

SRI VENKATESWARA UNIVERSITY: TIRUPATI, AP

DEPARTMENT B.Voc., FOOD PROCESSING TECHNOLOGY (CBCS): 2022-2023

COURSE STRUCTURE

SEMESTER-V

S.no	Skill/Gen.EDU	Courses	Title of the paper/courses and codes	Credits for courses	Hours/week	Total hours/courses	Marks		
							Internal	External	Total
1	Domain skill component	Core I	Food product design and development	4	4	60	25	75	100
		Practical	Food product design and development	2	2	30	-	50	50
2	Domain skill component	Core II	Sensory evaluation of foods	4	4	60	25	75	100
		Practical	Sensory evaluation of foods	2	2	30	-	50	50
3	Domain skill component	Core III	Food safety laws, regulations	4	4	60	25	75	100

			and certification						
		Practical	Food safety laws, regulations and certification	2	2	30	-	50	50
4	Domain skill component	Core IV	Fermentation Technology	4	4	60	25	75	100
		Practical	Fermentation Technology	2	2	30	-	50	50
5	Domain skill component	Core V	FOOD PACKAGING TECHNOLOGY	4	4	60	25	75	100
		Practical	FOOD PACKAGING TECHNOLOGY	2	2	30	-	50	50
6	Domain skill	Core VI	Nutraceuticals and functional	4	4	60	25	75	100

	component		food Technology						
		Practical	Nutraceuticals and functional food Technology	2	2	30	-	50	50
		Industrial internship	Industrial Training for 30 days	3	36	44	-	50	50

Total credits – 36

Total marks -950

SRI VENKATESWARA UNIVERSITY: TIRUPATI, AP
DEPARTMENT B.VOCFOOD PROCESSING TECHNOLOGY (CBCS) 2022-2023
SEMESTER-V
FOOD PRODUCT DESIGN AND DEVELOPMENT

Credits/ week

Theory: 4

Practicals: 2

UNIT-I

Need, importance and objectives of formation for new products development, products success and failure, factors for success, process of products developments, managing for product's success. innovation strategy possibilities for innovation, building up strategy.

UNIT-II

Ideas, Formulation based on sources availability and cost competitiveness for concept developments of new products, products strategy, products design and process developments, products commercialization, products launch and evaluation.

UNIT-III

Technology knowledge - product qualities, raw material properties, processing, packaging requirements, distribution and marketing. shelf-life studies, physico-chemical, microbial, sensorial changes of the food products during processing and storage.

UNIT-IV

Principles and design of: Therapeutic foods, herbal foods, fortified foods

Infants foods, Geriatric foods

Functional foods, Nutraceuticals

Probiotics and prebiotics

UNIT-V

Consumer behavior-food preferences integration of consumer needs in products needs in products development, Factors influencing consumer buying decisions. Market testing and marketing plan.

REFERENCES:

Howard R. Moskowitz Jacqueline H. Beckley, Anna V. A. Resurreccion, (2012), "Sensory and Consumer Research in Food Product Design and Development", John Wiley & Sons Publishers.

Kenneth B. Kahn, (2012), "The PDMA Handbook of New Product Development", John Wiley & Sons Publishers.

Jacqueline H. Beckley, M. Michele Foley, Elizabeth J. Topp, Jack C. Huang, Witoon Prinyawiwathkul, (2008), "Accelerating New Food Product Design and Development", John Wiley & Sons Publishers.

Functional Foods by R. Chadwick, S. Henson, B. Moseley, G.

Handbook of Nutraceuticals and Functional Foods by Robert E.C. Wildman

Principle of Sensory evaluation of Foods by Amerine M. A.

Fuller G. W. (1994) New Food Product Development. CRC Press

Meligaard, G. V. Carr B. T. (1991) Sensory evaluation techniques. CRC Press

Mahony, M. O. (1986) Sensory evaluation of Food. Marcel Dekker Inc

Howard Moskowitz, (2009), An integrated approach to new product development, CRC Press, New York

FOOD PRODUCT DESIGN AND DEVELOPMENT

PRACTICALS :

1. Market research
2. Ideation of new food product
3. Product design and development
4. Formulation and standardization
5. Shelf-life studies
6. Costing and studies
7. Food and Nutrition labelling and packaging
8. Development of Product Promotion strategies
9. Identification of Products Promotion strategies
10. Consumer evaluation

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SEMESTER-V

SENSORY EVALUATION OF FOODS

Credits/ week

Theory: 4

Practical's: 2

UNIT-I

Definition, classification, Background and importance of sensory analysis; Fields of application of sensory analysis, basic tastes; human senses and sensory perception; threshold; psychophysics, Tongue surface.

