochemistry | 31 |
| FQ010103 | Food Microbiology | 31 |
| FQ010104 | Food Chemistry | 31 |
| FQ010105 | Biochemistry and Microbiology- Practical I | 32 |
| SEMESTER 2 | | |
| FQ010201 | Food Engineering | 32 |
| FQ010202 | Food Analysis and Instrumentation | 32 |
| FQ010203 | Food Preservation Technology | 33 |
| FQ010204 | Food Additives and Packaging | 33 |
| FQ010205 | Food Quality Assurance and Management | 33 |
| FQ010206 | Food Additives & Food Preservation-Practical II | 34 |
| SEMESTER 3 | | |
| FQ010301 | Technology of Cereals, Pulses & Oilseeds | 34 |
| FQ010302 | Technology of Milk, Meat, Poultry & Fish | 34 |
| FQ010303 | Technology of Fruits & Vegetables | 35 |
| FQ010304 | Food Analysis-Practical III | 35 |
| FQ820301 | Sensory Evaluation and Product Development | 35 |
| FQ820302 | Food Sanitation and Hygiene | 35 |
| SEMESTER 4 | | |
| FQ820403 | Byproduct utilization and Waste Management | 36 |
| FQ010404 | Food Processing & Sensory Evaluation - Practical IV | 36 |
| FQ010405 | Project Evaluation | 36 |



PROGRAMME OUTCOME

| Sl. No. | Item | Description |
|---------|-------------------------------------|---|
| PO1 | Effective Communication | Speak, read, write and listen clearly in person and through electronic media in English and in one Indian language, and make meaning of the world by connecting people, ideas, books, media and technology |
| PO2 | Self-directed and Lifelong Learning | Acquire the ability to engage in independent and life-long learning in the broadest context socio-technological changes |
| PO3 | Effective Social Interaction | Elicit views of others, mediate disagreements and help reach conclusions in group settings |
| PO4 | Evaluative Thinking | Take informed actions after identifying the assumptions that frame our thinking and actions, checking out the degree to which these assumptions are accurate and valid, and looking at our ideas and decisions (intellectual, organizational, and personal) from different perspectives |
| PO5 | Ideal Citizenship | Demonstrate empathetic social concern and equity centred national development, and the ability to act with an informed awareness of issues and participate in civic life through volunteering |
| PO6 | Ethics | Recognize different value systems including your own, understand the moral dimensions of your decisions, and accept responsibility for them |
| PO7 | Environment and Sustainability | Understand the issues of environmental contexts and sustainable development |
| PO8 | Digital Knowledge System | Adequate training in the application of digital knowledge in higher education and workplace |



B.SC FOOD SCIENCE & QUALITY CONTROL

Programme Specific Outcome

| PSO | Description |
|-----|---|
| 1 | Apply knowledge gained in food chemistry, microbiology, engineering, and sensory evaluation to the development, processing, and preservation of safe, nutritious, and high-quality food products. |
| 2 | Utilize advanced instruments and technologies to process and analyse food products and to solve food safety problems. |
| 3 | Design food products that meet the various food regulations and laws. |
| 4 | Critically assess and analyse food science information available in the public domain in an innovative and ethical way. |
| 5 | Administer the technologies of food processing and preservation of plant and animal foods, cereals, pulses, oilseeds, fruits vegetables, spices, meat, fish, poultry, sea food, milk and dairy products |



COURSE OUTCOMES

SEMESTER 1

CH1CMT01: Basic Theoretical and Analytical Chemistry (Complementary)

CO1: To learn atomic structure, chemical bonding and the concept of equilibrium.

CO2: The students will understand the fundamentals of principles of analytical chemistry

CO3: To develop the skills to purify impure organic compounds.

Complementary- MM1CMT01: Partial Differentiation Matrices, Trigonometry and Numerical Methods (T)

CO1: Describe basic idea of partial derivatives

CO2: Recollect the idea of matrices

CO3: Understand the characteristics and transformation of matrices

CO4: Memorize the theory of trigonometry

CO5: Apply basic trigonometric properties to find expansions

CO6: Understand the numerical methods to solve a function

Complementary – ZY1CMT01 – Non-Chordate Diversity

CO1: Understand about the diversity of non-chordates living in varied habit and habitats.

CO2: Analyse the organization, complexity and characteristic features of non-chordates making them familiarize with the morphology and anatomy of representatives of various animal phyla.

CO3: Create knowledge about various pathogenic protists, their life cycle, transmission methods and prophylactic measures

CO4: Understand the habitat, morphology and physiological process of peanaeus

CO5: Remember about the structure, types and theories of coral reef formation

Core- Basic Nutrition -FS1CRT01

CO1: Understand the interrelationship between health and nutrition

CO2: Advertise about water and its usage in human body

CO3: Examine the proximate principles of carbohydrates, proteins and lipids

CO4: Compare and classify vitamins and minerals and their importance



CO5: Measure energy and calorific value of foods

Core- Basic Food Chemistry-FS1CRT02

CO1: Understand the basic composition of food and chemical nature, structure and properties of water

CO2: Illustrate the chemical structure, role, functions, classifications, physical and chemical properties of carbohydrates.

CO3: Point out the composition, amino acid units, structure, classification, physical and chemical properties and functions of proteins and classifications and mechanism of enzymes.

