

**MAHARASHTRA STATE BOARD OF VOCATIONAL EDUCATION EXAMINATION, MUMBAI**

1	Name of Syllabus	<b>C. C. IN CANNING &amp; FOOD PRESERVATION (401203)</b>																																																													
2	Max.Nos of Student	25 Students																																																													
3	Duration	1 year																																																													
4	Type	Part Time																																																													
5	Nos Of Days / Week	6 Days																																																													
6	Nos Of Hours /Days	4 hrs.																																																													
7	Space Required	1) Workshop = 300 sqfeet 2) Class Room = 200 sqfeet TOTAL = 500 sqfeet																																																													
8	Entry Qualification	S.S.C.																																																													
9	Objective Of Syllabus/ introduction	Students develop appropriate skills required for purchase, handling, processing and storing of foods with special application to long term preservation and understand the role of chemistry, microbiology, hygiene and nutrition to ensure quality standards.																																																													
10	Employment Opportunity	Canning & Food Preservation is fast growing Industry. So job are Max. available also to set small institute relevant is possible like dealership small scale production institute etc.																																																													
11	Teacher's Qualification	Diploma in Canning & Food Preservation & Hotel Management & Catering Technology.																																																													
12	Training System	<table><tr><th colspan="3">Training System Per Week</th></tr><tr><th>Theory</th><th>Practical</th><th>Total</th></tr><tr><td>6hrs</td><td>18hrs</td><td>24hrs</td></tr></table>							Training System Per Week			Theory	Practical	Total	6hrs	18hrs	24hrs																																														
Training System Per Week																																																															
Theory	Practical	Total																																																													
6hrs	18hrs	24hrs																																																													
13	Exam. System	<table><tr><th>Sr. No.</th><th>Paper Code</th><th>Name of Subject</th><th>TH/PR</th><th>Hours</th><th>Max. Marks</th><th>Mini. Marks</th></tr><tr><td>1</td><td>40120311</td><td>Principles &amp; Method of Fruits &amp; Vegetable preservation</td><td>TH-I</td><td>3 hrs.</td><td>100</td><td>35</td></tr><tr><td>2</td><td>40120312</td><td>Microbiology, Quality Control &amp; Hygiene</td><td>TH-II</td><td>3 hrs.</td><td>100</td><td>35</td></tr><tr><td>3</td><td>40120313</td><td>Nutrition, Costing &amp; Equipment Maintenance</td><td>TH-III</td><td>3 hrs.</td><td>100</td><td>35</td></tr><tr><td>4</td><td>40120321</td><td>Processing of fruits &amp; Vegetable</td><td>PR-I</td><td>3 hrs.</td><td>100</td><td>50</td></tr><tr><td>5</td><td>40120322</td><td>Microbiology &amp; Quality control</td><td>PR-II</td><td>3 hrs.</td><td>100</td><td>50</td></tr><tr><td>6</td><td>40120323</td><td>Nutrition, Costing &amp; Equipment Maintenance</td><td>PR-III</td><td>3 hrs.</td><td>100</td><td>50</td></tr><tr><td></td><td></td><td>Total</td><td></td><td></td><td>600</td><td>255</td></tr></table>	Sr. No.	Paper Code	Name of Subject	TH/PR	Hours	Max. Marks	Mini. Marks	1	40120311	Principles & Method of Fruits & Vegetable preservation	TH-I	3 hrs.	100	35	2	40120312	Microbiology, Quality Control & Hygiene	TH-II	3 hrs.	100	35	3	40120313	Nutrition, Costing & Equipment Maintenance	TH-III	3 hrs.	100	35	4	40120321	Processing of fruits & Vegetable	PR-I	3 hrs.	100	50	5	40120322	Microbiology & Quality control	PR-II	3 hrs.	100	50	6	40120323	Nutrition, Costing & Equipment Maintenance	PR-III	3 hrs.	100	50			Total			600	255					
Sr. No.	Paper Code	Name of Subject	TH/PR	Hours	Max. Marks	Mini. Marks																																																									
1	40120311	Principles & Method of Fruits & Vegetable preservation	TH-I	3 hrs.	100	35																																																									
2	40120312	Microbiology, Quality Control & Hygiene	TH-II	3 hrs.	100	35																																																									
3	40120313	Nutrition, Costing & Equipment Maintenance	TH-III	3 hrs.	100	35																																																									
4	40120321	Processing of fruits & Vegetable	PR-I	3 hrs.	100	50																																																									
5	40120322	Microbiology & Quality control	PR-II	3 hrs.	100	50																																																									
6	40120323	Nutrition, Costing & Equipment Maintenance	PR-III	3 hrs.	100	50																																																									
		Total			600	255																																																									

