OUTLINES OF TESTS SYLLABI AND COURSES OF READING
FOR
Bachelor of Vocation (Food Processing and Quality Management)

Session 2017-18

(1st to 4th Semester)
# SCHEME OF B.Voc. (Food Processing and Quality Management)
## (SEMESTER SYSTEM)

### Semester I

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<tr>
<th>Paper Code</th>
<th>Title</th>
<th>Generic/ Skill Component</th>
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<td>FPQM-103</td>
<td>Introduction to bakery and confectionary</td>
<td>Skill</td>
<td>Theory &amp; Practical</td>
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*Refer to Generic Components Common to all B.Voc. Courses*

** Summer Industrial Training of 4-6 weeks in a relevant Industry after 2nd Semester Examinations during summer break. Training report by the student to be submitted within in one week of start of 3rd Semester. Viva-Voce examination to be held within 3-weeks of the start of 3rd semester.
**Refer to Generic Components Common to all B.Voc. Courses**

** Summer Industrial Training of 4-6 weeks in a relevant Industry after 4th Semester Examinations during summer break. Training report by the student to be submitted within in one week of start of 5th Semester. Viva-Voce examination to be held within 3-weeks of the start of 5th semester.**

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B.Voc. (Food processing and quality Management) Semester: ----I

Paper Title: INTRODUCTION TO BAKERY AND CONFECTIONERY

Paper Code: FPQM-103 Credits: 6

Job Role: Baking Technologist: Responsible for manufacture of bakery and confectionary products and their quality control.

Objectives:
1. To understand the role of different ingredients used in Baking Industry.
2. To know the general methods of processing and preservation of foods.
3. To identify the microorganisms that can otherwise spoil bakery products.

Instructions for Examiner:
1. The syllabus of this paper has been divided into FOUR units.
2. Examiner will set a total of NINE questions comprising Two questions from each unit, including Question No. 1 (compulsory) of short answer type covering the whole syllabus.
3. The students are required to attempt one question from each unit and the entire Compulsory Question No. 1.
4. All questions carry equal marks.

UNIT I


UNIT II


UNIT III


UNIT IV
Bread Spoilage: Rope and Mould, Factors responsible for it and preventive measures. Defects and Remedies: Basic reasons and suggested remedies: Bread, Cake and Biscuits.

Suggested Resources for Reading:

4. Ornamental Confectionary and the Art of Baking in all its Branches by Herman Hueg
5. Bakery-I, Student handbook and practical manual, published by CBSE.
6. A professional Text to bakery and confectionary by John Kingslee

Practical based on FPQM-103

Time: 3 hours

1. Preparation of White Bread.
2. To determine moisture in bread and biscuits.
3. Studying the effect of temperature on process of biscuit making.
4. Determination of ash content in bread and biscuits.
5. Principle and preparation of Fruit cake
6. To do icing on the cake
7. Determination of gluten
Paper Title: Dairy Technology

Paper Code: FPQM-104 Credits: 6

Job Role: Dairy Technologist: To supervise manufacture of dairy products like milk, butter, yogurt, cheese and their preservation.

Objectives:
1. To develop knowledge among students about various aspects of dairy industry.
2. To study quality standards and production of various types of milk and milk products.
3. To study the role of dairy farming in Indian economy

Instructions for Examiner:
1. The syllabus of this paper has been divided into FOUR units.
2. Examiner will set a total of NINE questions comprising Two questions from each unit, including Question No. 1 (compulsory) of short answer type covering the whole syllabus.
3. The students are required to attempt one question from each unit and the entire Compulsory Question No. 1.
4. All questions carry equal marks.

UNIT I

Milk: Definition, composition, physicochemical properties of milk and its constituents, nutritional value, overview of processes used in milk and milk products- pasteurization, homogenization and standardization, dye detection test, platform tests, milk borne diseases. Microbiology of milk, types of spoilage and its preventions.


UNIT II

Technology underlying manufacture of Milk products: Butter, cream, butteroil, cheese, yoghurt, paneer, chhana, ice-cream

UNIT III

Composition, standards, manufacturing: Process, equipments and defects during manufacturing and storage of dairy products and by products (paneer, dahi, milk powder-skimmed milk and whole milk powder, casein, whey concentrate, lactose, ghee residue ).
UNIT IV

Dairy development in India: - Present status, future prospective and its role in Indian economy. Important government initiative. Role of dairy development organizations (NDRI, Amul) in dairy development

Suggested Resources for Reading:

