



Anekant Education Society's

**Tuljaram Chaturchand College,
Baramati**

(Autonomous)

**Three Year B.Voc Degree Program in
Food Technology & Research**

(Faculty of Food Technology & Research)

FY B.Voc (Food Technology) Semester –I

For Department Food Technology & Research

**Tuljaram Chaturchand College,
Baramati**

To be implemented from Academic Year 2019-20

Title of the Programme: FY B.Voc (Food Technology & Research)

**Anekant Education Society's
TULJARAM CHATURCHAND COLLEGE, BARAMATI
DIST-Pune-413102**

Autonomous

First Year: Semester-I

| Subj. Code | Subject Name | No. of Credits | Marks |
|------------------------------------|---------------------------------|----------------|-------|
| Theory (General Component) | | | |
| FP-1 | Principles of Food Preservation | 4 | 100 |
| FP-2 | Food Microbiology - I | 4 | 100 |
| FP-3 | Food Science - I | 4 | 100 |
| Practical (Skill Component) | | | |
| FP-1.1 | Principles of Food Preservation | 6 | 150 |
| FP-1.2 | Computer Application | 6 | 150 |
| FP-1.3 | Food Science-I | 6 | 150 |

First Year: Semester-II

| Subj. Code | Subject Name | No. of Credits | Marks |
|------------------------------------|------------------------|----------------|-------|
| Theory (General Component) | | | |
| FP-4 | Nutrition Science | 4 | 100 |
| FP-5 | Food Microbiology-II | 4 | 100 |
| FP-6 | Food Science - II | 4 | 100 |
| Practical (Skill Component) | | | |
| FP-2.1 | Nutrition Science | 6 | 150 |
| FP-2.2 | Food Microbiology-II | 6 | 150 |
| FP-2.3 | Soft Skill Development | 6 | 150 |

Second Year: Semester-III

| Subj. Code | Subject Name | No. of Credits | Marks |
|------------------------------------|---|----------------|-------|
| Theory (General Component) | | | |
| FP-7 | Processing of Fruits, Vegetables & Plantation Crops | 4 | 100 |
| FP-8 | Food Analytical Techniques | 4 | 100 |
| FP-9 | Food Chemistry-I | 4 | 100 |
| Practical (Skill Component) | | | |
| FP-3.1 | Processing of Fruits, Vegetables & Plantation crops | 6 | 150 |
| FP-3.2 | Food Analytical Techniques | 6 | 150 |
| FP-3.3 | Fundamentals in Bio-Statistics | 6 | 150 |

Second Year: Semester-IV

| Subj. Code | Subject Name | No. of Credits | Marks |
|-----------------------------------|---|----------------|-------|
| Theory (General Component) | | | |
| FP-10 | Processing of Cereal, Pulses and Oilseeds | 4 | 100 |
| FP-11 | Bakery and Confectionery Technology | 4 | 100 |

| | | | |
|------------------------------------|---|---|-----|
| FP-12 | Food Chemistry-II | 4 | 100 |
| Practical (Skill Component) | | | |
| FP-4.1 | Processing of Cereal, Pulses and Oilseeds | 6 | 150 |
| FP-4.2 | Bakery and Confectionary Technology | 6 | 150 |
| FP-4.3 | Food Chemistry -II | 6 | 150 |

Third Year: Semester-V

| Subj. Code | Subject Name | No. of Credits | Marks |
|------------------------------------|--------------------------------------|----------------|-------|
| Theory (General Component) | | | |
| FP-13 | Dairy Technology | 4 | 100 |
| FP-14 | Food Quality and Safety Management | 4 | 100 |
| FP-15 | Principle of Post-Harvest Technology | 4 | 100 |
| Practical (Skill Component) | | | |
| FP-5.1 | Dairy Technology | 6 | 150 |
| FP-5.2 | Entrepreneurship Development | 6 | 150 |
| FP-5.3 | Project | 6 | 150 |

Third Year: Semester-VI

| Subj. Code | Subject Name | No. of Credits | Marks |
|------------------------------------|-----------------------------------|----------------|-------|
| Theory (General Component) | | | |
| FP-16 | Animal Product Technology | 4 | 100 |
| FP-17 | Food Safety, Hygiene & Sanitation | 4 | 100 |
| FP-18 | Packaging Technology | 4 | 100 |
| Practical (Skill Component) | | | |
| FP-6.1 | Animal Product Technology | 6 | 150 |
| FP-6.2 | Packaging Technology | 6 | 150 |
| FP-6.3 | Internship | 6 | 150 |

Title of the Course: B. Voc. (Food Processing & Post Harvest Technology)
(To be implemented from Academic Year - 2019-2020)

Course structure:

- B. Voc. is three year degree programme with three theory and three practical courses in each semester.
- Each theory course will be of four credits and each credit is of 15 periods
- Each practical course will be of six credits and each credit is of 15 periods
- Each period is of one clock hour.
- In each practical course, there will be one visit to the relevant industry/ institute.
- In addition to the regular practicals based on the theory course, special emphasis will be on communications and soft skills development of the students.