## **CANNING & FOOD PRESERVATION**

### **PROCESSING :**

#### **Objectives**

Students develop skills in writing up purchasing specification, in handling, processing and storage of food as applied to preparation of jams, jellies, squashes, fruit juices, synthetic syrups, vinegar, pickles, chutneys, preserves, canned and frozen foods, etc.

### **THEORY :- I Principles & Method of Fruits & Vegetable preservation**

#### **Principles and methods of fruits and vegetable preservation.**

**Canning and bottling** - Can seam technology, general description of different seamers, examination of seam and measurements. Different types of containers and their uses; canning and bottling equipment their brief description, cost and sources; canning operation for fruits and vegetables; detail methods of canning some commercially important fruits and vegetables.

**Fruit and vegetables beverages** - Types of beverages, methods of preparation and preservation; equipment – their brief description, sources and cost, detailed methods of preparation of commercially important squashes; cordials; barley waters, syrups, crush, nectars; and ready-to-serve beverages.

**Jams, jellies, and marmalades – Definition:** differences and principles of preparation- role of sugar, pectin and acid in their preparation. Failure of ‘set’ and causes of other defects in the product and methods for rectification. Equipment - their brief description, sources and cost. Detailed methods of preparation of commercially important jams, jellies, marmalades.

**Fruit preserves, candies and cheese - Definition:** principles of preparation, use of different types of sugar and their role in preparation. Detailed methods of preparation of commercially important products.

**Tomato products** – Methods of preparation of tomato juice; cocktail; soup; puree; paste; ketchup; and sauce.

**Pickles, sauces and chutneys - Definition:** classification and types of pickles, chutneys and sauces. Principles of preparation and causes of spoilage and their control. Equipment – brief description, sources and cost. Methods of preparation of commercial products.

**Vinegar preparation – Definition:** types of vinegars; principles of preparation and factors affecting fermentation. Causes of spoilage and their control. Equipment- brief description, sources and cost.

**Drying and dehydration – Definition:** differences and advantages. Equipment – description, sources and cost. Methods of preparation of commercial products.

Utilisation of fruit and vegetable waste, Preparation of by products from waste.

Fruit juice concentrate and powders.

Fruit confectionery.

Canning of Indian dishes.

Canning of Indian sweets.

Alcoholic fruit beverages.

**Food packaging** – Different types of containers and packaging material; their characteristics and usefulness.

**Food Laws** - F. P. O. , F. D. A. , Packaged Commodities Acts, etc.

### **Practicals : - I Processing of fruits & Vegetable**

**Total 100 preparations of seasonal fruits and vegetables.**

Canning and bottling	16 items
Fruit beverages	18 items
Jams, jellies and marmalades	14 items
Brewed and synthetic vinegars	4 items
Tomato products	10 items
Pickles, chutneys and sauces	12 items
Preserves and candies	10 items
Miscellaneous products	<u>16 items</u>
<b>Total</b>	<b>100 items</b>

## **THEORY : - II    Microbiology, Quality Control & Hygiene**

### **Objectives**

Students acquire knowledge of organisms responsible for spoilage and contamination of canned and preserved foods and develop technique in identifying and controlling these to ensure quality control.

Classification of plant and animal kingdom.

Elementary knowledge of moulds, yeasts and bacteria- general nature and conditions of reproduction and transmission; structure classification; physiology.