CO4: Interpret the chemical composition of fat, types of fatty acids and its structures, classification, biological role, physical and chemical properties, and the technology of processing of lipids.

CO5: Remember the importance, classification, structure and role of pigments in foods.

Core - Methodology in the Discipline of Food Science - FS1CRT03

CO1: Describe the history and career of food science, activities of food scientist, components of food science and allied industries

CO2: Analyse different innovative concepts and competitive behaviour in food industry

CO3: Interpret the role and importance of research in the field of food science, research design, sampling and measurement techniques.

CO4: Understand the formulation of hypothesis, data collection methods in their academic discipline and awareness about scientific instruments used in the field of food science

CO5: Illustrate the different statistical methods and tests used for the evaluation of collected data.

SEMESTER 2

Complementary - CH2CMT02: Basic Organic Chemistry (T)

CO1: Understand some fundamental aspects of organic chemistry.

CO2: To learn the mechanism and stereochemistry of some organic reactions

CO3: Understand Optical isomerism and Geometrical isomerism with conformational analysis.

CO4: To outline structure and uses of some commercial and natural polymers.



Complementary - CH2CMP01: Volumetric Analysis (P)

CO1: Accrue skill in the quantitative analysis by doing titrations in the different branches of volumetric analysis.

Complementary - MM2CMT01: Integral Calculus and Differential Equations (T)

CO1: Understand differential calculus.

CO2: Describe basic ideas of partial derivatives.

CO3: Apply integration to find volumes of different structures.

CO4: Understand and implement the idea of multiple integrals to find volume of different structures.

Complementary - ZY2CMT02 – Chordate Diversity (T)

CO1: Understand the evolutionary history and relationship between different classes of chordates

CO2: Analyse the habitat and morphological characteristics of various classes of chordates

CO3: Create knowledge about physiological and anatomical peculiarities of Euphlytics

CO4: Remember about the peculiarities of poisonous and non - poisonous snake

CO5: Understand the adaptations of birds and aquatic mammals with examples.

Complementary – ZY2CMPO1 – Non-Chordate Diversity, Chordate Diversity (P)

CO1: Create knowledge about various steps and precautions involved in scientific drawing.

CO2: Remember the morphological, ecological, evolutionary characteristics of non-chordates for simple identification.

CO3: Analyse the internal structure of earthworm and fasciola by observing transverse sections.

CO4: Remember the anatomical peculiarities of cockroach and prawn nervous systems during dissections.

CO5: Create knowledge about morphology and structural peculiarities of prawn appendages

CO6: Remember the characteristic of chordates for simple identification.

CO7: Create diagrammatic sketches of vertebrae and girdles of frog.

CO8: Understand the role of scientific key in identification of poisonous and non - poisonous snake

CO9: Understand the structure of placoid scale of shark.



CO10: Analyse the dissections and vertebrae of frog and identify, sketch and label it's parts and functions.

Core- Food Commodities-FS2CRT04

CO1: Explain the composition, types and processes of perishable food commodities

CO2: Describe the composition, types and processes of semi perishable food commodities

CO3: Understand the composition, types and processes of non-perishable food commodities

CO4: Discuss different types of foods, importance and its properties

CO5: Understand about sugar and confectionary and its preservation function

Core- Food Preservation-FS2CRT05

CO1: Understand about the importance of food preservation to ensure the safe food

CO2: Remember about the different processing and preservation techniques based on low and high temperature

CO3: Discuss about the techniques of moisture removal to eliminate microbial attack

CO4: Identify the new trends in food preservation and knowledge about preservatives and its permitted levels

CO5: Paraphrase the general principle of fermentation, irradiation and microwave heating and its application in food preservation

Core- Food Microbiology, Sanitation and Hygiene -FS2CRT06

CO1: Understand the types and structures of microorganisms

CO2: Describe food borne illness

CO3: Discriminate the spoilage and contamination of different foods

CO4: Evaluate Food industry

CO5: Operate control of infestation in food industry

Core- (OJT) Industrial Training-FS2OJP07

CO1: Apply Industrial methods of food processing for different food products

CO2: Analyse the quality of different food products

CO3: Execute the prerequisite programmes for food processing

CO4: Relate the food safety management systems in food industry



CO5: Investigate the problems related to the different food processing sector

SEMESTER 3

CH3CMT04: Inorganic and Organic Chemistry (Complementary)

CO1: To give the students a basic understanding of nuclear chemistry

CO2: Understand the basics of nuclear chemistry applications: carbon dating, Isotopes as tracers, Radio diagnosis and radiotherapy

CO3: Describe the main roles of metal ions in biological processes, and identify the chemical properties that are required to each particular function.

CO4: To know how trace elements are involved in basic functions of the body.

CO5: Imparts knowledge on essential nutrients, soil fertility,

CO6: Imparts knowledge on different pesticides, their nature and, mode of action and their fate in soil so as to monitor their effect on the environment

CO7: To understand the structure, therapeutic uses and mode of action of different types of drugs

CO8: To recognize the type of additive added to a food by reading the label on the packaging of the food

CO9: To discuss some safety issues regarding intake of food additives.

Complementary - MM3CMT03 – Vector Calculus, Analytic Geometry and Abstract Algebra (T)

CO1: Understand vector valued functions and apply the concept of vector differentiation for finding arc length, curvature and directional derivatives.