1. Fluid milk industry, J.S Handerson, A.V.I Publishing Company, USA1
2. Indian Dairy products, K.T. AcharyaPublication

PRACTICAL BASED ON FPQM 104

Time: 3 hours

1. Sampling of milk and milk products for microbiological analysis
2. Platform test for milk analysis.
3. To determine fat in milk by gerber method.
4. To determine specific gravity of given sample of milk by lactometer.
5. Visit and study a nearby milk union/ dairy and prepare a checklist of problems in procurement and milk distribution.
6. Detection of various adulterants in milk.
7. Preparation of sterilized flavored milk.
8. To prepare pasteurized milk.
B.Voc. (Food processing and quality Management)       Semester : I

Paper Title: FOOD QUALITY CONTROL

Paper Code: FPQM 105                                                                                   Credits: 6

Job Role:

Food quality control manager: To determine and establish quality standards for food products and
Is responsible for ensuring that food products produced meet standards set by both the organisation and regulatory authorities.

Objectives:
1. To understand the different principles and functions of food quality control department.
2. To understand various food laws and regulations

Instructions for Examiner:
1. The syllabus of this paper has been divided into FOUR units.
2. Examiner will set a total of NINE questions comprising Two questions from each unit, including Question No. 1 (compulsory) of short answer type covering the whole syllabus.
3. The students are required to attempt one question from each unit and the entire Compulsory Question No. 1.
4. All questions carry equal marks.

UNIT-I

Objectives, functions and principles of quality control. Difference between food quality control and quality assurance, assessment of raw materials and finished products (quality control) of baking industry.

UNIT-II

Total quality management (TQM) – Principles of quality management, good manufacturing practices, good hygienic practices, good lab practices, general awareness and role of management practices in quality control.

Quality Attributes: Size, shape, colour, aroma and texture. Microbial quality control: an overview

UNIT-III

Food laws and regulations, grade and standards, concepts of Codex Alimentarious, HACCP, USFDA, ISO 9000 series etc. Food standards and safety Act: salient provisions and prospects, role of various food standards in India- PFA, FPO, AGMARK and BIS.
UNIT-IV

Sensory quality evaluation: Introduction, methods, panel screening, selection methods, Sensory and instrumental analysis in quality control.

Food adulteration, nature of adulteration, methods of evaluation of food adulterants and toxic constituents of bakery products.

Practical based on FPQM- 105

1. Techniques of quality assessment of different natural and processed foods.
2. Documentation of details of baking ingredients, process and finished products used in baking industry.
3. Quality evaluation of milk and milk products
4. Sensory methods for measuring food quality assessment of raw materials used and processed bakery products
5. Instrumental methods for measuring food quality assessment of raw materials used and processed bakery products
6. Study of cleaning and sanitizers used in pre and post-operative processes in bakery industry
7. Listing of quality control agencies at national and international levels

Suggested Resources for Reading:


B.Voc. (Food processing and quality Management)  
Semester: II

Paper Title: Food Packaging

Paper Code: FPQM 203  
CREDITS: 6

Job Role:
Food Packaging technician: monitors packaging of various foods and their subsequent Compatibility and handles all categories of packaging such as primary, secondary and tertiary packaging for food products.

Objectives: To enable the students to understand about packaging and packaging materials, compatibility of various food items with packaging materials

Instructions for Examiner:
1. The syllabus of this paper has been divided into FOUR units.
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3. The students are required to attempt one question from each unit and the entire Compulsory Question No. 1.
4. All questions carry equal marks.

UNIT-I
Packaging Technology: Definitions, Functions of packaging, Properties of packaging material in relation to their functions, package design, Tests on packaging materials, Gas and water vapor transmission rates, types of containers- primary & secondary, flexible & rigid, hermetic & non-hermetic.

UNIT-II
Wood: structure, types of wooden containers and their properties.
Glass: composition, properties, types and manufacture of glass containers.

UNIT-III
Metal Cans: properties of metals for packaging material, Types of Metallic Cans - Tin cans and Aluminum cans, steel plate and functions of its various constituents, Importance of Open top sanitary cans, Lacquering-types and applications, three piece cans and two piece cans.

Introduction to Canning operations – Can Reformer, Flanger, Seaming, Can closures, Sterilization of jars and bottles.
Filling And Sealing Operations For Various Types of Packages: Closing and sealing of rigid plastic containers. Filling and sealing of Flexible plastic containers,

Aseptic packaging, shrink packaging, gas packaging, vacuum and modified atmosphere packaging – principles, applications.

