Mahatma Gandhi Vidyamandir's

Arts, Science and Commerce College, Manmad
Tal. Nandgaon, Dist. Nashik (Maharashtra), 423104

Syllabus For

Community College Diploma Course
In
Food Processing (Agriculture)

Under

National Skill Qualification Framework (NSQF)

Details about Structure/Pattern of Syllabus:

1. **Title of the Course:** FOOD PROCESSING (Agriculture)
2. **Course Level:** Diploma
3. **Syllabus to be implemented from the Academic year**: 2019-20
4. **Preamble of the Syllabus** :-
5. It has been a long felt necessity to align higher education with the emerging needs of the economy so as to ensure that the graduates of higher education system have adequate knowledge and skills for employment and entrepreneurship. The higher education system has to incorporate the requirements of various industries in its curriculum, in an innovative and flexible manner. The University Grants Commission (UGC) has launched a scheme on skills development based higher education as part of college/university education, leading to Community College, under the NSQF (National Skills Qualifications Framework). The course content is developed based on NVEQF (National Vocational Educational Qualification Framework), NSQF, CBCS (Choice Based Credit System) & Industry requirements.
6. **Faculty of the Course :** Science & Technology
7. **Eligibility for Admission :**10+2 pass
8. **Duration of the Course**: One Year
9. **Intake Capacity of Students: 50**
10. **Examination**:
    - I. **Pattern of Examination**Annual Pattern
        - i. Internal exam, Term end exam, Practical, Oral, Project.
        - ii. Pattern of the question paper: As per University rules
    - II. **Standard of Passing:**As per Pune University norms
    - III. **ATKT Rules**: As per Pune University norms
    - IV. **Award of Class:** The Certification Levels Will lead to Diploma

Award	Duration	Total Credits for Award
Diploma	2 Semester	60

    - V. **External Students**:Not permitted
    - VI. **Setting of Question Paper/Pattern of Question Paper**: As per Pune University norms
    - VII. **Verification/Revaluation**: As per Pune University norms
11. **Structure of the Course**:
    - I. **Compulsory Paper**: All Papers are Compulsory
    - II. **Optional Paper**: None
    - III. **Question Paper** : As per Pune University norms

Medium of Instructions: English, Marathi

COURSE: FOOD PROCESSING

SEMESTER-I

Course Code	Title	Credits		Hours / Week	
		General Education (Theory)	Skill Component (Practical)	General Education (Theory)	Skill Component (Practical)
FP-11	Food Science&Food Preservation	4	6	4	12
FP-12	Agro Processing	4	6	4	12
FP-13	Bakery & Confectionery	4	6	4	12
	Total	**12**	**18**	**12**	**36**

SEMESTER-II

Course Code	Title	Credits		Hours / Week	
		General Education (Theory)	Skill Component (Practical)		
FP-21	Food Quality & Safety	4	6	4	12
FP-22	Milk and Milk Product Processing	4	6	4	12
FP-23	Grape Processing	4	6	4	12
	Total	**12**	**18**	**12**	**36**

FP = Food Processing

FP11- Food Science&Food Preservation

Objectives:

To enable students to

1) Understand the basic concept, functions, and classification of food.
2) To acquire knowledge of food preservation and preservation technique.
3) To know the importance and basic principles of food preservation.

Course content:

Unit I - Introduction to food science&Cereals

- Concept of food, food science
- Objectives of food science
- Classification and Functions of food
- Structure, composition and Importance of cereal grains
- Types of cereals used in cooking
- Cereal cookery- Gelatinization, Dextrinization and Identity ofgrain
- Processed cereals, millets and Ready-To- Eat cereals used incooking

Unit – II- Pulses, Legumes&Fruits, Vegetables Cookery

- Definition, composition and structure of pulses
- Cooking of Legumes and Factors Affecting cooking time ofpulses and legumes
- Uses of legumes in cookery
- Classification of Fruits and vegetables
- Colour pigments in Fruits and vegetables
- Effect of heat, acids and alkali on Fruits and vegetables
- Changes during cooking and storage

Unit - III - Introduction to food preservation &Preservation by drying

- Concept, importance of food preservation.
- Principles of preservation.
- Preservation techniques.
- Concept, history
- Types of drying and dryers.