Use of microscope and other accessories.

Spoilage of preserved and canned foods – types; causal organisms; source and control.

Detection and enumeration of micro- organisms.

Microbial food borne illness; causes and control.

Effects of heat on micro-organisms.

Sanitary aspects with respect to layout of cannery.

Sanitation principles in the processing and handling of food products.

Problems of fruit and vegetable waste disposal.

Quality control; evaluation; methods; system and scope.

Food acceptability.

Product evaluation and marketing technique.

Food grades and standards.

Methods of products development and regulation

Measurement, metric system.

Matter, molecule, atoms, elements and compounds.

Physical and chemical changes, simple laboratory processes used in food analysis.

Acid, base and salt; catalyst.

**Types of natural water** - types of hardness. Use and effect of hard water on boilers and quality of food. Method of softening and chlorination.

**Organic chemistry** - Classification of homologous series and characteristic properties of some organic compounds.

**Physical Chemistry** – Elementary knowledge of gas laws, atomic theory, osmosis, pH, dissociation etc.

Specific gravity and use of hydrometer.

**Heat-** Conduction, convection and radiation. Measurement terms of heat, principle of evaporation and refrigeration, thermal factors in food processing.

**Light** – Spectrum, use of colours – natural and synthetic food colours; measurement of colours.

Chemical constituents of foods.

Structure and texture of foods.

Flavour and aroma of fruits and vegetables.

Pigment in fruits and vegetables.

Food additives.

**Pre-harvest and post** - harvest changes in fruits and vegetables. Changes on cooking, processing and storage of fruits and vegetables in relation to colour, texture, taste and nutritive value.

## **HYGIENE**

### **Objectives**

Students develop an attitude to correct habits of personal and environmental hygiene to ensure complete safety of processed foods sold/food served/baked goods sold to customers.

**Definition of hygiene, its application to everyday life.**

**Personal hygiene** - Care of skin, hair, hands, feet, teeth, use of cosmetics and Jewellery.

**Food-borne diseases** - Causal organisms, route of contamination and control measures; precautions to be taken by food handlers.

Reporting of cold; sickness, boils septic wounds etc. Good grooming; clean and correct uniform; diet and exercise. Evaluation of personal hygiene.

Illustrations of cultures of smears of fingers with and without washing and, washing with ordinary and anti-bacterial soaps.

**Storage of food** – Correct handling of food, techniques of correct storage. Temperature at which bacteria are killed or their growth retarded; storage temperatures of different commodities to prevent bacterial contamination and spoilage or growth.

Safe and correct disposal of garbage.

**Rodents and insects as carriers of food borne diseases** - rodent and insect control techniques. Special stress on control of flies; rats and cockroaches.

Daily weekly and spring cleaning.

**Care of premises and equipment** – Layout of the premise; impervious washable floors and walls. Cleaning table tops, floors etc. With sodium hypochlorite (100 p.p.m.). Good ventilation and lighting. Smooth flow of work- prevention of over- crowding and back tracking, care of dark corners, crevices and cracks.

Cleaning of equipment and personal tools immediately after use. Use of hot water in the washing process.

Legal administration and quality control – laws relating to food hygiene.

## **PRACTICALS :- II Microbiology & Quality control**

Preparation of culture media and agar plate.

Transfer of culture.

Method of preparing slides and use of simple stains.

Differentiation of yeasts, moulds and bacterial cells.

Fermentation test technique for juices and beverages.

Bacterial count in tomato products.

Water analysis- colony count.

Microbiological examination of canned foods.

Examination of raw material.

Examination of can seam.

Determination of brix by (a) Hydrometer (b) Refractometer (c) Indirect method.

Determination of acidity in fruit and vegetable products.  
Methods of determining reducing sugar and salt contents of foods.  
Methods of determining sulphur dioxide and benzoic acid contents of foods.  
Detailed cut-out analysis of fruit and vegetable products.  
Test for adulterants in common foods.  
Detection of pathogens in foods.

