

NATIONAL EDUCATION POLICY
Certificate Course in Food Processing and Preservation
DEPARTMENT OF FOOD AND NUTRITION, INSTITUTE OF HOME SCIENCE,
DR. BHIMRAO AMBEDKAR UNIVERSITY, AGRA

Core Courses	CERTIFICATE COURSE IN FOOD PROCESSING AND PRESERVATION	Marks		Total 100	Credit	Course Mapping		
		CIE	UE			EC	EPC	SDC
I	Fundamentals of Food Science	40	60	100	5			
II	Food Processing Technology	40	60	100	5			
III	Food Preservation	40	60	100	5			
IV	Bakery & Confectionery	40	60	100	5			
	Total			400	25			

Mapping of the course to employability/ Entrepreneurship/skill development :

*EC: M e m o r a b i l i t y Courses *EPC: Entrepreneurship Courses * Skill Development Courses :

Mapping of the course to Local/ Regional/National/Global need :

*Loc: Local Need *Reg: Regional Need *Nati: National Need *Glob: Global Need

Programme Educational Objectives (PEOs)

Program in Certificate Course in Food Processing and Preservation

The Program Educational Objectives (PEOs) for the Certificate Course In Food Processing and Preservation program describes accomplishments that graduates and post graduates are expected to attain within six months.

PEO1: To demonstrate proficiency in food processing techniques, including sanitation, preservation methods, packaging, and labeling and ensure food safety and quality in compliance with industry standards and regulations.

PEO2: To be capable of processing a variety of food products, including fruits, vegetables, grains, meats, dairy, and seafood, using appropriate processing methods and equipment to optimize nutritional value, flavor, texture, and shelf life.

PEO3: To be able to apply a range of preservation technologies, such as thermal processing, refrigeration, freezing, drying, fermentation, and irradiation, to extend the shelf life of perishable foods, minimize spoilage, and prevent food borne illness.

PEO4: To understand the principles of food safety and quality assurance, including hazard analysis, critical control points (HACCP), good manufacturing practices (GMPs), and quality control measures

PEO5: To develop skills in product development and innovation, including recipe formulation, ingredient selection, process optimization, and sensory evaluation, to create new food products that meet consumer preferences and market demands.

PEO6: To acquire entrepreneurial and business skills necessary for starting and managing food processing ventures, including business planning, market analysis, cost management, regulatory compliance, and marketing strategies.

Program Outcomes (POs):

The Program Educational Objectives (PEOs) for the The Certificate Course In Food Processing And Preservation program will be able to:

PO-1: To understand the scientific principles and techniques of food processing and preservation.

PO-2: To acquire skills to establish a food service outlet.

PO-3: To formulate nutritious food products.

PO-4: To develop analytical skills to be employed in industries.

PO-5: To develop the skill to analyze food quality.

Programme Specific Outcome (PSOs)

After the successful completion of The Certificate Course In Food Processing And Preservation program the students will be able to:

PSO1:To demonstrate proficiency in various food processing techniques, including blanching, canning, freezing, drying, fermenting, and pasteurization, ensuring the safety, quality, and shelf-life of processed food products.

PSO2:To understanding of the chemical and microbiological principles underlying food processing and preservation, including factors affecting food spoilage, microbial growth, enzymatic reactions, and methods for controlling microbial contamination.

PSO3:To be able to select and apply appropriate food preservation methods based on the characteristics of food products, including pH, moisture content, texture, and nutritional composition, to extend shelf life and maintain product quality.

PSO4:To possess skills in quality control and assurance, including sensory evaluation, laboratory testing, and monitoring of critical control poi.

PSO5:To be capable of developing new food products and formulants (CCPs) throughout the food processing and preservation process to ensure product safety, consistency, and compliance with quality standardstions, adapting traditional recipes, and incorporating innovative ingredients and processing technologies to meet consumer preferences, market demands, and industry trends.

PAPER: I

FUNDAMENTALS OF FOOD SCIENCE

Credit:5
L:T:P: 4:0:1

External (Theory: 60
Internal (Sessional) :40

Course objectives:

This course deals with the basic understanding on cookery science. It includes basics of food Science, cereal & pulse cookery, milk cookery, meat, poultry & fish cookery and sugar cookery. The course aims to provide students with a comprehensive understanding of the principles and practices underlying nutrition and food science, preparing them for further studies or careers in fields such as nutrition, dietetics, food science, food technology, culinary arts, and public health.