Estimation of shelf life, analysis of storage requirement, accelerated storage

**Suggested Resources for Reading:**


**Practical based on FPQM- 203**

1. To determine thickness of paper and paper board.

2. To identify different types of packaging materials.

3. Demonstration. of measurement of cartons’ dimensions as per organizational standards.

4. Demonstration of measurement of dimensions of bottle mouth, cans and their caps.

5. Demonstration of sealing processes used in food industry.

6. Demonstration of filling process.
B.Voc. (Food processing and quality Management)  
Semester: II

Paper Title: Industrial Safety, Hazards & Prevention  
Paper Code: FPQM 204  
Credits: 6

Job Role:

To evaluate values of industrial safety and hygiene.

Is responsible for monitoring and assessing hazardous and unsafe situations and developing measures to assure workers safety.

Objectives:

1. To create awareness about health hazards of industrial substances.
2. To evaluate the threshold value of industrial hygiene and safety.

Instructions for Examiner:

1. The syllabus of this paper has been divided into FOUR units.
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3. The students are required to attempt one question from each unit and the entire Compulsory Question No. 1.
4. All questions carry equal marks.

UNIT-I

Microbial Contaminants associated with food–Bacteria, viruses, fungus, molds and yeast. Factors affecting the growth of microbes in food. General Microbiological Methods of enumeration and isolation of food related microbes.

General methods of Preservation: Pasteurization, sterilization and appertization

UNIT-II

Studies of process hazards, Law Codes, Standards, Properties and functions of Chemicals, and Health hazards of industrial substances.

UNIT-III

Toxicology: Toxic materials and their properties, effect of dose and exposure time, relationship and predictive models for response, Threshold value and its definitions, industrial sanitation and hygiene evaluation.

UNIT-IV

Propagation of fire and effect of environmental factors, ventilation, dispersion, purifying and sprinkling, safety and relief valves.
Practical based on FPQM- 204

1. Methods of sterilization and preparation of media
2. Gram staining
3. Study of morphology of bacteria, yeast and fungi
4. Methods of pure culture techniques for bacteria
5. Enumeration and isolation of bacteria and fungi from water/milk and contaminated food.
6. Demonstration of different safety aspects and maintenance of material safety data sheets followed in food industry.

Suggested Resources for Reading

Paper Title: FOOD PLANT LAYOUT AND WASTE DISPOSAL

Job Role:

Food Plant layout officer: Managing and updating food plant layout time to time as per business policies and safety standards.

Objectives:
1. Introduction of the basic setup of a food processing industry.
2. To make them conversant with the machinery and equipments used in different types of food industry.

Instructions for Examiner:
1. The syllabus of this paper has been divided into FOUR units.
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3. The students are required to attempt one question from each unit and the entire Compulsory Question No. 1.
4. All questions carry equal marks.

UNIT-I

Industrial plant design concepts and general design considerations for location of food plants. Application of HACCP concept, ISO, FPO & MPO requirements in food plant layout and design.

UNIT-II

Importance of plant layout selection of site. Selection of building material. Selection and planning of manufacturing process and service facilities Basic understanding of equipment layout and ventilation in food processing plants. Process flow charts for material movement and utility consumption in food plants.

UNIT-III

Plant layout and design of milk and milk products. Plant layout and design of beverage industry

UNIT-IV

Plant layout and design of bakery and biscuit industries. Miscellaneous aspects of plant layout and design like provision for waste disposal, safety arrangements etc.
1. Industrial visit and report making.

Text Books/ References.


B.Voc. (Food processing and quality Management)  
Semester: III

Paper Title: Technology of fruit and Vegetable processing

Paper Code: FPQM 303  
Credits: 6

Job Role:

Fruit and vegetable processing technician is responsible for processing various fruits & vegetable and developing new products from them.

Objectives:

1. To know technical details of processing of different fruits and vegetables in accordance with their composition.
2. To understand various aspects of fruit and vegetable preservation.

Instructions for Examiner:

1. The syllabus of this paper has been divided into FOUR units.
2. Examiner will set a total of NINE questions comprising Two questions from each unit, including Question No. 1 (compulsory) of short answer type covering the whole syllabus.
3. The students are required to attempt one question from each unit and the entire Compulsory Question No. 1.
4. All questions carry equal marks.

UNIT-I

Post-harvest losses of fruit and vegetable and factors affecting them. Post harvest changes in fruits and vegetables. Maturity indices of fruits and vegetables. Climateric and non climateric fruits. Fruit ripening and changes. Packaging of whole fruits and vegetables. Processing and packaging of cut fruits and vegetables. Post-harvest physical and chemical treatment to enhance the shelf life of fruits and vegetables. Microbiological spoilage of fruits and vegetables.