## **Theory - III Nutrition, Costing & Equipment Maintenance**

### **Objectives**

Students understand the value of food as the means of providing nutrition for positive health essential for work efficiency., productivity., etc.

**Definition** – Nutrition, optimum nutrition, malnutrition and under- nutrition.

**Definition of calories** – Daily requirements; factors that affect the daily requirements.

Food groups and their role in balanced diets.

**Carbohydrates** – Composition, classification, sources, functions, daily requirements, excess and deficiency.

**Protein** – Composition, classification, sources, daily requirements, excess and deficiency., improving protein quality by supplementation.

**Fat** – Classification according to source, difference between animal fat and vegetable fat, functions, daily requirements, excess and deficiency.

Digestion of food; absorption and metabolism of food.

**Vitamins in diet** – Fat soluble – A,D,E and K, water soluble –B complex and vitamin C- Sources, functions, daily requirements, excess and deficiency. Effects of heat on vitamins.

**Mineral elements** - Mineral composition of the body and general functions; classification of minerals into macronutrients and micronutrients (or trace elements). Sources, functions, daily requirements, excess and deficiency of sodium, potassium, calcium, phosphorus, iron, iodine and fluorine. Effect of heat on minerals.

Calculation of nutritive value of prepared products.

## **COSTING**

### **Objectives**

Students will develop ability to identify cost elements., such as materials, labour and overheads and to price several products with a desired cost and profit percentages. They will cultivate an attitude to cost reduction and elimination of waste by adherence to standardized procedures and practices.

Importance of costing and cost control, method of costing and costing methodology in canning business, emphasis on batch costing.

Cost classification into materials, labour and overheads and their percentage analysis on net sales for clear understanding of their relative importance.

Materials costing, use of standardized recipes, materials cost control through basic operating activities like purchasing, receiving, storage issuing, production, sales and accounting; yield analysis from time to time.

Materials costing as an aid to pricing by a suitable mark up policy, sales mix to achieve a desirable contribution.

Control of labour costs and overheads, periodical percentage analysis, calculation of overhead allocation rates.

Cost behaviour into variable, fixed and semi-variable and its impact on unit cost.

Cost reporting system- daily, monthly and for special managerial decisions.

## **EQUIPMENT, MAINTENANCE & SERVICES**

### **Objectives**

Students acquire knowledge of the safety aspects of electricity, gas and other fuels, their comparative efficiency, the equipment available for the specific craft, their specifications and cost.

**Elementary study of services with particular reference to economy and safety in their use.**

**Heat and temperature** – types of heat – sensible heat., latent heat; heat transfer – conduction, convection and radiation.

**Types of fuel gases** – properties., principle of Bunsen burner; striking back; safety precautions; meter reading.

Conductors and non-conductors; meaning of Ampere, Volt, Watt, fuse and earthing.  
Short circuit - causes and remedies; Different types of thermostat. Meter reading.  
Breakdown maintenance and preventive maintenance equipment.  
**Fire precautions** – different types of fires – extinguishers, common fire hazards.  
The equipment available for the specific craft, their specifications and cost.  
Use care & Maintenance cleaning of fixed & Moveable equipments.

### **PRACTICALS III Nutrition, Costing & Equipment Maintenance**

#### **Objectives**

Including refrigerators, Mixers, Food processor, pectin incubators, autoclave, Juice, microves, Hot plates, to assen, colbac, percolators etc. Their operations safety precondition.

Students gain basic skills in the use, care and cleaning of appropriate equipment.

Routine use, care and cleaning of all fixed and movable equipment including refrigerators, mixers, peelers, incubators, autoclaves, mincers Microvaves, food processor etc.

#### **RESOURCE MATERIAL :**

Cruess W.V. (1958) Commercial Fruit and Vegetable Products, Mc Graw Hill Book Co., Inc. New York.

Srosier N.W. and Desrosier J.N. (1977) The Technology of Food preservation , AVI Publishing Co., Inc., Westport, Connecticut.

Karel M. (1963) Exploration in Future Food Processing Techniques., MIT press, Cambridge, Massacl asetts.