Unit:1- Basics of food science:

Definition for Food science, objectives, Functions of Food, Food Groups, Food Guide Pyramid
Preliminary preparation (Cleaning, peeling, Stringing, Cutting, Grating, Sieving, Chopping, Soaking, Coating, Blanching, Grinding, Marinating). Cooking methods.

2. Cereals and pulses:

Cereals - wheat and rice - structure, composition and Nutritive value -milling - by products of wheat and rice, parboiling - methods, advantages. Effect of soaking, germination & fermentation on cereals and pulses, properties of gluten, gluten formation and the factors affecting it.
Pulses - Composition and Nutritive value, Germination, Effect of cooking on pulses, factors affecting cooking quality of pulses, role of pulses in cookery. Ready -To- Eat cereals used in cooking.

3.Fats, Oils and Sugar

Composition, nutritive value, Rancidity, Hydrogenation, role of fat in cookery, effect of heating, factors affecting absorption of fats, smoking point Rancidity-Types, Prevention.
Sugar: Nutritive value, properties,. Sugar -Nutritive value, properties, Types of sugars, stages in sugar cookery, role of sugar in cookery.

4. Milk and Milk products

Properties of milk protein, other milk products- curds, evaporated, spray dried and condensed milk, Cheese, Khoya, Their use in food preparations.
Composition and Nutritive value, physical properties of milk, Different types of milk and milk products, role of milk and milk products in cookery.

5. Fruits and Vegetables

Composition, classification, nutritive value, pigments in fruits and vegetables and effect of cooking on pigments. enzymatic browning, role in cookery.

Laboratory Experiments

1. Preparation of Malting, Extrusion and Germination.
2. Preparation of Pasta, Sandwich and Burger.
3. Preparation of Cake and Puff.
4. Preparation of Nutritious Balls and Chikki.
5. Preparation of Khoa, Paneer, Rasagulla and Sandesh.
6. Preparation of Custard, Mutton Cullet, Fish Finger and Chicken Pie.
7. Preparation of Caramel, Burfi, Jalebi and Halwa.
8. Sensory Evaluation.
9. Visit to Food Processing units

References:

Srilakshmi B (2005) Dietetics. New Age International Publishers, New Delhi.
Swaminathan M (1979) Food Science and Experimental foods. Ganesh and Co, Madras.
Mudambi SR and Rao SM (1986) Food Science. Wiley Eastern Ltd. New Delhi.

Chakraverty A (1988).Post-harvest Technology of Cereals, Pulses and oilseeds, Oxfordand IBH, New Delhi.
 GirdhariLal, Siddappa GS and Tandon CL (1967).Preservation of Fruits and Vegetables,ICAR, New Delhi.
 Norman W, Desrosier, Donald K andTressler (1977).Fundamentals of food freezing, AVIpublishing company, US.
 Potter (1973).Food science, 2nd edition.AVI Publishing Company, US.

Course Outcomes

Upon completion of this course, the students will be able to:

CO1:Outline the basics of food science.

CO2:Discuss the processing of cereals ,pulses, milk and milk products, meat, poultry and fish

CO3:Analyze the various compounds of sugar cookery.

Course Mapping:

	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	2	2	2	2	3	3	3	2	1	2
CO2	3	1	3	2	2	3	2	2	1	1
CO3	3	1	2	2	2	1	1	1	2	2

Matching: * 0 to 30% = 1; *30% to 60% = 2; * 60% to 100% =3

PAPER:II

FOOD PROCESSING TECHNOLOGY

Credit:5
L:T:P: 4:0:1

External (Theory): 60
Internal (Sessional) :40

Course Objectives:

The course aims to equip students with the knowledge, skills, and practical experience needed to effectively manage food processing operations, ensure food safety and quality, innovate in product development, and contribute to the sustainable and responsible advancement of the food processing industry.