UNIT-II

Environment and test room design; products controls; sample preparation and presentation; panelist controls; factors influencing measurements: psychological and physiological errors.

UNIT-III

Classification of subjective methods; discrimination tests: paired-comparison, duo-trio and triangle tests; affective tests: qualitative (interview and focus group) and quantitative tests (paired preference and acceptance tests); Two sample test, Ranking test, Two sample difference test, numeric scoring tests hedonic ranking test, Instrumental tests for sensory attributes-color, texture, and odor.

UNIT-IV

Objectives methods of evaluation – instruments used in sensory evaluation Texture analyzer-mechanical characteristics- chewiness, brittleness, and geometric characteristics.

sensory panel-types-criteria for panel selection.

UNIT-V

Quality control; storage stability testing; Importance of data analysis, tests of significance, null hypothesis, Variance, Standard deviation, t-test, chi-square test.

REFERENCES:

Jellinek, G., Sensory Evaluation of Food Theory and Practice. Elis Horwood Ltd.,England.,1985.

Srilakshmi, B.,Food Science., New Age International (p) Limited., NewDelhi.,2005

Manay,S.,Shadaksharaswamy,M.,Food Facts and Principles, New Age International (P) limited., Newdelhi.,2008

Brich G;Brennan J., & Parker K.J.(1977)"Sensory properties of Foods "applied science Publisher

Charley H.,'Food Science'.,Memillan Publisher company

Lawyer H.T.,& Heymann.'Evaluation of Food Principle & Practice'. Chapman & Hall

Mahony M., Sensory Evaluation of Food, Statistical methods & procedure

Swaminathan M.,Food Science, Chemistry & Experimental Foods, Bappco< Ganesh & Company, Madras

SENSORY EVALUATION OF FOODS

PRACTICALS:

1. Training of sensory panel
2. Threshold test for any two basic tastes
3. Recognition tests for various food flavors, flavors defects in milk
4. Difference tests for sensory analysis
- 5 Discrimination tests for sensory analysis
6. Texture evaluation of various food samples- Crispies/ cookies/ biscuits/ snacks foods
7. Measurement of color by using Tintometer/ Hunter Color Label etc.
8. Sensory evaluation by Hedonic Scale
9. Sensory evaluation by scoring method
10. Sensory evaluation of different food samples

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DEPARTMENT B.VOC., FOOD PROCESSING TECHNOLOGY (CBCS) 2022-2023
SEMESTER-V
FOOD SAFETY LAWS, REGULATIONS AND CERTIFICATION

Credits/ week

Theory: 4

Practicals: 2

UNIT-I

Definition of food Safety and Quality, Importance of Food Safety in the food processing industry, Risk classification.

National and International food regulatory agencies, General food laws and food safety regulations of FSSAI.

UNIT-II

Physical hazards (metals, Glass, etc.). Chemical hazards (Food additive toxicology, Natural toxins, pesticides, antibiotics, hormones, heavy metals and packaging components), Biological hazards (epidemiology of biological pathogens: virus, bacteria and fungi), Hazard Analysis Critical Control Point (HACCP) system.

UNIT-III

Definitions and importance, Good Manufacturing Practices (GMPs) Pest Control Program, Facility Maintenance, Personal Hygiene, Supplier control, Sanitary Design of Equipment and Infrastructure, sanitation Program. (sanitation standard operating procedure (SSOPs))

UNIT-IV

Food laws and Regulations, Food grades and standards BIS Act, FPO Act, Essential Commodities Act, Consumer Protection Act, Agricultural Procure Act (AGMARK) CAC (Codex Alimentarius Commission), packaging and labelling regulations for food products; Regulations for products export and imports.