UNIT-II

Classification, chemical composition and nutritive value of fruits and vegetables. Preparing fruit and vegetable for processing-washing, sorting, grading, peeling, blanching, grating, destoning, pitting. Bottling and canning of fruit and vegetable products.

UNIT-III

FPO Specifications and preparation of Jam, Jellies, marmalade, preserves, pickles. Tomato processing- FPO standards and preparation of tomato juice, puree, paste, chutney, sauce and ketchup. Preparation and standards of fruit juices, squashes & cordials, fruit syrups, nectar, RTS & pulp.
UNIT-IV

Machinery for peeling, slicing/dicing, pulping, grating, hydraulic pressing & Clarification.
Fruit juice aroma recovery & its equipment & importance. Different systems of filling practices- tetrapack for small quantities. Minimal processing- basic concepts.

Suggested Resources for Reading:

3. Food Science by Potter, N.N., CBS Publisher, New Delhi.

Practicals based on FPQM -303

1. Preservation and processing of certain vegetables by freezing.
2. Preparation of fruit juices.
3. Preparation of tomato ketchup & its preservation.
4. Preparation of Amla preserve & candy.
5. Minimal processing of fruits and vegetables.
6. Organoleptic evaluation of fruit & vegetable products.
7. Visit to fruit & vegetable industry.
Paper Title: Egg, Poultry, Meat & Fish Processing

Job Role:
To work in an abattoir, wholesale meat factories and meat processing plants. A meat processor is involved with the production of meat and poultry products.

Objectives:
1. To enable the students to understand the various aspects of egg, meat and fish products and their preparation.
2. To gain knowledge on processing of meat and fish.

Instructions for Examiner:
1. The syllabus of this paper has been divided into FOUR units.
2. Examiner will set a total of NINE questions comprising Two questions from each unit, including Question No. 1 (compulsory) of short answer type covering the whole syllabus.
3. The students are required to attempt one question from each unit and the entire Compulsory Question No. 1.
4. All questions carry equal marks.

UNIT-I

Egg-structure, composition, nutritive value, interior quality of egg and its evaluation, functional properties, grading, microbial spoilage of egg and preservation and storage of eggs.
Poultry types, nutritive value of poultry meat, antimortem examination and slaughtering of hen, poultry cut up parts.

UNIT-II

Meat- scope of meat processing industry in India, structure, composition & nutritive value of meat, classification of meat- mutton, pork & sheep. Meat quality parameters- meat colour, water holding capacity, marbling, firmness and factors affecting it. Slaughtering and dressing of meat animal, post mortem changes in meat- rigor mortis, biochemical changes associated with rigor mortis, conversion of muscle to meat.

UNIT-III

UNIT-IV

Fish –types, compositions & nutritive value, post mortem changes in fish.
On board handling, storage & transportation of fish, curing, smoking, salting & drying of fish, fish oil, fish protein concentrate, fish meal.

Text Books/References:

2. G.J. Mountney.1995. Poultry Products Technology by Taylor & Francis,
6. Fish Processing & preservations by Charles L, Cutting.

Practicals on FPQM-304: Egg, poultry, meat & fish processing

1. Determination of egg components.
2. Grading and quality evaluation of egg.
3. Preparation of egg products-boiled, scrambled and omelette.
4. Visit to slaughter houses.
5. Study of post motem changes.
6. Preparation of sausages, burger, meat balls & kebab.
7. To check freshness of fish.
B.Voc. (Food processing and quality Management) Semester: III

Paper Title: Principles of food processing and preservation

Paper Code: FPQM 305 Credits: 6

Job Role:

Working on different methods of processing of different foods and their preservation techniques.

Objectives:

To understand the basic principles & objectives of food processing.
To study different means of food preservation and their subsequent utilization.

Instructions for Examiner:

1. The syllabus of this paper has been divided into FOUR units.
2. Examiner will set a total of NINE questions comprising Two questions from each unit, including Question No. 1 (compulsory) of short answer type covering the whole syllabus.
3. The students are required to attempt one question from each unit and the entire Compulsory Question No. 1.
4. All questions carry equal marks.

UNIT-I

Introduction- Historical developments of food preservation, Principles of food preservation, benefits of food preservation. Food Spoilage and to study its causes (microbial, physical or chemical)

UNIT-II

Preservation by heat: Heat resistance of microorganisms, thermal death curve, heat treatments and their effects on food- Boiling, steam under pressure, blanching, pasteurization, canning, aseptic packaging, cans and container types, spoilage of canned foods, heat penetration in cans.

