Anekant Education Society's

TULJARAM CHATURCHAND COLLEGE,

BARAMATI, DIST-PUNE – 413102

Revised Proposed Syllabus

For

M. Voc.

(Food Processing Technology)

F.Y (Semester II) (Autonomous)

Sponsored by

University Grant Commission

Under

National Skill Qualification Framework (NSQF)

To be implemented from

2022-23

Title of the Course: M. Voc. (Food Processing Technology)
(To be implemented from Academic Year - 2022-2023)

Course Structure:

- M. Voc. is two year post graduate programme with three general education courses and three skill components courses in each semester
- Each general education course will be of four credits and each credit is of 15 periods.
- Each skill component course will be of six credits and each credit is of 15 periods.
- Each period is of one clock hour.
- In each skill component course there will be one visit to the relevant industry/ institute.
- In addition to the regular practical are based on the theory course, special emphasis will be on communications and soft skills development of the students.

Eligibility:

1) First Year M.Voc. (Post Graduate Diploma): A student who has passed the graduation degree (10+2+3) in any streamor its equivalent examination.
2) Second Year M.Voc. (Post Graduate Degree): Satisfactorily keeping terms of First Year of M. Voc. and if they fulfill the eligibility conditions.

Note: Admissions will be given as per the selection procedure / policies adopted by the college, in accordance with conditions laid down by the Savitribhai Phule Pune University, Pune.

Examination Pattern:

Pattern of Examination: Semester:

- General education courses (Theory paper) - I, II, and III Semester.
- Skill Component (Practical Course): Practical examination will be conducted.
- Weight-age of marks in each course: Internal continues assessment (50%) and end semester examination (50%)

Theory Examination: -

i) Continuous Internal Assessment: 50 Marks (Unit Test I & II, Assignment-2No., Attendance) for each course of programme.

ii) Semester End Examination: 50 Marks on the basis of Answer Sheet Evaluation for each course

Practical Examination: -

i) Continuous Internal Assessment: 75 Marks (Written exams, Visit Report, Journal, Viva Voce, Seminar/Presentation, Group Discussion and Attendance) for each course.

ii) Semester End Examination: 75 Marks on the basis of Answer Sheet Evaluation with performance in practical examination which will be evaluated by external examiner for each course.

Proposed subjects / papers for the General Education & Skill component
Food Processing Technology (M. Voc. Programme)

First year: Semester I

Sr. No.	Subject Name	No. of Credits	Marks
Theory (General Education Component)			
PMFP111	Food Microbiology	4	100
PMFP112	Food Chemistry and Analysis	4	100
PMFP113	Nutrition Science	4	100
Practicals (Skill Component)			
PMFP114	Food Microbiology	6	150
PMFP115	Food Chemistry and Analysis	6	150
PMFP116	Bakery and Confectionery Technology	6	150

Semester II

Sr. No.	Subject Name	No. of Credits	Marks
Theory (General Education Component)			
PMFP121	Beverage and Snack Food Technology	4	100
PMFP122	Food Additives, Contaminants and Toxicology	4	100
PMFP123	Advances in Food Processing & Packaging	4	100
Practicals (Skill Component)			
PMFP124	Beverage and Snack Food Technology	6	150
PMFP125	Processing of Fruits and Vegetables	6	150
PMFP126	Advances in Food Processing & Packaging	6	150

Second year: Semester III

Sr. No.	Subject Name	No. of Credits	Marks
Theory (General Education Component)			
PMFP231	Elective-1: Dairy Processing Technology Elective-2: Meat Processing Technology	4	100
PMFP232	Post-Harvest Technology	4	100
PMFP233	Food Safety and Quality Management	4	100
Practicals (Skill Component)			
PMFP234	Dairy Processing Technology	6	150
PMFP235	Post-Harvest Technology	6	150
PMFP236	Statistics and Research Methodology	4	100
PMFP237	Industrial training/Dissertation part-I	2	50

Semester IV

Sr. No.	Subject Name	No. of Credits	Marks
Practicals (Skill Component)			
PMFP244	Seminar based on case study	6	150
PMFP245	Industrial Visit	6	150
PMFP246	Industrial training/Dissertation Part-2	18	450

Note:

- One compulsory visit to field/industry/institute for practical papers in all semesters
- Report Submission and PPT presentation of visit report is mandatory

- Seminar Report preparation and PPT presentation mandatory for each theory papers.
- Group discussion/case study based on local/regional/national social economic aspects.