Eligibility:

- 1) **First Year B.Voc. (Diploma):** A student who has passed the Higher Secondary School Certificate (10+2) in any stream or its equivalent examination
- 2) **Second Year B.Voc. (Advanced diploma):** Keeping terms of First Year of B. Voc. and if they fulfill the eligibility conditions.
- 3) **Third Year B.Voc. (Degree):** Student shall pass all First Year B. Voc. courses and satisfactorily keeping terms of Second Year of B. Voc.

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

Examination Pattern:

Examination:

➤ **Pattern of Examination.**

- i) Internal exam, Term end exam, Oral, Project, Presentation, GD, Viva voce
- ii) Pattern of the question paper:

- i) 25% Objective Question
- ii) 50% Short and Long Answer type question
- iii) 25% Problem based Case Study/long answer type

➤ **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.

Programme Specific Outcomes (PSOs)

| | | |
|--------------|---|--|
| PO-1 | Disciplinary Knowledge | Understand the basic concepts, fundamental principles and experimental findings and the scientific theories related to food technology, food science and food technology & engineering and its other fields related to the program. |
| PO-2 | Communication Skills | Develop various communication skills such as reading, listening and speaking skills to express ideas and views clearly and effectively. |
| PO-3 | Critical Thinking | Propose novel ideas in explaining the scientific data, facts and figures related to science and technology. |
| PO-4 | Analytical Reasoning and Problem Solving | To enable the students with good scientific and engineering knowledge so as to comprehend, design, and create food products and devices for the food industry and provide solutions for the challenges in the food industry as well as in agriculture. |
| PO-5 | Sense of Inquiry | Curiously ask relevant questions for better understanding of fundamental concepts and principles, scientific theories and applications related to the study. |
| PO-6 | Use of Modern Tools | Operate modern tools, equipment, instruments and laboratory techniques to perform the experiments and write the programs in different languages. |
| PO-7 | Research Skills | Understand how to design, collect, analyze, interpret and evaluate information/data that is relevant to food technology. |
| PO-8 | Application of Knowledge | Develop a scientific outlook and apply the knowledge with respect to food technology. |
| PO-9 | Ethical Awareness | To train students in professional and ethical attitude, effective communication skills, teamwork skills and multidisciplinary approaches related to food technology and engineering. |
| PO-10 | Teamwork | Understand the basic concepts, fundamental principles and experimental findings and the scientific theories related to food technology, food science and food technology & engineering and its other fields related to the program. |
| PO-11 | Environment and Sustainability | Develop various communication skills such as reading, listening and speaking skills to express ideas and views clearly and effectively. |
| PO-12 | Lifelong Learning | Propose novel ideas in explaining the scientific data, facts and figures related to science and technology. |

First Year

Semester I

Theory Paper No, FP-1, Principles of Food Preservation

Maximum Marks: 100

Credits: 4

Teaching Period: 4 /week

Teaching Load: 60 Theory Period/Semester

Learning Objectives:

- To study importance of shelf life and preservation of foods
- To study traditional methods of food preservation
- To study different modern methods of food preservation
- To develop the skills for processing of food after postharvest
- To learn various types of food preservatives
- To study current scenario of food preservation

Course Outcomes:

CO1: Students will have a thorough understanding of various food processing techniques.

CO2: The students will know the importance of various preservation techniques.