UNIT-III

Preservation by low temperature- refrigeration storage, requirements of refrigerated storage, changes of foods during refrigerated storage, refrigeration load, Freezing and frozen storage- Slow and quick freezing, factors determining freezing rate, freezing methods, changes in foods during freezing, frozen food storage, Freezing curve, Intermediate moisture foods- their advantages and problems.
Drying, dehydration and concentration- Types of drying, types of dryers, food concentration and their methods, changes in foods during dehydration and concentration.

UNIT-IV

Microwave Heating- Properties, mechanism and its food applications.
Preservation by radiations- Ultraviolet and ionizing radiations, its applications in foods.
Chemical Preservation: Types, uses and effects of class I & class II preservatives in foods.
Suggested Resources for Reading:

3. The Technology of food preservation by Desrosier and Desrosier.

Practicals:

1. Study of blanching process in vegetables.
2. Dehydration of foods.
3. Preservation of food products by low temperature.
4. Use of chemicals in preservation of food.
5. Microwave cooking of food.
6. Cut out examination of canned foods.
7. Visit to food industry.
B.Voc. (Food processing and quality Management) Semester: IV

Paper Title: Technology of oils and fats processing

Paper Code: FPQM 403 Credits: 6

Job Role:

Oil and fat processing technician is responsible for maintaining the quality of oils and fats used in preparation of various food products.

Objectives:
1. To understand the basic properties of oils and fats.
2. To know their nutritional importance and extraction of oils

Instructions for Examiner:
1. The syllabus of this paper has been divided into FOUR units.
2. Examiner will set a total of NINE questions comprising Two questions from each unit, including Question No. 1 (compulsory) of short answer type covering the whole syllabus.
3. The students are required to attempt one question from each unit and the entire Compulsory Question No. 1.
4. All questions carry equal marks.

UNIT-I
Introduction to oils and fats, physical and chemical properties of oils and fats, Nutritional importance of oils and fats.

UNIT-II
Extraction of oils/fats, refining, degumming, bleaching and deodourization, problems during storage-rancidity and reversion.

UNIT-III
Hydrogenation of oils, fractionation & winterization of oils, functions of oils and fats in food processing: Frying, Cooking and baking, Quality assessment tests of fats and oils, packaging of oils and fats

UNIT-IV
Sources and physic-chemical properties of following oils: animal (butter oil, lard and Tallow) and plant(groundnut, sunflower, soyabean and coconut oil)

Suggested Resources for Reading:
1. Food Chemistry by Meyer LH,2006, CBS Publisher, New Delhi

Practicals:
1. To determine moisture content of oilseeds.
2. To determine FFA (free Fatty acid) of oil.
3. Determination of Iodine value , R.M. value and Polenke value.
4. Detection of adulteration of fats or oil.
5. Visit to vegetable oil factory.
6. To determine fat and moisture of butter.
Job Role:

Spices and flavor technologist is responsible for checking the quality and purity of various spices and flavor to be used in food products.

Objectives:

1. To know various types of spices and flavors.
2. To understand the techniques of processing spices.

Instructions for Examiner:

1. The syllabus of this paper has been divided into FOUR units.
2. Examiner will set a total of NINE questions comprising Two questions from each unit, including Question No. 1 (compulsory) of short answer type covering the whole syllabus.
3. The students are required to attempt one question from each unit and the entire Compulsory Question No. 1.
4. All questions carry equal marks.

UNIT-I

Classification and uses of spices, Chemical constituents of spices, microbial contamination and insect infestation in spices and its control.

UNIT-II

Chemistry & Technology of major spices-pepper, cardamom, ginger & turmeric.

UNIT-III

Chemistry & Technology of minor spices- cumin, coriander, cinnamon, fenugreek, garlic, cloves and vanilla.

UNIT-IV

Cryomilling of spices, spice oleoresins and spice emulsion, essential oils, packaging of spices and spice products. Classification of flavouring compounds, processing of cocoa and coffee, stability of flavourings, present trends in synthesis of volatiles.

Suggested Resources for Reading:

Practicals:

1. Identification of different spices.
2. Determination of moisture in ground spices.
3. Determination of total ash in spices.
4. Determination of extraneous matter in spices.
5. Determination of pungency rating (scoville method) in red pepper.
6. Adulteration tests of different spices.
7. Organoleptic evaluation of flavours.
B.Voc. (Food processing and quality Management)    Semester: IV

Paper Title: Seminars

Paper Code: FPQM -405    Credits: 6

Job Role:

To improve the communicating and presentation skills of the individuals.

Objectives:

To make the student conversant with latest happening in the field of food processing and preservation and to improve their communication skills.