Syllabus on Vocational Education and Training Course (VTC)

Paper Title	**: Food Processing -I**
CODE	**: VTC: 246.2**
Number of Credits	**: 4**
Semester	**: III**
No. of Theory Hours Per Week	**: One (1 hour)**
No. of Practical Hours per Week	**: Three (3 Hours)**

Outline of the Paper:

Type of Course	Units in the VTC	Hours	Credits	Total Marks	Distribution of Marks (as per OC-8)			
					In-Semester		End-Semester	
					Theory	Practical	Theory	Practical
Food Processing-I	Unit-I Theory (25 Marks)	15	4	100	25			
	Unit-II to IV Theory (75 Marks)	90				15		60

Marks Distribution	**: Internal Assessment: 40** **: External Assessment: 60**
Course Objectives	1. To explain the concept of food processing 2. To illustrate on various preservation techniques 3. To describe how to apply food processing methods in development of skill in food processing sector.
Course Learning Outcome	After the completion of the course the students are able to: 1. relate the processing of different food ingredients 2. infer the extrusion process and its working principles 3. demonstrate through an experiment using whole grain and legume processing 4. compare the different types of processing related equipment in operator. 5. Prepare different cereals and pulse products with quality assurance
Unit I: (Theory) **15 Hours**	• Preservation by Low Temperature - Concept, History – • Types of preservation methods by low temperature - Different equipment used for preservation by low temperature - Treatments prior to freezing. • Preservation by using Preservatives - Definition and Concept - Types of preservatives-Natural and Artificial - Mode of action of different preservatives. • Preservation by Irradiation Process - Meaning and Concept - Irradiation methods - Sources of radiation – • Level of dose and their effect on food. • Modern Techniques in Food Preservation - Use of pulsed electric field - High hydrostatic Pressure -

	Hurdle technology
UNIT-II: (Practical) **30 Hours**	• Introduction to freezing equipment • Preservation by using chemical preservatives • Preparation of product by using salt as preservative • Preparation of product by using sugar as preservative • Preparation of product by using oil as preservative • Preparation of food product by Freeze drying to food preservation
UNIT-III: (Practical) **30 Hours**	• Preparation of malt • Determination of gluten content in wheat flour • To study the cooking quality of rice using water uptake method. • To study the methods of extraction of oil from oilseeds • Determination of under milled grains from polished rice • Preparation of quick cooked rice • Determination of specific gravity of grains • Parboiling of rice • Visit to working rice, pulse and oil mill
UNIT-IV: (Practical) **30 Hours**	• Examine the processing of different food ingredients. • Explore extrusion processing and its working principles • Learn and understand whole grain cereals and legumes processing • Handling the different food related equipment in operation • Make different Cereals & pulses products with quality assurance. • To study dextrinization in foods. • To study gelatinization behavior of various starches • Qualitative tests for hydrogenated fats, butter, and ghee • Determine the organoleptic characteristics of food.
Suggested Readings	1. Barbosa-Cánovas, G. V., Tapia, M. S., &Cano, M. P. (Eds.). (2004). Novel food processing technologies. CRC press, United States. 2. Chakravarty, A. (1988). Post harvest technology of cereals, pulses and oilseeds. Oxford and IBH Publishing Co, Calcutta. 3. Potter, N. N., & Hotchkiss, J. H. (2012). Food science. Springer Science & Business

	Media.Latest, United States. 4. Ramaswamy, H. S., & Marcotte, M. (2005). Food processing: principles and applications. CRC Press, United States. 5. Ranganna, S. (1986). Handbook of analysis and quality control for fruit and vegetable products. Tata McGraw-Hill Education. 6. Sadasivam, S., & Manickam, A. (1996). Biochemical methods,New age international (P) Ltd. Publishers, New Delhi. Page 4 of 9 7. Sahay, K. M., & Singh, K. K. (1996). Unit operations of agricultural processing (pp. xii+ 340). Vikas Publishing House Pvt. Ltd., New Delhi. 8. Serna-Saldivar, S. O. (Ed.). (2018). Corn: chemistry and technology. Elsevier, Amsterdam.
Requirements	**Preservation Equipment:** • Freezers, blast freezers, cryogenic freezing units. • Freeze dryers. • Gamma irradiators, electron beam irradiators. • Pulsed electric field processors, high hydrostatic pressure equipment. **Processing and Production Equipment:** • Brining tanks, pickling vats, oil preservation vats. • Rice polishers, wheat flour mills. • Oil expellers, presses. • Parboiling units. **Quality Control Instruments:** • pH meters, spectrophotometers, refractometers. • Chromatography setups (TLC, HPLC). • Instruments for gluten content, specific gravity, and cooking quality testing. **Any other item as and when required**
Qualified Instructors	• Instructors with experience in food science, technology, and processing. • Certifications or relevant qualifications in Food Processing