CO2: Understand vector integration and apply vector integration work, circulation and flux and apply Green's theorem, Stoke's theorem and divergence theorem.

CO3: Understand polar co-ordinates, conic sections and conics in polar co-ordinates.

CO4: Understand groups, cyclic groups, permutation groups and homomorphism

Complementary – ZY3CMT03 – Physiology and Immunology (T)

CO1: Understand important physiological and metabolic activities of human body.

CO2: Remember the various process and steps involved in excretion, neuro physiology and muscular activities of our body.

CO3: Create knowledge about the various endocrine organs, their hormones and disorders.



CO4: Analyse and inculcate the fundamental knowledge on immune system and immunological responses to antigens.

CO5: Understand the immune mechanisms in disease control, vaccination and the process of immune interactions

Core-Processing Technology of Animals Foods - FS3CRT08

CO1: Understand the source, structure and composition of various food products from animal origin.

CO2: Analyse the physiological and biochemical changes in animal-based raw food materials.

CO3: Evaluate the characteristics of materials, processing procedures in animal-based products in terms of food quality and safety.

CO4: Understand about processing of different animal-based food products

CO5: Remember the defects and spoilage in animal-based food products

Core-Sensory Evaluation - FS3CRT09

CO1: Understand sensory evaluation and quality attributes

CO2: Describe the practical requirements of sensory evaluation

CO3: Interpret sensory assessment of food quality

CO4: Articulate different sensory tests

CO5: Apply different statistical methods for sensory evaluation

Core-Food Packaging Materials & Testing - FS3CRT10

CO1: Interpret the functions and requirements of effective food packaging

CO2: Classify food packaging

CO3: Analyse properties and production of various packaging materials and its interaction with foods.

CO4: Observe recent techniques of food packaging

CO5: Analyse the quality of food packaging materials and shelf-life evaluation of packaged products.



SEMESTER 4**CH4CMT06: Advanced Bio-Organic Chemistry (Complementary)**

CO1: To impart the students thorough idea in the chemistry of enzymes, amino acids, proteins and nucleic acids.

CO2: To study the fundamentals of terpenoids, alkaloids, vitamins, lipids, carbohydrates and steroids.

CH4CMP03 - Organic Chemistry Practicals

CO1: Equipping students for the qualitative analysis of organic compounds.

Complementary - MM4CMT04 – Fourier Series, Laplace Transform and Complex Analysis (T)

CO1: Understand Fourier Series and Legendre polynomials

CO2: Understand Laplace Transform and apply Laplace Transform to solve differential equations.

CO3: Understand complex numbers and Cauchy – Reimann equations

CO4: Understand line integrals in complex plane and apply Cauchy's Integral Theorem and Cauchy's Integral formula.

Complementary- ZY4CMT04 – Applied Zoology (T)

CO1: Understand about the concepts, methods, factors, types and various strategies involved in aquaculture.

CO2: Analyse the life history, rearing techniques, diseases and pests of silk worm.

CO3: Create knowledge about various steps involved in vermiculture.

CO4: Memorize about the organisation of bee colony, various bee keeping methods and equipments

CO5: Understand the economic importance of byproducts of apiculture.

Complementary – ZY4CMP02 – Physiology and Immunology, Applied Zoology (P)

CO1: Understand about human blood smear preparation and examination.

CO2: Analyse the various test involved in qualitative analysis of reducing sugar, protein and lipid.

CO3: Create knowledge about role of salivary amylase on starch digestion.



CO4: Analyse the haemoglobin content of human using Sahli's haemoglobinometer.

CO5: Understand and identify human blood groups.

CO6: Understand economic and morphological importance of culturable fishes.

CO7: Memorize the morphological characteristics of earthworm and honeybees for specimen identification.

CO8: Analyse the caste system of honey bees.

CO9: Understand the uses of various bee keeping equipment and byproducts of apiculture.

CO10: Understand the life history of silkworm.

CO11: Apply the knowledge about sericulture, vermiculture, aquaculture and apiculture for specimen identification.

Core- Processing Technology of Plant foods - FS4CRT11

CO1: Understand the processing technology of pulses, legumes and oilseeds

CO2: Explain the processing technology of different fruits and vegetable products

CO3: Describe the processing technology of spice oil and oleoresins.

CO4: Summarize the processing technology of tea, coffee, alcoholic beverages, soft drinks, cocoa products and sugar

Core- Analytical Instrumentation - FS4CRT12

CO1: Understand basic principles of chromatography

CO2: Illustrate different types of chromatography, their instrumentation and their procedural considerations

CO3: Memorize most advanced chromatographic instruments

CO4: Discuss the basic principles and different types of spectroscopy

CO5: Understand various advanced technologies for the analysis of biomolecules

Core- Food Safety & Quality Assurance - FS4CRT13

CO1: Understand the concepts of quality and the biological, chemical, and physical hazards associated with foods and the food system

CO2: Analyse appropriate statistical control tools to assess food safety and quality.