F.Y M.Voc Food Processing Technology

First year: Semester I

Sr. No.	Subject Name	No. of Credits	Marks
Theory (General Education Component)			
PMFP111	Food Microbiology	4	100
PMFP112	Food Chemistry and Analysis	4	100
PMFP113	Nutrition Science	4	100
Practicals (Skill Component)			
PMFP114	Food Microbiology	6	150
PMFP115	Food Chemistry and Analysis	6	150
PMFP116	Bakery and Confectionery Technology	6	150

Semester II

Sr. No.	Subject Name	No. of Credits	Marks
Theory (General Education Component)			
PMFP121	Beverage and Snack Food Technology	4	100
PMFP122	Food Additives, Contaminants and Toxicology	4	100
PMFP123	Advances in Food Processing & Packaging	4	100
Practicals (Skill Component)			
PMFP124	Beverage and Snack Food Technology	6	150
PMFP125	Processing of Fruits and Vegetables	6	150
PMFP126	Advances in Food Processing & Packaging	6	150

First Year **Semester II**

PMFP121:Beverages and Snack Food Technology

Theory **Paper No. – FPT-201**

Maximum Marks: 100 **Credits: 4**

Teaching Period: 4/week **Teaching Load: 60 Theory Period/ Semester**

Learning objectives:

- To develop the skills for processing of different types of alcoholic and non-alcoholic beverages with a brief knowledge of packaged drinking water manufacturing industry and Indian snack food markets.

Learning Outcomes:

After learning this subject

1. Students will be able to know different types of beverages found in Indian as well as international market.
2. Students will have better ideas regarding alcoholic and non-alcoholic beverages with water industry.
3. Students will have thorough knowledge of different types of cereal based snacks food items available in market.
4. Students will get brief knowledge of fruits and vegetables based snacks

Unit-I: Introduction to Beverages **12P**

History, status and importance of beverage industry, Present status of beverage industry in India, Types of Beverages, Water for food processing industries.

Unit-II: Processing of beverages **12P**

Juice based beverages processing, Packaged drinking water, Synthetic, still, carbonated, low-calorie and dry beverages, isotonic and sports drinks, dairy based, alcoholic beverages fruit beverages, speciality beverages, tea, coffee, cocoa, spices, plant extracts, etc.

Unit-III: Quality of Beverages **12P**

- FSSAI specifications for beverages, Ingredients, Manufacturing and packaging processes and equipment for different beverages;
- Sweeteners, colorants, acidulants, clouding and clarifying and flavouring agents for beverages Carbon dioxide and carbonation Quality tests and control in beverages;
- Miscellaneous beverages Coconut water, sweet toddy, sugar cane juice, coconut milk, flavoured syrups.

Unit IV: Grain Based Snacks **12P**

Overview of grain-based snacks: whole grains – roasted, toasted, puffed, popped and flakes Coated grains-salted, spiced and sweetened Flour based snack– batter and dough based products; savoury and farsans; formulated chips and wafers, papads.

Unit V: Other Snack Foods **12P**

Technology for fruit and vegetable based snacks: chips, wafers, papads etc. Technology for coated nuts – salted, spiced and sweetened products- chikkis,Sing bhujia, Technology for RTE puffed snack- sand puffing, hot air puffing, explosion puffing, gun puffing etc

PMFP124: Beverages and Snack Food Technology

Learning objectives:

- To learn about manufacturing of different types of beverages.
- To get knowledge about processing of snack food items.

Learning Outcomes:

After learning this subject

- Students will be able to know different types of beverages found in Indian as well as international market.
- Students will have better ideas regarding alcoholic and non-alcoholic beverages with water industry.
- Students will get knowledge of different types of cereal based snacks food items available in market.