CO3: The students will know about traditional methods of food preservation

CO3: Students will have thorough knowledge of emerging preservation techniques

CO4: Students will get practical skills for processing of food after postharvest

CO5: Students will have a thorough understanding of types of food preservatives

CO6: Students will get thorough knowledge of current scenario of food preservation

CO7: Students will know importance of various packaging and processing methods in food preservation

TOPIC-

Unit-1: Introduction to Preservation

10 Periods

Definition, Introduction to preservation, History of preservation, general principles of food preservation, Need & benefits of industrial food preservation & Methods of Preservation

Unit-2: Preservation by drying

15 Periods

Types of drying, changes during drying, effect of drying on food, advantages and disadvantages of drying

Unit-3: Preservation by High & Low temperature

15 Periods

Preservation by high temperature: Blanching, pasteurization & Canning, Effect of heat on food and micro-organisms

Preservation by low temperature: Chilling, Refrigeration & freezing Effect of low temperature on food & microorganisms

Unit-4: Preservation by Irradiation & Non Thermal Methods

10 Periods

Introduction & units of irradiation, mechanism of action of radiation, radiation process, effect of radiation on food, effect of radiation on micro-organisms, Non-thermal methods

Unit-5: Preservation by other methods

10 Periods

Definition of preservative, Types of preservatives- Class I & Class II, Carbonation, Antibiotics, Fermentation & Filtration

References:

- Food Facts & Principles – N. Shakuntala Manay, M. Shadaksharswamy
- Food Science – Sumati R. Mudambi, Shalini M. Rao, M.V.Rajagopal
- Essentials of Food Science – Vickie A. Vaclavik, Elizabeth W. Christian
- Food Science (Vth edition) – Norman N. Potter and Joseph H. Hotchkiss (CSB Publishers and Distributors, New Delhi, 1996)
- Food Preservation, Desorier
- Unit Operations by Brennan & Cowell Lilly

| CO/ PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|-----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| CO1 | 3 | - | - | - | 4 | - | - | - | 3 | 3 | - | - |
| CO2 | 1 | 1 | 2 | - | - | 3 | - | - | - | 1 | 1 | - |
| CO3 | - | 1 | - | 2 | 1 | - | - | 3 | - | - | 1 | - |
| CO4 | 1 | - | 2 | - | - | - | 1 | - | - | 1 | - | 2 |
| CO5 | 2 | - | - | - | 1 | - | - | 2 | 1 | 2 | - | - |
| CO6 | 1 | 5 | - | - | 1 | - | - | - | 1 | 1 | 5 | - |
| CO7 | - | - | 1 | - | - | - | - | - | 1 | - | - | - |

Justification for the mapping

PO1:- Disciplinary Knowledge - Understand the basic concepts, fundamental principles and experimental findings and the scientific theories related to food technology, food science and Food technology & engineering and its other fields related to the program.

CO1: Students will have a thorough understanding of various food processing techniques, by using various equipment's and also by using traditional methods.

CO2: The students will know the importance of various preservation techniques like preservation by salt, sugar oil and other various preservation techniques.

CO4: Students will get practical skills for processing of food after postharvest like preparation of various food products.

CO5: Students will have a thorough understanding of types of food preservatives like natural preservatives, chemical preservatives and their uses, advantages disadvantages etc.

CO6: Students will get thorough knowledge of current scenario of food preservation.

PO2:- Communication Skills:- Develop various communication skills such as reading, listening and speaking skills to express ideas and views clearly and effectively.

CO2: The students will know the importance of various preservation techniques like preservation by salt, sugar oil and other various preservation techniques.

CO3: The students will know about traditional methods of food preservation and they can express their new ideas for preservation.

CO6: Students will get thorough knowledge of current scenario of food preservation, and they can communicate with the industries.

PO3- Critical Thinking :- Propose novel ideas in explaining the scientific data, facts and figures related to

Science and technology.

CO2:The students will know the importance of various preservation techniques like preservation by salt, sugar oil and other various preservation techniques.

CO4: Students will get practical skills for processing of food after postharvest like preparation of various food products and get knowledge about machines.

CO7: Students will know importance of various packaging and processing methods in food preservation so they can think about more packaging materials and processing.

PO4- Analytical Reasoning and Problem Solving- To enable the students with good scientific and engineering knowledge so as to comprehend, design, and create food products and devices for the food industry and provide solutions for the challenges in the food industry as well as in agriculture.

CO2:The students will know the importance of various preservation techniques like preservation by salt, sugar oil and other various preservation techniques.

PO5- Sense of Inquiry:- Curiously ask relevant questions for better understanding of fundamental concepts and principles, scientific theories and applications related to the study.

CO1: Students will have a thorough understanding of various food processing techniques, by using various equipment's and also by using traditional methods.

CO3: Students will have thorough knowledge of emerging preservation techniques

CO5: Students will have a thorough understanding of types of food preservatives like natural preservatives, chemical preservatives and their uses, advantages disadvantages etc.