CO3: Apply the voluntary standards in food processing sector



CO4: Understand the major national and international laws and regulations that govern food safety

CO5: Analyse the external quality control activities in food industry

Core (OJT)-Industrial Training - FS4OJP14

CO1: Apply Industrial methods of food processing for different food products

CO2: Analyse the quality of different food products

CO3: Execute the prerequisite programmes for food processing

CO4: Relate the food safety management systems in food industry

CO5: Investigate the problems related to the different food processing sector

SEMESTER 5

Core- Food Analysis (Theory)-FS5CRT15

CO1: Understand the different sampling plans and sampling methods used to collect samples in a food industry.

CO2: Discuss the physical principles and instruments used for food analysis.

CO3: Memorize the principles, procedures, advantages and disadvantages, and applications of different methods for the proximate analysis (moisture, carbohydrates, minerals, proteins, fat) of foods.

CO4: State the principles, procedures, advantages and disadvantages, and applications of different methods for the analysis of vitamins in foods.

CO5: Understand and remember the principles, procedures, advantages and disadvantages, and applications of different methods for the analysis of minerals in foods.

Core-Food Toxicology - FS5CRT16

CO1: Investigate toxicity in food

CO2: Discuss naturally occurring toxicants in various foods

CO3: Investigate toxicants of public health hazard

CO4: Interpret xenobiotics & carcinogens

CO5: Analyse intentionally added foods and GM foods



Core- Environmental studies and Human Rights - FS5CRT17

CO1: Understand the importance of environmental studies and its public awareness

CO2: Compare the natural resources, concept and characteristics of an ecosystem

CO3: Identify the biodiversity its conservation, pollution and social issues related to environment

CO4: Demonstrate the waste management in food industries, solid and liquid waste management

CO5: To understand the human rights in United Nations, In India and conservation of human rights and environment

Practical-Core- Basic Microbiology FS5CRP21

CO1: Understand different laboratory equipment in the lab

CO2: Experiment the working of compound microscope

CO3: Prepare bacterial culture media

CO4: Analyse various staining techniques

CO5: Evaluate the enumeration of microorganisms from different foods

Practical-Core- Food Analysis & Adulteration testing - Practical FS5CRP22

CO1: Demonstrate analysis of milk and milk products according to specification

CO2: Analyse Fruit Juice, Squash & tomato ketchup according to specification

CO3: Interpret honey, vinegar & wine according to specification

CO4: Estimate the quality parameters for spices

Practical-Core- Food Chemistry Practical - FS5CRP23

CO1: Illustrate carbohydrates by titrimetric and instrumental methods

CO2: Analyse quality criteria of oils

CO3: Examine the quality of water in terms of hardness



SEMESTER 6**Core- Entrepreneurship Development & Management in food Industry - FS6CRT24**

CO1: Understand entrepreneurship and the role of entrepreneurs in economic development

CO2: Create project

CO3: Analyse the role of government in promoting entrepreneurship

CO4: Evaluate the role of management in the food industry

CO5: Describe and develop a product

Core- Food Adulteration & Testing - FS6CRT25

CO1: Discuss on various adulterants present in food materials and their testing procedures

CO2: Explain Composition and quality criteria of different plant food materials

CO3: Identify the composition and quality criteria of animal foods

CO4: Understand the composition and quality criteria for sugar products and tin foods

CO5: Recall functions and properties of different food additives and their uses in food products

Core - FS6CBT27- Basic Food Engineering

CO1: Remember basic physical quantities, their dimensions and units

CO2: Describe fundamentals of fluid flow

CO3: Examine general principles and various modes of heat transfer

CO4: Categorize various separation processes and mechanical operations used in food industries

CO5: Identify the basic technical aspects and machinery used for various process like refrigeration, freezing, drying and evaporation

Core - Advanced Food Microbiology (Practical)- FS6CRP29

CO1: Enumerate standard plate count method

CO2: Evaluate the enzymatic activity of microorganism in milk

CO3: Analyse micro flora of various food samples

CO4: Determine the sanitary quality of water

CO5: Enumerate the microflora in water and soil



Core - Food Analysis & Adulteration testing -Practical II –FS6CRP30

CO1: Analyse Jam, Jelly and related products

CO2: Evaluate Tea and Coffee according to specification

CO3: Develop wheat flour according to specification

CO4: Analyse adulterants present in foods

Core - Advanced Food Chemistry Practical- FS6CRP31

CO1: Analyse protein by instrumental methods

CO2: Evaluate the quality of fat

CO3: Analyse food Additives

Core- Project/Dissertation - FS6DSP32

CO1: Understand the research and development methodology in food processing

CO2: Create new product development strategies in food

CO3: Apply the analytical methods in quality assurance of food

CO4: Evaluate the overall production and process control in food industry

CO5: Apply the management skills in food processing sector



B.VOC FOOD TECHNOLOGY & ANALYSIS

Programme Specific Outcome

| PO | Description |
|----|--|
| 1 | Apply valid sampling techniques to food materials having widely diverse properties and volumes; |
| 2 | Administer appropriate analytical techniques for specific food components; |
| 3 | Compare advanced and conventional techniques and instruments to analyse chemical and physical properties of foods; |
| 4 | Apply a range of chemical analyses of food components; |
| 5 | Analyse, interpret and report on results obtained in a scientific format. |



SEMESTER 1

BOVG101- Basic Theoretical and Analytical Chemistry

CO1: To understand changes in the atomic model overtime and why those changes were necessitated by experimental evidence.