- Treatments prior to drying

Unit – III - Preservation by use of high temperature &Low Temperature

- Concept and importance
- Various methods used – Pasteurization, Boiling, Canning
- Effect of high temperature on food.
- Concept, History
- Types of preservation methods by low temperature
- Different equipments used for preservation by low temperature
- Treatments prior to freezing

Practical:

1) Weights and Measures of raw and cooked food.
2) Preparation of product by Gelatinization.
3) Preparation of product by Dextrinization
4) Preparation of product by Germinated pulses
5) Preparation of product by milled pulses
6) Preparation of product by green leafy vegetable
7) Preparation of product by roots and tuber
8) Preparation of product by fruits
9) Introduction to drying equipments
10) Preparation of food product by drying
    i) Onion flakes
    ii) Raw mango powder / Leafy vegetable powder
    iii) Papad and chips
11) Blanching of vegetables
12) Introduction to freezing equipments
13) Preservation by using chemical preservatives
    i) Tomato ketchupii) Fruit squash
14) Preparation of product by using salt as preservative
15) Preparation of product by using sugar as preservative
16) Preparation of product by using oil as preservative

References:

1) B. Shreelaksmi : ``Food Science'' (second edition), New Age International, New Delhi.

2) Swaminathan : ``Text book of Food Science'', Vol-1, BAPPCO, Banglore

3) Devendrakumar Bhatt &PriyankaTomar : An Introduction to Food Science, Technology& Quality Management, Kalyani Publishers.

4) Sumati R. Mudambi : Fundamentals of Food & Nutrition wiley Eastern Ltd., New Delhi.

5) Philips T E, Modern Cooking for teaching and trade, Volit orient longman, Bombay

6) PrakashTriveni : Food Preservation, Aadi Publication, Delhi.

7) M. ShafiurRahman : Hand Book of Food Preservation, Marcel Dekker Inc, New york.

8) McWillims and Paine : Modern Food Preservation, Surjeet Publication.

9) Fellows ,P. and Eills H. 1990 Food Processing Technology: Principles and Practicals, NewYork

10) NPCS Board, Modern Technology on Food Preservation

11) B. Sivasankar: Food Processing and Preservation

FP12-Agro Processing

Objectives:

To enable students –

1) To understand the processing techniques of agro products.

2) To know the use of agro processing equipments.

Course Content:

Unit I - Agro processing industry.

- Introduction to Agro processing industry.
- Scope and importance of Agro processed products.
- Processing equipments – Floor mill, mini grain mill pulverizers, Hammer mill, Floor separator, Dal mill, Packing and Sealing machine, Balance

Unit – II - Cereal grain Processing

- Different grains suitable for agro processing.
- Primary processing of major cereals
- Milling of cereals- Dry and Wet milling

Unit – III - Pulses and Legumes processing

- Principles of pulse milling
- Different methods of Dhal milling
- Milling of major legumes

Unit IV - Oil seeds Processing

- Properties and suitability of oil seeds for processing
- Methods of oilseed processing
- Terminologies in oil processing industry

Practicals:

1) Physical analysis of grains

2) Flour Analysis

3) Starch Estimation of wheat flour

4) Preparation of Cereal flour of different granule size

5) Preparation of Cereal flakes

6) Preparation of Puffed cereals

7) Preparation of Dal

8) Preparation of Pulse flour of different granule size

9) Preparation of soy milk

10) Preparation of Peanut butter

Reference:

1) Kader A A: Post harvest technology of horticultural crops. 2nd edition, University ofCalifornia

2) Salunkhe D K and Kadam S S: handbook of world food legumes, CRC Press, Florida

3) NiirBoard : Modern Technology of Agro processing and Agricultural waste, NationalInstitute of India Re 2000.