UNIT-V

Registration and Licensing process and requirements; Labelling of food products; Liability for Defective products; TQM - concept and need for quality, components of TQM, Accreditation and auditing. Challenges in quality management and green processing system implementation.

REFERENCES :

Food hygiene & sanitation by S. Roday

Fundamentals of food sanitation by Norman G.Marriott

Basic concept of Industrial Hygiene, Ronald M Scott, CRC Press

Basic Concept of Industrial Hygiene, Ronald M Scott, CRC Press

Food Hygiene, Microbiology & HACCP. S J Forsythe, P R Hayes. Springer.

www.fssai.com

FOOD SAFETY LAWS, REGULATIONS AND CERTIFICATION

PRACTICALS:

- 1.Examination of physical hazard
- 2.Examination of chemical hazard
- 3.study CIP techniques
- 4.study the techniques of personal hygiene
- 5.conducts hazards analysis & risk assessment of identified hazards
- 6.preparations of HACCP chart for food industry
- 7.determination of CCP through CCP Decision tree
- 8.Document preparation for the approval of FSSAI
- 9.Visit to quality control Laboratory
- 10.visit to different food industries and study the implementation of HACCP

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DEPARTMENT B.VOC., FOOD PROCESSING TECHNOLOGY (CBCS): 2022-2023
SEMESTER-V
FERMENTATION TECHNOLOGY

Credits / Week

Theory:4

Practicals:2

UNIT-I

Introduction to fermentation: Rate of microbial growth and death. Types of fermentation submerged/solid state, Batch /continuous fermentation. Fermentation process. Fermentation products of importance. Isolation and maintenance of pure culture. Preparation of substrates/media, inoculums.

UNIT-II

Fermenter design, operation, measurement and control in fermentation, Aeration and agitation in fermentation, sterilization of air and media; scale up in fermentation. Features of different types of Fermenter, recovery of fermentation products and conversion into marketable /storage forms.

UNIT – III

Production of bakers yeast, food yeast, SCP, beer, wine, cider, vinegar, organic acids (eg.Citric and lactic acids) and enzymes (eg. Amylases, protease, lipases, pectinases, celluloses, hemicellulose etc.). IMFL/ distilled spirits (eg. Rum, gin, whisky).

Mushroom cultivation, Traditional fermented foods like idly and dosa. Principles of down stream processing and Product recovery.

UNIT –IV

Enzymes and immobilization of enzymes and application in food processing. Biological waste treatment through fermentation technology.

UNIT V

Oriented Fermented Products, soy sauce, pickles, fermented milks & cheeses. Microbial fats. Indian traditional sweet, savoury and snack food products: Sweetmeats, Namkins, Papads, wari, Idly, Dosa, Dhokla etc.

PRACTICALS

1. Follow up of bacterial growth in batch culture,
 2. Different methods of microbial cultivation,
 3. Mass transfer across membrane, permeability coefficient,
 4. Measurement of B.O.D., Measurement of C.O.D.,
 5. Fermenter operation and measurement,
 6. Production of starter, bakers yeast culture,
 7. Production of citric acid, alcohol, alcoholic beverages, enzymes, amino acids,
 8. Visit to effluent treatment plant
- 9.Preparation of fermented products
- 10.Observation of fermented products shelf life

REFERENCES

1. Food Microbiology. 2nd Edition By Adams M & Moss, M. 2008. RSC Publishing.
2. Biotechnology: Food Fermentation Microbiology, Biochemistry and Technology. Volume 2 by Joshi V. K. & Pandey, A., Sanjanya Books 1999.
3. Essentials of Food Microbiology. Edited by John Garbutt. Arnold International Students Edition. 1997
4. Microbiology of Fermented Foods. Volume II and I. By Brian J. Wood.Elsiever Applied Science Publication.1997
5. Principles of Fermentation Technology by Stanbury, P.F., Whitekar A. and Hall. 1995., Pergaman. McNeul and Harvey. (AC)
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DEPARTMENT B.VOC., FOOD PROCESSING TECHNOLOGY (CBCS): 2022-2023
SEMESTER-V
FOOD PACKAGING TECHNOLOGY

Credits / Week

Theory:4

Practicals:2

UNIT I

Definitions, objectives and functions of packaging, Types of Packaging, Packaging requirements, selection of packaging Materials- Paper, Glass, Metals, Plastics.