CO2: To understand the chemical reactivity of an element based on its number of valence electrons and location on periodic table.

CO3: Apply thermodynamic principles to chemical systems ie, predicting directions, spontaneity and equilibrium constants of reactions

CO4: To develop some understanding of the professional and safety responsibilities residing in working on chemical analysis and to provide experience in some scientific methods employed in analytical chemistry.

CO5: To analyse the purity of the isolated compounds using different Chromatographic techniques.

BOVS101 - General Mathematics and Statistics

CO1: Understand the matrix operations of addition, multiplication and transposition and express a system of simultaneous linear equations in matrix form

CO2: Understand the method of Gauss elimination to find the solution of system of linear equations.

CO3: Students able to understand how to find the derivatives and higher derivatives of a function explicitly using differentiation formulas.

CO4: Understand the concept of antiderivatives, indefinite and definite integrals and integrate by different methods of integration.

CO5: Understand the various methods of collecting data and get familiar with some elementary methods of data viz. measures of central tendency, dispersion, skewness and kurtosis.

CO6: Understand the basic concept of probability.

BOVS102 - Food Chemistry

CO1: Understand the chemical nature, structure and properties of water

CO2: Describe the chemical structure, role, functions, classifications, physical and chemical properties of carbohydrate

CO3: Discuss the composition, amino acid units, structure, classification, physical and chemical properties and functions of proteins. The students will also remember the classifications and mechanism of enzymes.



CO4: Understand the chemical composition, types of fatty acids and its structures, classification, biological role, physical and chemical properties, and the technology of processing of lipids.

CO5: Remember the importance, classification, structure and role of pigments in foods.

BOVS103 - Food Chemistry Practical

CO1: Understand the volumetric principle of chemical Analysis

CO2: Apply the standardisation methods for common reagents used in food Analysis

CO3: Analyse the macronutrients of food

CO4: Examine the micronutrients of food

CO5: Analyse water sample in terms of hardness

SEMESTER 2

BOVG201 - Basic Organic Chemistry

CO1: Understand the reactivity and stability of an organic molecule based on structure, including conformation and stereochemistry.

CO2: Differentiate the reaction mechanisms of electrophilic and nucleophilic substitution reactions in organic chemistry.

CO3: Apply different types of natural and synthetic polymers in daily lives and to understand their environmental hazards.

CO4: Understand the structure, properties and aromaticity of different heterocyclic compounds.

CO5: Analyse the effects of pollution on the environment and on human health and its control.

BOVG202 - Nutritional Biochemistry

CO1: Compare the structure of prokaryotes and eukaryotes

CO2: Illustrate the structure and function of carbohydrate

CO3: Illustrate the structure and function of fats & proteins

CO4: Remember the classification, sources vitamins, and minerals

CO5: Evaluate the energy value of foods, BMR, Protein deficiency diseases



BOVS201 - Food Preservation

CO1: Discuss the principles and applications of food preservation

CO2: Generalize the significance of drying and methods of commercial drying

CO3: Recall about the different processing and preservation techniques

CO4: Memorize about the principle of fermentation and radiation in food preservation

CO5: Administer about the new trends in food preservation and knowledge about the preservatives

BOVS202 - Dairy Technology

CO1: Summarize about the composition, and physicochemical properties of milk

CO2: Discuss about milk processing operations

CO3: Analyse about the processing of different milk products

CO4: Demonstrate the processing of Indian dairy products

CO5: Establish dairy plant sanitation procedures

BOVS203 – Internship - Dairy Industry

CO1: Apply Industrial methods of food processing for different food products

CO2: Analyse the quality of different food products

CO3: Execute the prerequisite programmes for food processing

CO4: Relate the food safety management systems in food industry

CO5: Investigate the problems related to the different food processing sector

SEMESTER 3**BOCG301 - Principles of Management**

CO1: Understand the basic management functions and theories

CO2: Recall about the concept of planning and its types

CO3: Relate about different culture and designs of organisation

CO4: Apply basic management and HR principles

CO5: Focus on basic principles, theories of leadership and motivation



BOVG301 - Bio Organic Chemistry

CO1: Explain molecular recognition and its application in biopolymer structure organisation.

CO2: Describe the role of vitamins, steroids and hormones in metabolism.

CO3: Develop an understanding about the isolation of various terpenoids and alkaloids.

CO4: Evaluate the types of fertilizers and pesticides, their method of preparation and environmental hazards caused by their excessive use.

CO5: Explain the metal ion binding to biomolecules and understand the importance of inorganic elements in vital systems.

BOVG302 - Packaging Technology

CO1: Understand the functions and classification of food packaging materials

CO2: Discuss about the characteristics and processing of paper, plastics and metals

CO3: Identify the modern food packaging techniques

CO4: Demonstrate the quality testing of paper and plastics and shelf-life testing of packaged food products

CO5: Point out the recent trends in food packaging

BOVS301 - Post Harvest Technology I

CO1: Understand the source, structure and composition of materials and various food products from animal origin.

CO2: Analyse the physiological and biochemical changes in animal-based raw food materials.

CO3: Evaluate the characteristics of materials, processing procedures, and animal-based products in terms of food quality and safety.