4) Salunkhe D K, Chavan J K, Adsule R N and Kadam S S : World oilseeds chemistry,technology and utilization. VNR, New York

FP13-Bakery & Confectionery

Objective:

To enable students –

1) to develop skill in Bakery & Confectionery

Course content:

Unit – I - Introduction to bakery and confectionery industry

- Importance of bakery and confectionery in food industry
- Primary processing equipments used in Bakery and Confectionery- Flour Mill, mixer, moulding machine, balance, packing machines, measuring glass, moulds, knifes, extruder, oven

Unit II - Bakery Products

- Ingredients used in Bakery products
- Types and quality of flour
- Principle involved in bakery products
- Procedures of Different types of bakery products

Unit – III - Introduction to confectionary products

- Types of confectionary products
- Characteristics of confectionary products
- Ingredients used in confectionary products

Unit – IV - Confectionary Products

- Chocolate Processing
- Boiled Sweets
- Gelatine Sweets
- Crystallized confectionery

Practical:

1) Introduction to Bakery and Confectionery Equipments
2) Determination of Gluten content
3) Preparation of Bread

4) Preparation of Cake

5) Preparation of Biscuits

6) Preparation of Cookies

7) Preparation of Chocolate

8) Preparation of Boiled candy

9) Preparation of Toffee

10) Preparation of Fudge

References:

1) John Kingslee: A professional text to bakery and confectionary, New Age InternationalPublication.

2) NIIR Board: The complete technology book on bakery products

3) W.P. Edwards : Science of Bakery Products.

4) EmmanuealObene : Chocolate science and Technology

FP21- Food Quality & Safety

Objectives:

To enable students –

1. to understand the concept of nutrients.
2. to study the role of various nutrients.
3. to understand concept of sampling and quality of the foods.
4. to study the working of equipments for quality control of food products.

Course content:

Unit – I - Introduction to Nutrition&Macro nutrients

- Definition of nutrition, nutrients, RDA
- Classification of nutrients (Macro, Micro)
- Classification, Sources
- Functions, RDA
- Deficiency, excess

Unit – III - Micro nutrients&Water

- Classification, Sources
- Functions, RDA
- Deficiency, excess
- Composition, Sources, Classification
- Functions, RDA
- Deficiency, excess

Unit – III - Introduction to Quality Control in the food industry

- General concepts of quality and quality control
- Major quality control functions
- Sampling of Food
- Sample Selection and Sampling Plans
- Preparation and storage of Laboratory Samples
- Sampling Methods

Unit – IV- Standard tests for quality assessment

- Physical Tests
- Chemical tests
- Microbiological tests
- Sensory analysis

Unit – V- Waste Management in Food Industry

- Types of waste generated: non-degradable &biodegradablewastes
- Methods of utilizing wastes to make value added products
- Waste storage and disposal methods
- Storage and disposal of liquid and gaseous waste- land-filling, burial, incineration, recycling, biological treatment of food industry wastes.
- Storage and disposal of liquid and gaseous waste

Unit - VI- Food Laws and Standards

- Existing food laws and standards in India
- Concept and application of ISO and HACCP

Practical:

1. Determination of Moisture content of food
2. Determination of Fat content of food
3. Determination of protein content of food
4. Determination of crude fiber content of food
5. Determination of ash content of food
6. Determination of Total Plate Count
7. Determination of Yeast and Mould Count
8. Sensory analysis of food products
9. Study of solid waste disposal methods
10. Study of liquid waste disposal methods
11. Preparation of list of nutrient rich food sources (Carbohydrates, proteins, fats)
12. Calculation of nutritive value of foods

13. Preparation of high carbohydrate product from cereals with calculation of nutritive value

14. Preparation of high fibre product with calculation of nutritive value

15. Preparation of high protein product from plant source with calculation of nutritive value

16. Preparation of high protein product from animal source with calculation of nutritive value

17. Preparation of high fat product with calculation of nutritive value

18. Preparation of low fat product with calculation of nutritive value

References:

1. Philip,A.C. Reconceptualizing quality. New Age International Publishers,Banglore. 2001.

2. Bhatia,R. and Ichhpujan,R.L. Quality assurance in Microbiology. CBS Publishers and Distributors, New Delhi. 2004.

3. Kher, C.P. Quality control for the food industry. ITC Publishers, Geneva. 2000.

4.Shubhangini Joshi, Textbook of food and nutrition, Tata Macgrohill Publishing Co., NewDelhi.