Practicals:

1. Quality analysis of water from different sources and treatments 1P
2. Determination of aqueous extraction of tea/coffee 1P
3. Detection of sodium benzoate in beverage 1P
4. Measurement of pH and acidity of beverage 1P
5. Detection of E. coli in beverage 1P
6. Measurement of CO2 content of carbonated beverage 1P
7. Determination of caffeine in beverages 1P
8. Determination of tannins in wine 1P
9. Preparation of Instant Tea/coffee 1P
10. Preparation of carbonated beverage 1P
11. Specifications for different fruit beverages and preparation of fruits squash 1P
12. Preparation of artificial lemon juice 1P
13. Preparation of beverage using artificial sweetener 1P
14. Preparation of cereals based fried snack foods 1P
15. Preparation of legume based fried snack foods 1P
16. Preparation of cereal grain based puffed products 1P

17. To study the effect of frying time and temperature on potato chips 1P
18. Preparation of cereal and legume based roasted snack 1P
19. Physical properties of extruded foods expansion, density, water index etc.) 1P
20. Preparation of protein isolate and concentrate 1P
21. Preparation of noodles/vermicelli 1P
22. Preparation of weaning foods 1P
23. Determination of oil absorption capacity of noodles 1P
24. Effect of extrusion cooking on anti-nutritional factor 1P
25. Visit to bakery, confectionery and extrusion industry 1P
26. Determination of shelf-life and packaging requirements of snack food products 1P
27. Visit to carbonation unit 1P
28. Visit to mineral water plant 1P
29. Visit to industries Manufacturing snack foods. 1P

First Year **Semester II**

PMFP122: Food Additives, Contaminants and Toxicology

Theory **Paper No. – FPT-201**

Maximum Marks: 100 **Credits: 4**

Teaching Period: 4/week **Teaching Load: 60 Theory Period/ Semester**

Learning Objectives:

- To study about different food additives& their functions.
- To learn about toxicants & contamination in food processing industry.

Learning Outcomes:

Students will be,

- Able to get knowledge about different of food additives & their role in food processing industry.
- Understand toxins, contaminants & their hazard to our body.

Unit-1 Introduction to Food Additives

Definitions of Food Additives, Classification and Functions, Legitimate uses of Additives in foods, Intentional & Non Intentional additives, Indirect food additives; Difference between Additives & Adulterants, Food Formulation, Food uses and functions in formulations.

Unit-2 Properties of Additives

Toxicological evaluation of food additives, Acute and chronic studies. LD50. Analytical methods: chemical and instrumental.

Unit-3: Food additives - I

Various additives such as preservatives, antioxidants, emulsifiers, sequestrants, humectants, stabilizers with respect to chemistry, food uses and functions in formulations.

Unit-4:Food additives - II

Colours, flavours, sweeteners, acidulants with respect to chemistry, food uses and functions in formulations, indirect food additives

Unit-5 Food Contaminants

Food contaminants, physical, chemical, microbial and other contaminants; food toxicants.

Suggested Readings

Fennema, O.R. Ed. 1976. Principles of Food Science: Part-I Food Chemistry. MarcelDekker, New York.
Potter, N.N. 1978. Food Science. 3rd Ed. AVI, Westport.
Branen A.L. and Davidson, P.M. 1983. Antimicrobials in Foods. Marcel Dekker, NewYork.
Furia, T.E. 1980, Handbook of food additives, Vol I and Vol II.

PMFP125-Processing of Fruits and Vegetables

Learning Objectives:

- To impart knowledge of different methods of fruits and vegetable processing.
- To develop the skills for processing of fruit vegetable based products.

Learning Outcome:

- Students will have a thorough understanding of various food processing techniques.
- The students will know the preparation of various food products.

1.	Determination of Total Soluble Solids	1P
2.	Preparation of mixed fruit Jam	1P
3.	Preparation of Blended juice	1P
4.	Preparation of Jelly	1P
5.	Preparation of RTS	1P
6.	Preparation of Squash	1P
7.	Preparation of Syrup	1P
8.	Preparation of Fruit butter	1P
9.	Preparation of Fruit toffee	1P
10.	Preparation of Tomato-Chilli sauce	1P
11.	Preparation of Mushroom pickle	2P
12.	Preparation of Potato flour	2P
13.	Preparation of mango slices (Amchur)	1P