CO4: Explain about processing of different animal-based food products

CO5: Recall about the quality control activities in animal-based food products

BOVS302 - Food Additives and Food Safety Standards

CO1: Understand basic concepts of food additives and their classification

CO2: Evaluate functions and use of different types of food additives in various food matrix

CO3: Identify basic concepts of FSS act

CO4: Apply the provisions in food safety standard regulations

CO5: Explain the role of international organizations in food sector



BOVS303 - Food Additives Practical

CO1: Understand different instruments used in the analysis of food additives

CO2: Analyse preservatives used in food

CO3: Evaluate antioxidants used in food

CO4: Experimental study of Iodine in Iodised salt

CO5: Determine rancidity of fat

SEMESTER 4**BOCG401 - Soft Skills and Personality Development**

CO1: Evaluate, identify and create personal skills with in the students.

CO2: Apply social skills

CO3: Create an attractive personality

CO4: Discover presentation skills.

CO5: Create and apply professional skills like team work, job-oriented skills etc.

BOVG401 - Advanced Bio Organic Chemistry

CO1: Recognize the electrochemical processes and applications of conductance measurement.

CO2: Formulate the macroscopic and quantum laws of the absorption of light by molecules and solids.

CO3: To understand the types of adsorptions of gases and to analyse the properties of colloids and the environmental aspects of surfactants.

CO4: Understand the concept of rate of change associated with chemical change and to have an elementary idea about autocatalysis.

CO5: Analyse the characteristics of an oxidation- reduction reaction.

BOVG402 - Post Harvest Technology II

CO1: Understand the processing technology of rice, wheat, corn and baked products

CO2: Explain the processing technology of pulses, legumes and oilseeds

CO3: Describe the processing technology of different fruits and vegetable products

CO4: Recall the processing technology of spice oil, oleoresin, tea and coffee

CO5: Generalize the processing technology of alcoholic beverages, soft drinks and sugar



BOVS401 - Food Microbiology

CO1: Discuss about the control of growth of microorganisms

CO2: Remember the characteristics of microorganisms and their cultivation methods and techniques

CO3: Apply the identification techniques for microorganisms

CO4: Identify the role of microorganisms in food spoilage and fermentation

CO5: Demonstrate the role of microorganisms in degradation of xenobiotics

BOVS402 - Food Microbiology Practical

CO1: Demonstrate the working and handling of microscope for slide examination

CO2: Experiment about the bacterial smear preparation and examination

CO3: Interpret the biochemical characteristics of microorganisms for identification

CO4: Analyse the bacterial motility by hanging drop wet mount technique

CO5: Experiment about the microbial analysis of food

BOVS403 - Internship II

CO1: Apply Industrial methods of food processing for different food products

CO2: Analyse the quality of different food products

CO3: Execute the prerequisite programmes for food processing

CO4: Relate the food safety management systems in food industry

CO5: Investigate the problems related to the different food processing sector

SEMESTER 5**BOCG501 - Environmental Studies**

CO1: Understand the multidisciplinary nature of environmental studies and its resources

CO2: Discuss the natural resources, concept and characteristics of an ecosystem, the biodiversity its conservation

CO3: Recall about pollution, disaster management, history of environmental pollution

CO4: Criticize about human rights and family welfare programmes

CO5: Prioritize social issues, sustainable development



BOVG501 - Analytical Instrumentation

CO1: Understand various chromatographic methods and their applications

CO2: Apply general principles of electrophoresis and how they are useful to analyse biomolecules.

CO3: Distinguish about types of electrophoretic techniques and how to detect and interpret the final results

CO4: Discuss on spectroscopy and its basic principles

CO5: Generalize different spectroscopic methods and their procedural considerations

BOVG502 -Sensory Analysis of Food

CO1: Analyse the importance of sensory attributes

CO2: Design laboratory conditions for sensory evaluation

CO3: Analyse the mechanism of different sensory perception

CO4: Evaluate different applications of sensory tests in food

CO5: Apply the suitable statistical methods for sensory evaluation

BOVS501 - Food Toxicology

CO1: Investigate toxicity in food

CO2: Understand naturally occurring toxicants in various foods

CO3: Evaluate toxicants of public health hazard

CO4: Describe xenobiotics & carcinogens

CO5: Analyse intentionally added foods and GM foods

BOVS502 - Food Analysis 1

CO1: Apply sampling procedures in food analysis and method of pH measurement

CO2: Discuss importance of moisture in food products and its various methods of analysis

CO3: Explain importance of fat, its properties and techniques of analysis

CO4: Recognize different methods of carbohydrate analysis

CO5: Examine various methods in protein analysis and techniques used for protein separation



BOVS503 - Food Analysis Practical 1

CO1: To understand the proximate composition of food

CO2: Analyse milk and milk products

CO3: Analyse fruit, vegetable and sugar products

CO4: Analyse alcoholic and non-alcoholic beverages

CO5: Experimentally determine different adulterants in various

SEMESTER 6**BOCG601 - Entrepreneurship Development**

CO1: Identify the types of entrepreneurs, woman entrepreneurs, and role of entrepreneurs in India

CO2: Create awareness about entrepreneurship development programmes

CO3: Correlate the enterprises, venture and project its legal requirements and financing institutions

CO4: Identify opportunities in small business enterprises and institutions supporting small business

CO5: Develop project report and solve problems of an entrepreneur

BOVG601 - Food Engineering

CO1: Remember basic physical quantities, their dimensions and units

CO2: Describe fundamentals of fluid flow

CO3: Examine general principles and various modes of heat transfer

CO4: Categorize various separation processes and mechanical operations used in food industries

CO5: Identify the basic technical aspects and machineries used for various process like refrigeration, freezing, drying and evaporation

BOVG602 - Food Safety Management Systems

CO1: Understand the prerequisite programmes for an effective food safety management system in food industry

CO2: Develop the HACCP system in food industry.