Paper Title	**: Food Processing -II**
CODE	**: VTC: 266.2**
Number of Credits	**: 4**
Semester	**: IV**
No. of Theory Hours Per Week	**: One (1 hour)**
No. of Practical Hours per Week	**: Three (3 Hours)**

Outline of the Paper:

Type of Course	Units in the VTC	Hours	Credits	Total Marks	Distribution of Marks (as per OC-8)			
					In-Semester		End-Semester	
					Theory	Practical	Theory	Practical
Food Processing - II								
	Unit-I Theory (25 Marks)	15	4	100	25			
	Unit-II to IV Theory (75 Marks)	90				15		60

Marks Distribution	**: Internal Assessment: 40** **: External Assessment: 60**
Course Objectives	**1.** To explain to students on the knowledge on confectionary . **2.** To describe how manufacturing technology of Confectionary products are being utilized. **3.** To demonstrate the strategies for skill development to meet the demands from ongoing innovations in the field.
Course Learning Outcome	After completion of the course students are able to: 1. relate the market trends and consumer preferences related to processed fruits and vegetables, helping in decision-making for product development. 2. classify the composition and nutritional value of various fruits and vegetables 3. identify recent advances in processing technology and applications in fruits and vegetables 4. distinguish between processed foods from fruits and vegetables 5. assess sustainable practices in processing, waste reduction, and environmental impact.
Unit I: (Theory) **15 Hours**	• Current trends in fruits and vegetable processing - Structural, compositional and nutritional aspects. • Quality requirements of raw materials for processing-preparation of raw material, primary processing-grading, sorting, cleaning, washing, peeling, slicing and blanching. • Fruits and Vegetable of processing. Vegetables: Composition, nutritive value and functional properties, Freezing of vegetables.Fruits: Composition, nutritive value and functional properties. Pre- processing of tomatoes. • Preservation of fruits and vegetables - Canning,

	Freezing,Dehydration of Fruits and Vegetables in cabinet drier. • Fruits and Vegetable processing - Recent advances in juice processing technology, application of membrane technology in processing of juices. • Technology of Products: juices & pulps, concentrates & powders, squashes & cordials, nectars, fruit drinks & beverages carbonated and its quality control. Fermented products- Cider, wine, brandy. • Dehydration of fruits and vegetable - Manufacturing process of juice, soup, puree, and paste. Jams, Jellies and marmalades: selection, preparation, production. • Difference between jam and jelly. Theory of jell formation, failure and remedies in jam and jelly making. • General principles and manufacturing processes of preserves, candied fruits, glazed fruits, crystallized fruits. Spices and condiments.
UNIT-II: (Practical) 30 Hours	• Preservation and processing of certain vegetables by drying. • Preparation of tomato ketchup and its preservation. • Preparation of tomato puree and its preservation. • Preparation of pickles. • Preparation of jam • Preparation of jelly • Preparation of marmalades
UNIT-III: (Practical) 30 Hours	• Preparation of squash and cordial • Processing and Preservation of peas by use of high temperatures (Bottling of Peas). • Blanching of a given sample (pea) and assessment of its adequacy. • Enzymatic browning of fruits and vegetables and its control. • Osmotic dehydration of given sample (Carrot/Grapes). • Preparation of amla preserve and dried fruit product (Aam papad, bars) • Quality analysis of spices. • Visit to Vegetables, Fruit and spice processing unit
UNIT-IV: (Practical) 30 Hours	• Influence of pH and heat on pigments from fruits and vegetables. • Determination of Total Soluble Solids (TSS) in different juices using a Brix refractometer • Identification of pigments in fruits and vegetables by Paper Chromatography or TLC. • Studying quality drying/dehydration/freezing. characteristics of foods • Determination of microbial loads in various animal food products. • Field visit to a food packaging industry.

Suggested Readings	1. Desrosier Norman, W. (1970). The technology of food preservation. AVI Publishing Company, Incorporated, United States. 2. Lal, G., Siddappa, G. S., & Tandon, G. L. (1960). Preservation of fruits and vegetables. Indian Council of Agricultural Research, New Delhi. 3. Pruthi, J. S. (2001). Minor spices and condiments: crop management and post-harvest technology, Indian Council of Agricultural Research, New Delhi. 4. Salunkhe, D. K., & Kadam, S. (Eds.). (1995). Handbook of fruit science and technology: production, composition, storage, and processing. CRC press, United States. 5. Srivastava, R. P., & Kumar, S. (1994). Fruit and vegetable preservation principles and practices. CBS Publishers & Distributors Pvt. Limited, New Delhi. 6. Verma, L. R., & Joshi, V. K. (2000). Post harvest technology of fruits and vegetables, Agricultural and Food Sciences, Environmental Science. Indus Publishing Company. New Delhi.
Requirements	**Preservation Equipment:** • Freezers, blast freezers, cryogenic freezing units. • Freeze dryers. • Gamma irradiators, electron beam irradiators. • Pulsed electric field processors, high hydrostatic pressure equipment. **Processing and Production Equipment:** • Brining tanks, pickling vats, oil preservation vats. • Rice polishers, wheat flour mills. • Oil expellers, presses. • Parboiling units. **Quality Control Instruments:** • pH meters, spectrophotometers, refractometers. • Chromatography setups (TLC, HPLC). • Instruments for gluten content, specific gravity, and cooking quality testing. **Any other item as and when required**
Qualified Instructors	• With expertise in food science, technology, and processing. • Lab Technicians: For maintaining and operating lab equipment. • Support Staff: For administrative and logistical support.