Lal G., Siddappa G.S. and Tandon G.L. (1967) Preservation of Fruits and Vegetables., Indian Council of Agricultural Research, New Delhi.

Woodroof J.G. and Lul B.S. (1975) Commercial Fruit Processing., AVI publishing Co., Inc. Westport., Connecticut.

Bahl B.S. and Bahl A. (1971) Textbook of Organic Chemistry, S. Chand & Co., New Delhi.

Basu N.N. and Chatterjee j. (1961) Pre-University and Intermediate Physics, B. chand & Co., Calcutta.

Deolalkar T.K. (!957). A text of Intermediate Physics, Kitab Mahal Publisherers, New Delhi.

Hopwood R. (1975) Advanced Food Science, G. Bell and Sons Ltd., London.

Mc Williams M. (1979) Food Fundamentals, John Wiley and Sons Inc., New York.

Meyer L.H. (1960) Food Chemistry, Reinhold Publishing Corp., New York.

Pyke M. (1964) Food Science and Technology, John Murray, London.

Applied Food Service Sanitation (1978) NIFI Textbook. Published by D.C. Health and Co., in Co-operation with the National Institute for the Food Service Industry., U.S.A.

Christie., A. B. and Christie M. C. (1975) Food Hygiene and Food Hazards For All Who Handle Food, Faber and Faber, London.

Cook D. J. and Binsted R. ( 1975) Food Processing Hygiene, Food Trade Press Ltd., London.

Longree K, and Blaker, G. G. (1971) Sanitary Techniques in Food Service, John Wiley and Sons, New York.

Frazier W.C. and Westhoff D.C. (1979) Food Microbiology, Tata Mc Graw Hill Publishing Co., New Delhi.

Herschdoerfer S.M. (1967) Quality Control in the Food Industry, Vols. I&II, Academic Press, London.

Hobbs B.C. and Gilbert R.J. (1978) Food Poisoning and Food Hygiene, Edward Arnold Publishing co., Edinburgh.

Joshua A.K. (1971) Microbiology. The Indian Printing works, Madras.

Pelczar M.J., Reid and Chan E.C.S. (1977), Microbiology, Tata MC Graw Hill Publishing Co., New Delhi.

Ranganna S.(1977) Manual of Analysis of Fruit and vegetable Products, Tata Mc Graw Hill Publishing Co., New Delhi.

Woodman A.G. (1959) Food Analysis., MC Graw Hill Book Co. Inc., New York.

Burton B. T. (1978) Human Nutrition, Tata Mc Graw Hill publishing Co., New Delhi.

Fleck H. (1981) Introduction to Nutrition, Mc Millan and Co., London.

Mc Divitt M. E. and Mudambi S. R. (1973) Human Nutrition- Principles and applications in India. Prentice Hall of India Pvt Ltd., New Delhi.

Swaminathan M. (1974) Essentials of Food and Nutrition., Vol.I, Ganesh and Co., Madras.

Bhar B. K. (1977) Cost Accounting, Academic Publishers, Calcutta.

Matz A., Curry O. J. and Frank G. W. (1970) Cost Accounting, Taraporewala Sons & Co., Pvt. Ltd., Bombay.

Prasad N. K. (1979) Principles and practice of Cost Accounting Book., Syndicate Pvt. Ltd., Calcutta.

Clawson A., (1951) Equipment Maintenance Manual., Ahrens Publishing Co., New York.

Gladwell, D. C. (1963) Practical Maintenance and Equipment for Hoteliers, Licensees and Caterers, Barrie & Rockliff, London.

Hurst R. (1967) Services and Maintenance for Hotels & Residential Establishments, Heinemann, London.

Kiton, R. and Ceserani, V. (1974) The Theory of Catering, Edward Arnold, London.

Macfarlane, J. E.(1956) Electricity in the House, The English University Press Ltd; London.

Stieri., E. (1961) Electricity in the Home, Burnes & Noble, London.

Woodrook R. A. (1950) Gas in the House, The English Universities Press Ltd., London.

\*\*\*\*\*