CO3: Analyse different quality management systems in food processing sector

CO4: Discuss different food safety management systems in food industry

CO5: Analyse international standards and systems in food processing sector

BOVS601- Food Analysis 2

CO1: Discuss the analysis method of mineral content and its importance

CO2: Explain pigment analysis and application of different chemical techniques

CO3: Explain extraneous matter and fiber content in food

CO4: Apply different analytical procedures in vitamin analysis

BOVS602 - Food Analysis Practical 2

CO1: Understand the instrumental method of analysis

CO2: Analyse micro nutrients HPLC

CO3: Analyse micro nutrients fluorimetry

CO4: Determine micronutrients by atomic absorption spectroscopy

CO5: Evaluate micronutrients by Flame photometer

CO6: Analyse salt content of food

BOVS603 - Internship III – Project Work

CO1: Understand the research and development methodology in food processing

CO2: Apply new product development strategies in food

CO3: Apply the analytical methods in quality assurance of food

CO4: Analyse the overall production and process control in food industry

CO5: Apply the management skills in food processing sector



M.SC. FOOD TECHNOLOGY & QUALITY ASSURANCE

Programme Specific Outcome

| PSO | Description |
|-----|--|
| 1 | Acquire a deep scientific knowledge regarding the chemical and microbial characteristics, nutritive and functional properties, processing, preservation. Packaging, engineering and quality control techniques of various type of food items. |
| 2 | Able to apply these knowledge and technology to for development of safe, nutritious and high- quality food products. |
| 3 | Able to contribute trained human resource with the sound knowledge and skills of food quality assurance and modern food processing technologies, to work in industrial, educational and health sectors. |
| 4 | Generate the ability to design and conducts research for solving both health/ nutritional and food safety problems of the society and also for contributing to the development of scientific and technical knowledge in food science and technology. |
| 5 | Develop into vibrant and internationally competitive food science and technology professional with entrepreneurial skills, good reasoning skills, communication abilities and societal consciousness |



SEMESTER 1**FQ010101- Introduction to Food Science and Technology**

CO1: Compare about different classes of food and various nutritional programmes across the country and world wide

CO2: Recognize various physical and chemical properties of food

CO3: Differentiate the objectives and different methods of food preservation and their technological advancements

CO4: Describe food flavour chemistry and toxicology

CO5: Understand food safety and its regulations

FQ010102- Basic Biochemistry

CO1: Describe the Structure, function and the utilization of carbohydrate in human body

CO2: Discuss lipid metabolism in human body and its functions

CO3: Recognize amino acid metabolism, basics of protein digestion, its structure and role of enzymes in metabolism, its mechanism of action

CO4: Understand the basics of genetics and details of central dogma in molecular biology

CO5: Explain the steps in photosynthesis and its cycles in details

FQ010103 - Food Microbiology

CO1: Illustrate about the history, scope of microbiology and cell structure

CO2: Understand the control of microorganisms and mechanism of action of antibiotics

CO3: Differentiate the physiology, growth, culture methods and techniques of microorganisms

CO4: Discuss the role of microorganisms in food spoilage

CO5: Memorize the role of food related beneficial and pathogenic microorganisms

FQ010104 - Food Chemistry

CO1: Discuss general components of food

CO2: Describe classification, structure, reactions and general properties of carbohydrates



CO3: Explain classification, structure, reactions and general properties of amino acids and proteins

CO4: Identify classification, structure, reactions and general properties of fats and oils

CO5: Summarize classification, structure, functions, bioavailability and losses of vitamins and minerals

FQ010105 - Biochemistry and Microbiology- Practical I

CO1: Apply the working and handling of microscope

CO2: Demonstrate about the laboratory culture techniques and equipment

CO3: Experiment about bacterial smear preparation and examination

CO4: Analyse the microbial analysis of food and water

CO5: Understand the biochemical characteristics of microorganisms for identification

CO6: Evaluate the amount of carbohydrate, proteins and vitamins

CO7: Compare different carbohydrates by qualitative method

SEMESTER 2

FQ010201 - Food Engineering

CO1: Memorize basic physical quantities, their dimensions and units

CO2: Illustrate fundamentals of fluid flow

CO3: Explain general principles and various modes of heat transfer

CO4: Understand the design and working of unit operations

CO5: Compare the design of different drying and freezing equipments

FQ010202 - Food Analysis and Instrumentation

CO1: Explain various analytical instruments, their principles and working.

CO2: Compare the importance and various methods for carbohydrate analysis

CO3: Express the necessity and different methods for lipid and moisture analysis in food sample



CO4: Memorize various methods for protein analysis and their importance

CO5: Review various analytical methods for vitamins and minerals

FQ010203 - Food Preservation Technology

CO1: Describe about shelflife of food and the types and causes of food spoilage

CO2: Illustrate the principles, methods, types, machinery and applications of heating systems used in food industries - Pasteurization, Sterilization and Canning.