- 1. Processing of foods:** Primary, secondary and tertiary processing, historical perspective, traditional technologies used in food processing. Effects of processing on components, properties and nutritional value of foods.

- 2. Cereals and pulses:** Milling of wheat - extraction of flour, refined wheat flour and pasta products Milling of rice – parboiled rice, rice based instant food Processing of corn, barley and millets – pearling, flaking and puffing, corn starch products, Malting-Pulses – Red gram, Bengal gram, black gram, green gram, soy-based products, Decortication and milling,

- 3. Milk and milk products:** Collection, Standardization, pasteurization, homogenization, UHT processing, manufacture of paneer, khoa, curd, yogurt, cream, butter, cheese, ghee, flavoured milk, ice creams, dehydrated milk products

- 4. Fruits and vegetables:** Harvesting, physiological and bio chemical changes during ripening, handling and storage, general methods of processing – extraction and pulping, raw material and product specifications and standards.

- 5. Meat, poultry, fish and egg:** Ageing and tenderizing, curing, smoking and freezing of meat, fresh storage of meat. Meat based products: sausages, salami, bacon. Fish: Dry fish - Tuna Fish Canning - Fish processing and storage, pickling. Egg: storage, frozen egg, dehydrated egg powder.

Laboratory experiments:

Milling of wheat
Malting
Standardization of different products
Preparation of paneer, khoa, curd, yogurt, cream, butter, cheese, ghee, flavoured milk, ice creams, dehydrated milk products
Product specifications and standards.
Effect of cooking methods on pigmentation
Adulteration of different food products

References:

Desrosier N W and Desrosier J N (1987) The Technology of Food Preservation, 4th Edition, CBS, New Delhi.
Fellows P J (2000) Food Processing Technology: Principles and Practice 2nd edition CRC Woodhead Publishing Ltd., Cambridge.
Khetarpaul Neelam (2005) Food Processing and Preservation, Daya Publications, New Delhi.
Salunke D K and Kadam S (1995) Hand book of Food Science and Technology -
Sivasankar B (2002) Food Processing & Preservation, Prentice Hall, India.

Course Outcomes:

After completing this course, student is expected to learn the following:-

- CO1:** To understand the principles and processes involved in food processing
- CO2:** To understand the technological innovations for various food stuffs.
- CO3:** To gain the knowledge of fortification and extrusion technology.

Course Mapping:

	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	3	2	2	2	2	3	3	3	1	2
CO2	2	2	3	2	3	3	2	2	2	2
CO3	2	2	2	2	3	2	1	2	1	2

Matching: * 0 to 30% = 1; *30% to 60% = 2; * 60% to 100% =3

PAPER:III

FOOD PRESERVATION

Credit:5
L:T:P: 4:0:1

External (Theory: 60
Internal (Practical) :40

Course Objectives:

This course deals with the techniques and principles involved in processing and preservation of food substances. It includes processing and preservation of fruits & vegetables, milk & milk products, meat, poultry & egg, sea foods through the different preservation techniques.

Unit:1- Importance of food processing:

Methods of processing cereals - wheat, rice, maize, pulses.

Processing of fruits and vegetables, meat, fish, poultry, egg, oil seeds, milk and milk products, condiments and spices.

Unit: 2-Food preservation by low temperature:

Freezing and refrigeration:

Thawing, changes during thawing and its effect on food.

Unit: 3-Food preservation by high temperature:

Thermal Processing- Commercial heat preservation methods – Sterilization, commercial sterilization, Pasteurization, and Canning – bottling.

Unit:4- Food preservation by moisture control drying and dehydration:

Drying, preservation, factors affecting rate of drying, types of driers used in the food industry.

Evaporation – Definition, factors affecting evaporation, evaporators used in food industry.

Unit:5- Food preservation by irradiation: Introduction - units of radiation - kinds of ionizing radiations used in food irradiation- mechanism of action - uses of radiation processing in food industry.

PRACTICALS

1. Preservation of foods by sugar

Preparation of Jam, Jelly.

Preparation of Marmalade, Cordial.

Preparation of Squash, Fruit bars.

Preparation of Preserves-Tuity Fruity, Ginger Murabha, Amla Preserves.

2. Preservation of foods by salt and acid

Preparation of Tomato ketchup and sauce.