UNIT II

Properties of materials such as tensile strength, bursting strength, tearing resistance, puncture resistance, impact strength, tear strength, their methods of testing and evaluation; Barrier properties of packaging materials: Theory of permeability, factors affecting permeability, permeability coefficient, gas transmission rate (GTR) and its measurement, water vapor transmission rate (WVTR) and its measurement

UNIT III

Food packaging systems: Different forms of packaging such as rigid, semi rigid, flexible forms and different packaging system for (a) dehydrated foods, (b) frozen foods, (c) dairy products, (d) fresh fruits and vegetables, (e) meat, poultry, and sea foods.

UNIT IV

Packaging equipment and machinery: Vacuum, CA and MA packaging system; gas packaging machine; seal and shrink packaging machine; form and fill sealing machine; aseptic packaging systems; bottling machines, retractable pouches.

UNIT-V

Packaging- Laws & Regulations- FDA, PFA, Packaging commodity rules, weights & measurements Act. Barcoding, Environmental & ECO issues and waste disposal, Active packaging and Biodegradable packaging

PRACTICALS:

1. Identification and testing of packaging materials
2. Determination of wax from wax paper
3. Testing of lacquered tin plate sheets.
4. Measurement of tin coating weight by Clarke's method
5. To perform sulphide stain test
6. To conduct ferricyanide paper test for porosity;
7. Determination of equilibrium moisture content;
8. Visit to market and observe the different types of package material.
9. Observer the Biodegradable packaging materials in market.
10. Visit to any packaging industry

REFERENCES

1. Robertson GL, Food Packaging – Principles and Practice, CRC Press Taylor and Francis Group, 2012
2. Paine FA and Paine HY, A Handbook of Food Packaging, Blackie Academic and Professional, 1992
3. Coles R, McDowell D, Kirwan MJ Food Packaging Technology. Blackwell, 2003

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SEMESTER-V

NUTRACEUTICALS AND FUNCTIONAL FOOD TECHNOLOGY

Credits / Week

Theory: 4hours /week
Practical's: 2 hours)

UNIT-I

Background, status of nutraceuticals and functional food market, definitions, difference between nutraceuticals and functional foods, types of nutraceutical compounds and their health benefits, current scenario.

UNIT-II

Prebiotics and Probiotics. Concept of angiogenesis and the role of nutraceuticals/functional foods; Nutraceuticals for cardiovascular diseases, cancer, diabetes, cholesterol management, obesity, joint pain, immune enhancement, and mood disorders –compounds and their mechanisms of action.

UNIT-III

Functional fruits and vegetables, herbs and spices, beverages (tea, wine etc), Future prospects of functional foods and nutraceuticals and their potential for use in improving health. Development in processing of functional foods. Formulation and fabrication of functional foods

UNIT-IV

Types of nutraceutical compounds – Phytochemicals, phytosterols and other bioactive compounds, peptides and proteins, carbohydrates (dietary fibers, oligosaccharides and resistant starch), prebiotics, probiotics and symbiotic, lipids (Conjugated Linoleic Acid, omega-3 fatty acids, fat replacers), vitamins and minerals; their sources and role in promoting human health.

UNIT-V

Stability of nutraceuticals. Safety, consumer acceptance and assessment of health claims, labelling, marketing and regulatory issues related to nutraceuticals and functional foods.

PRACTICALS:

1. Identification of various nutraceuticals and functional foods available in the market
2. Estimation of chlorophyll content of green vegetable
3. Determination of lycopene in fruit/vegetable
4. Determination of total pectin in plant material
5. Estimation of crude fibre/dietary fibre in cereals
6. Estimation of anthocyanins in food sample
7. Preparation and evaluation of probiotic/prebiotic foods
8. Preparation of herbal tea
9. Preparation of cereals based products
10. Preparation of vitamins and minerals rich products

REFERENCE BOOKS

1. Wildman REC, Hand Book of Nutraceuticals and functional foods, CRC Press-2001
2. Pathak YV, hand book of Nutraceuticals Volume-2, CRCpress 2011
3. Various journals of Food technology, food science and allied subjects.