CO3: Explain the principles, methods, types, machinery and applications of cold food preservation systems used in food industries - Refrigeration, freezing.

CO4: Understand the principles, methods, types, machinery and applications of moisture removing systems used in food industries for preserving foods - Drying, Dehydration, Concentration.

CO5: Discuss the newly developed food preservation technologies - Irradiation, Ohmic heating, Microwave heating, Hurdle technology.

FQ010204 - Food Additives and Packaging

CO1: Recognize basic concepts of food additives and their classification

CO2: Explain functions and use of different types of food additives in various food matrix

CO3: Categorize different packaging materials used in food industry, test for packaging materials

CO4: Identify new methods in food packaging and their application

CO5: Demonstrate food adulteration and their detection in various food products

FQ010205 - Food Quality Assurance and Management

CO1: Understand the methods for the quality assessment of different food products

CO2: Describe concepts of quality and the biological, chemical, and physical hazards associated with foods and the food system

CO3: Explain the prerequisite programmes for an effective food safety management system in food industry

CO4: Write the concept of TQM and its principles



CO5: Discuss different food regulation and standards in food industry

FQ010206 - Food Additives & Food Preservation-Practical II

CO1: Understand tests done for packaging materials

CO2: Analyse additives present in food products

CO3: Demonstrate principles and methods of analysis of various additives in food products

CO4: Experiment different methods in analysis of food additives

CO5: Memorize basic laboratory protocols in testing of common food additives

SEMESTER 3

FQ010301 - Technology of Cereals, Pulses & Oilseeds

CO1: Describe the post-harvest processing and quality requirements of rice

CO2: Discuss the composition, types and processing technology of wheat and analyse the quality testing of dough

CO3: Understand the processing technology of corn and its products

CO4: Compare chemical composition, anti-nutritional factors and processing technology of different pulses

CO5: Explain the chemical composition, anti-nutritional factors and processing technology of oilseeds

FQ010302 - Technology of Milk, Meat, Poultry & Fish

CO1: Understand the source, structure and composition of materials and various food products from animal origin.

CO2: Compare the physiological and biochemical changes in animal-based raw food materials.

CO3: Illustrate the characteristics of materials, processing procedures in animal-based products in terms of food quality and safety.

CO4: Describe about processing of different animal-based food products

CO5: Memorize the defects and spoilage in animal-based food products



FQ010303 - Technology of Fruits & Vegetables

CO1: Describe different kinds of fruits and necessity of reducing post-harvest losses

CO2: Determine maturity indices of Fruits and vegetables

CO3: Understand various packing house operations and storage of fruits and vegetables

CO4: Explain different processing steps of fruits and vegetables

CO5: Generalize emerging trends in minimal processing of fruits and vegetables

FQ010304 - Food Analysis-Practical III

CO1: Assess the quality of fruit and vegetable products

CO2: Analyse milk and milk products

CO3: Evaluate quality of tea and coffee

CO4: Analyse alcoholic beverages

CO5: Determine quality of cereals and related products

FQ820301 - Sensory Evaluation and Product Development

CO1: Describe the basics of sensory evaluation

CO2: Design the requirements needed for sensory evaluation

CO3: Apply sensory tests in analysis of food

CO4: Discuss instrumental methods of sensory evaluation

CO5: Identify different stages in product development and establish the plant layout

FQ820302 - Food Sanitation and Hygiene

CO1: Summarize the sources of food contamination and the importance of sanitation in a food industry.

CO2: Understand the different types of cleaning compounds, cleaning mechanism, types and properties of sanitizers, advantages and disadvantages and applying techniques.

CO3: Practice the importance of personal hygiene in food industry.



CO4: Administer the sanitation process done in different food processing industries - Dairy, Seafood, Beverages, Fruits and vegetables and meat processing industries.

CO5: Describe the regulations and standards related to the sanitation of food industries.

SEMESTER 4

FQ820403 - Byproduct utilization and Waste Management

CO1: Discuss the importance of waste management and effluent treatment

CO2: Categorize waste

CO3: Describe different stages in effluent treatment

CO4: Compare byproduct utilization in agro industries

CO5: Distinguish byproduct utilization in animal and marine products

FQ010404 - Food Processing & Sensory Evaluation - Practical IV

CO1: Experiment principles and methods of preparation of different fruits and vegetable products

CO2: Understand the standardization of different fruit and vegetable products

CO3: Develop intermediate moisture foods

CO4: Analyse different extraction techniques used for the preparation

CO5: Create practical skills for the development of products

FQ010405 - Project Evaluation

CO1: Generate idea of research and how to achieve objective.

CO2: Able to use statistical tool and machinery for analysing samples and write research paper.

CO3: Gain hands on experience in one or more commercial establishments

CO4: Outline the methodology that will be followed to achieve the listed objectives

CO5: Analyse the data which has been generated by carrying out several experiments

CO6: Evaluate the data – accuracy and precision, sources of errors, specificity, sensitivity and detection limits, regression analysis, reporting results.



CO7: Develops foods for the future by utilizing technologies such as food fermentation, application of enzymes in food processing, food products development, nutraceuticals, nutritional and functional foods.