5. B. Shrilakshmi, Nutrition Science, New Age International Publishers

6.Muddambi S.R. and Rajgopal M. V., Fundamentals of Food and Nutrition, Wiley EasternLtd., New Delhi.

7. Nutritive Value of Indian Foods, NIN, Hyderabad.

FP22-Milk and Milk Product Processing

Objectives:

To enable students –

1. to understand techniques in Milk and Milk Product processing
2. to study the working of equipments used in Milk and Milk Product Processing

Course content:

Unit – I - Introduction to Milk and milk products

- Definition, Production and Processing status of milk
- Physio-chemical properties
- Composition and Nutritive value

Unit – II - Processing of milk

- Pasteurisation
- Sterilization
- Dehydration

Unit – III - Special Milks

- Re-constituted or Re-hydrated milk
- Condensed milk, Toned milk and Flavoured milk
- UHT Milk

Unit – IV - Milk Products

- Dahi, Chakka, Shrikhand
- Butter, Butter Milk, Butter Oil, Lassi
- Channa, Paneer, Rasogolla
- Khoa and Basundi
- Ice-cream and Cheese

Practical:

1) Physical examination of milk

2) Platform tests of milk

3) Determination of Fat content of milk

4) Preparation of Flavoured milk

5) Preparation of Condensed milk

6) Preparation of Curds and Shrikhand

7) Preparation of Khoa

8) Preparation of Gulabjamun

9) Preparation of Paneer

10) Preparation of Rasgulla

11) Preparation of Ice-cream and Kulfi

Reference:

1) Dey S., 1994, Outlines of Dairy Technology, Oxford Univ. Press, New Delhi.

2) Rosenthal I., 1991, Milk and Milk Products, VCH, New York.

3) Robinson R. K., (2 vol. set), 1986, Modern Dairy Technology, Elsevier Applied Science, UK.

4) Warnar J. M., 1976, Principles of Dairy Processing, Wiley Eastern Ltd, New Delhi

FP23-Grape Processing

Objectives:

To enable students –

1. to understand techniques in grape processing.
2. to study the procedures for preparation of grape products.

Course content:

Unit – I - Introduction to Grape Processing

- Types of Grapes
- Harvesting and Maturity Indices of grapes for processing
- Composition of grape
- Recent trends in grape processing

Unit – II - Raisin Processing

- Selection and preparation of grape for raisin processing
- Pre-treatments used in raisin processing
- Drying methods
- Grading of Raisin (By colour and size)

Unit – III - Packaging of Raisin

- Packaging materials used
- Packaging methods used
- Equipments used in raisin processing and packaging

Unit – IV - Beverages

- Non-alcoholic beverages
- Alcoholic beverages
- Packaging material and methods
- Equipments used in beverage processing

Practical:

1. Selection of grapes for various grape products
2. Determination of TSS, pH and Acidity of grape
3. Preparation of Raisin from different variety of grapes

4. Preparation of grape juice
5. Preparation of grape RTS
6. Preparation of grape squash
7. Preparation of grape Syrup
8. Preparation of grape crush
9. Preparation of grape nectar
10. Preparation of grape wine

References:

1) Lal G., Siddhappa G., Tondon G. L., 1986, Preservation of fruits and vegetables, ICAR, NewDelhi.

2) Shrivastava, R. P. and Kumar. S., 1998, Fruit and Vegetable Preservation: Principles and Practices, 2nd Edition, International Book Distribution Co., Lakhanow.

3) Salunkhe, D. K., and Kadam S. S., Ed 1995, Handbook of Fruit Science and Technology:Production, Composition and Processing, Marcel Dekker, New York.