Preparation of Chutneys.

Preparation of Pickles-Lemon, Mango, Garlic, Mixed vegetable.

3. Preservation by fermentation – Wine.

4. Visit to Food Processing Units – Cereal based, Pulse Based, Oil based and Spice Based.

References:

Potter NN (2013) Food science.

Brennan JG and Grandison AS (2012) Food processing handbook. 2nd Edition, John Wiley. 21

Manoranjan Kalia (2014) Food Quality Management Second Edition, Agrotech Publishing Academy, Udaipur.

Walter A. Mercer, (1988) Advances in Food Research First Edition, Academic Press, University of California, U.S.A.

Potter N (1995) Food Technology, 5th Edition, Cornell University, Ithaca, New York.

Course Outcomes

After completing this course, student is expected to learn the following:

CO1:To understand the principles and processes involved in food processing

CO2:To understand the technological innovations for various food stuffs.

CO3:To gain the knowledge of fortification and extrusion technology and packaging in the delivery of food stuffs.

Course Mapping:

	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	3	2	2	2	2	3	3	3	1	2
CO2	2	2	3	2	3	3	2	2	2	2
CO3	2	2	2	2	3	2	1	2	1	2

Matching: * 0 to 30% = 1; *30% to 60% = 2; * 60% to 100%=3

PAPER:IV BAKERY AND CONFECTIONERY

Credit:5
L:T:P: 4:0:1

External (Theory: 60
Internal (Practical) :40

This course is designated to gain a deeper understanding in art of Bakery and Confectionery products.

Bakery and Confectionery industry:

Raw material, quality parameters – dough development

Raw materials for cake making – flour, egg, yeast, butter, margarine, oil, leavening agents

Preparation of bakery products I:

Bakery products description – donut, puddings, waffle, caramel, rusk toast and custard.

Preparation of bakery products II:

Bakery products description – cakes, eggless cake, pizza base bread, biscuits, icecream and effect of variations in formulation.

Physical Parameters:

Rheological testing- Farinograph, Mixograph, Extensograph, Amylograph / Rapid Visco Analyzer, Falling number, Hosney's dough stickiness tester.

Confectionery products:

Characteristics and processing of raw material, Technology of manufacturing of toffee, chocolate, hard candies, bars, bubble gums storage and characteristics of finished products.

Laboratory Experiments

1. Microscopic examination of wheat flour and other flours
2. Preparation of Gluten from various cereal flours.
3. Quality test for wheat flour used in the baked products- Maltose Number, Waterabsorption, Sedimentation value, Alcohol Acidity.
4. Preparation of wheat bread, milk bread, millet bread, buns, rolls.
5. Preparation of cakes and icing.
6. Preparation of puffs.
7. Preparation of salt biscuits, sweet biscuits, masala biscuits, chilli biscuits, chocolate biscuits, tri color biscuits, chocolate cookies, coconut cookies, nut rings.
8. Preparation of fudge, fondant, candies, toffees chocolates
9. Planning and preparation of menu for various occasions
10. Calculation of food cost, labor cost, operating cost and overhead cost of a homemadedish.
11. Calculation of gross profit percentage of an establishment welfare/ commercial /transport for catering

References:

Singh UK (2011). Theory of Bakery and Confectionary An operational approach, Kanishka Publishers and Distributors, New Delhi.

Bakers Hand Book on Practical Baking (2000). U.S. Wheat Associates, New Delhi.

Dubey SC (2002). Basic Baking. Published by the society of Indian Bakers, New Delhi.

Niccolello I and Foote R (2000). Complete Confectionary Techniques, Hodder and Solution, London,

Course Outcomes

Upon completion of this course, the student will be able to:

CO1: Outline the various properties of raw materials in bakery and confectionery industries

CO2: Discuss methods involved in manufacture of bakery products

CO3: Compile technical knowledge in bakery and confectionery finished products

Course Mapping:

	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	2	3	2	2	2	2	1	2	2	2
CO2	3	2	2	2	2	3	2	2	3	2
CO3	2	2	3	2	2	2	1	2	2	1

Matching: * 0 to 30% = 1; *30% to 60% = 2; * 60% to 100% =3