Paper Title	**: Food Processing -III**
CODE	**: VTC: 366.2**
Number of Credits	**: 4**
Semester	**:VI**
No. of Theory Hours Per Week	**: One (1 hour)**
No. of Practical Hours per Week	**: Three (3 Hours)**

Outline of the Paper:

Type of Course	Units in the VTC	Hours	Credits	Total Marks	Distribution of Marks (as per OC-8)			
					In-Semester		End-Semester	
					Theory	Practical	Theory	Practical
Food Processing - III	Unit-I Theory (25 Marks)	15	4	100	25			
	Unit-II to IV Theory (75 Marks)	90				15		60

Marks Distribution	**: Internal Assessment: 40** **: External Assessment: 60**
Course Objectives	**1.** To explain to the students the technology for handling,processing, preservation of meat, poultry and fish products.
Course Learning Outcome	After completion of the course students are able to: 1. describe the need and importance of livestock, egg and poultry industry 2. identify the structure, composition and nutritional quality of animal products 3. explain the processing and preservation of animal foods 4. discover the technology behind preparation of various animal food products and by product utilization Syllabus Content
Unit I: (Theory) **15 Hours**	• Compositional and Nutritional aspect of Animal foods, • Fish - Classification of fish (fresh water and marine), composition, spoilage of fish - microbiological, physiological, biochemical, • Meat - Definition of carcass, concept of red meat and white meat, composition of meat, marbling in meat, post mortem changes in meat - rigor mortis, tenderization of meat, ageing of meat, • Egg- composition and nutritive value, egg proteins, characteristics of fresh egg, deterioration of egg quality.
UNIT-II: (Practical) **30 Hours**	• Fish Processing Preservation of fish-Chilling, Freezing, curing, drying, • salting - salting methods: brining, pickling, curing and

	canning of fish. • Smoking - smoke production, smoke components, quality, safety and nutritive value of smoked fish, pre - smoking processes, smoking process control.
UNIT-III: (Practical) 30 Hours	• Meat processing Meat Quality - colour, flavour, texture, Water Holding Capacity (WHC), Emulsification capacity of meat. • Tests for assessment of raw meat - TVN, FFA, PV, Nitrate and nitrite in cured meat. • Preservation of meat -Refrigeration and freezing, thermal processing - canning of meat, dehydration, meat curing.
UNIT-IV: (Practical) 30 Hours	• Egg processing Egg-Composition and nutritive value. Factors affecting egg quality. • Preservation of eggs - Refrigeration and freezing, thermal processing, dehydration, coating. • Products from fish, meat and egg Fishery products: Surimi - Process, traditional and modern production lines, quality of surimi products. • Fish protein concentrates (FPC), fish protein extracts (FPE). • Meat products: Sausages - processing, RTE meat products. • Egg products– Egg powder, frozen egg pulp, designer eggs.
Suggested Readings	1. Guerrero-Legarreta, I. (2010). Handbook of poultry science and technology, Volume 2: secondary processing. John Wiley & Sons, Inc., United States. 2. Hall, G. M. (Ed.). (1997). Fish processing technology. Springer Science & Business Media., United States. 3. Nollet, L. M., &Toldrá, F. (2006). Advanced technologies for meat processing. CRC Press, United States. 4. Rao, D. G. (2023). Fundamentals of food engineering. PHI Learning Pvt. Ltd., New Delhi. 5. Sams, A. R., Alvarado, C., & Owens, C. M. (Eds.). (2001). Poultry meat processing (Vol. 7). Boca Raton, FL: CRC Press, United States. 6. Toldrá, F. (Ed.). (2010). Handbook of meat processing. John Wiley & Sons., United States.
Requirements	**Preservation Equipment:** • Freezers, blast freezers, cryogenic freezing units. • Freeze dryers. • Gamma irradiators, electron beam irradiators. • Pulsed electric field processors, high hydrostatic pressure equipment. **Processing and Production Equipment:** • Brining tanks, pickling vats, oil preservation vats.

	• Rice polishers, wheat flour mills. • Oil expellers, presses. • Parboiling units. **Quality Control Instruments:** • pH meters, spectrophotometers, refractometers. • Chromatography setups (TLC, HPLC). • Instruments for gluten content, specific gravity, and cooking quality testing. **Any other item as and when required**
Qualified Instructors	• With expertise in food science, technology, and processing. • Lab Technicians: For maintaining and operating lab equipment. • Support Staff: For administrative and logistical support.