14.	Preparation of Ginger candy	2P
15.	Preparation of Frozen peas	2P
16.	Preparation of guava cheese	1P
17.	Preparation of petha	2P
18.	Preparation of fruit candy	2P
19.	Adulteration of spices	2P
20.	Visit to Fruit & Vegetable Processing Industries	2P
21.	Preparation of visit report & presentation	2P

First Year **Semester II**

PMFP123: Advances in Food Processing and Packaging

Theory **Paper No. – FPT-203**

Maximum Marks: 100 **Credits: 4**

Teaching Period: 4/week **Teaching Load: 60 Theory Period/ Semester**

Learning objectives:

To impart the basic knowledge of:

- Cold preservation and freezers
- Dehydration
- Irradiation
- Food Packaging
- Thermal Processing

Learning Outcomes:

1. Students will be able to understand major food preservation and Packaging techniques, and underlying principles.
2. Students will be able to determine suitable methods of processing and Packaging techniques for a chosen food
3. Students will be able to understand Novel food processing methods like thermal processing, cold preservation etc.
4. Students will be able to understand operations involved in packaging material manufacturing
5. Students will be able to understand major packaging material and methods used in food packaging

Unit I: Preservation by low temperature

Freezing: requirements of refrigerated storage-controlled low temperature, air circulation and humidity, changes in food during refrigerated storage, progressive freezing, changes during freezing-concentration effect and ice crystal damage, freezer burn. Refrigeration

load, factors determining freezing rate-food composition and non -compositional influences.

Unit II: Thermal and Non-Thermal Processing

Introduction, classification of Thermal Processes, Principles of thermal processing, Thermal resistance of microorganisms, Thermal death time, Lethality concept, Characterization of heat penetration data, Thermal process Calculations.

Unit III: Food Irradiation and Microwave Heating

Ionizing radiation and sources, unit of radiations, direct and indirect radiation effects, safety and wholesomeness of irradiated food. Microwave heating and applications, High pressure processing, Hurdle Technology, Cold plasma.

Unit IV: Packaging of Foods

Packaging: Properties of packaging material, factors determining the packaging requirements of various foods and brief description of packaging of frozen products, dried products, fats and oils and thermally processed foods.

Unit V: Advances in packaging technology

Introduction, Active packaging, Modified atmospheric packaging, Aseptic packaging, packages for microwave ovens, Biodegradable plastics, Edible gums, Coatings.

Packaging equipment and machinery-Vacuum packaging machine, CA and MA packaging machine, Gas packaging machine, Seal and shrink packaging machine. Form and fill sealing machine, Aseptic packaging systems, Retort pouches, Bottling machines, Package printing machines.

PMFP126- Advances in Food processing and packaging

Learning objectives:

- To get knowledge of low & high temperature methods.
- To learn about dehydration techniques & food packaging.

Learning Outcomes:

- Students will be able to determine suitable methods of processing and Packaging techniques for a chosen food
- Students will be able to understand Novel food processing methods like thermal processing, cold preservation etc.

- Students will be able to understand major packaging material and methods used in food packaging.

Practical:

1. Comparison of conventional and microwave processing of food
2. Low Temperature processing
    - Experiment on storage of leafy vegetables, fruits, perishable produce at refrigerated temperature, cold storage, and chilling temperature.
    - By using appropriate pre-processing and various packaging materials.
3. Frozen food processing
    - Experiments on processing of Fruit pulp ,fruits, vegetables, eatables by using appropriate packaging and freezing
    - Quality evaluation and storage studies
4. Drying of food using tray dryer/ other dryers
5. Preservation of food by using canning (Fruit/Vegetable)
6. Osmotic dehydration
7. Identification and testing of packaging materials
8. Determination of tensile strength of given packaging material
9. Cut out analysis of canned food
10. Determining water absorption capacity of packaging material
11. Determining bursting strength of packaging material
12. Determining tearing strength of packaging material
13. To perform vacuum packaging of food sample and carry out its storage study
14. Testing of lacquered tin plate sheets
15. Determination of water vapour transmission rate of package films
16. Pre-packaging practices followed for packaging fruits and vegetables
17. Packaging and labeling of the product-packaging design, graphics, labeling
18. Visit to packaging industry & prepare report on market survey.
19. Preparation of album of different packaging material