CO6: Students will get thorough knowledge of current scenario of food preservation.

PO6- Use of Modern Tools:-

Operate modern tools, equipment, instruments and laboratory techniques to perform the experiments and write the programs in different languages.

CO2:The students will know the importance of various preservation techniques like preservation by salt, sugar oil and other various preservation techniques.

PO7- Research Skills:- Understand how to design, collect, analyze, interpret and evaluate information/data that is relevant to food technology.

CO4: Students will get practical skills for processing of food after postharvest like preparation of various food products.

PO8- Application of Knowledge:- Develop a scientific outlook and apply the knowledge with respect to food technology.

CO3: Students will have thorough knowledge of emerging preservation techniques so they can get knowledge about different scientific preservation techniques.

CO5: Students will have a thorough understanding of types of food preservatives like natural preservatives, chemical preservatives and their uses, advantages disadvantages etc.

PO9- Ethical Awareness- To train students in professional and ethical attitude, effective communication skills, team work skills and multidisciplinary approaches related to food technology and engineering.

CO1: Students will have a thorough understanding of various food processing techniques, by using various equipment's and also by using traditional methods.

CO5: Students will have a thorough understanding of types of food preservatives like natural preservatives, chemical preservatives and their uses, advantages disadvantages etc.

CO6: Students will get thorough knowledge of current scenario of food preservation.

CO7: Students will know importance of various packaging and processing methods in food preservation so they can think about more packaging materials and processing.

PO10:- Team Work - Understand the basic concepts, fundamental principles and experimental findings and the scientific theories related to food technology, food science and Food technology & engineering and its other fields related to the program.

CO1: Students will have a thorough understanding of various food processing techniques, by using various equipment's and also by using traditional methods.

CO2: The students will know the importance of various preservation techniques like preservation by salt, sugar oil and other various preservation techniques.

CO4: Students will get practical skills for processing of food after postharvest like preparation of various food products.

CO5: Students will have a thorough understanding of types of food preservatives like natural preservatives, chemical preservatives and their uses, advantages disadvantages etc.

CO6: Students will get thorough knowledge of current scenario of food preservation.

PO11:- Environment and Sustainability:- Develop various communication skills such as reading, listening and speaking skills to express ideas and views clearly and effectively.

CO2: The students will know the importance of various preservation techniques like preservation by salt, sugar oil and other various preservation techniques.

CO3: The students will know about traditional methods of food preservation and they can express their new ideas for preservation.

Po12:- Lifelong Learning:- Propose novel ideas in explaining the scientific data, facts and figures related to Science and technology.

CO2: The students will know the importance of various preservation techniques like preservation

by salt, sugar oil and other various preservation techniques.

CO4: Students will get practical skills for processing of food after postharvest like preparation of various food products and get knowledge about machines.

CO7: Students will know importance of various packaging and processing methods in food preservation so they can think about more packaging materials and processing.

First Year

Semester I

Theory Paper No, FP-2, Food Microbiology –I

Maximum Marks: 100

Credits: 4

Teaching Period: 4 /week

Teaching Load: 60 Theory Period/Semester

Learning Objectives:

- To learn importance and role of microorganism in food technology
- Learn about the morphology of different microorganisms
- To study harmful and beneficial microorganisms
- To study emerging technologies related to microbes
- Study the spoilage caused by microorganism
- Learn about important microorganisms used in food processing industry

Course Outcome:

CO1:Students will know role of microbes in food technology

CO2:Students will have a thorough understanding of microbes responsible for food spoilage.

CO3:The students will know the specifications of various contamination sources and disease developed in certain processed products.

CO4:Students will get thorough knowledge of harmful and beneficial microbes

CO5:Students will get knowledge about emerging technologies related to microbes

CO6:Students will know production of various substances by using microbes

CO7:Students will know importance of microorganisms in food technology

TOPIC-

Unit-1 History & scope of Microbiology

12 Periods

Introduction to microbiology, Historical Contribution of various scientists, scope of microbiology in food, Types of cell – Prokaryotic & Eukaryotic cell, Introduction to various types of micro-organisms

Unit-2Morphology & cytology of bacteria

13 Periods

Classification of Bacteria on the basis of Structure/Shape/Size& functions of various parts of bacterial cell

Unit-3Microbial growth in food

10 Periods

Factors affecting growth of micro-organisms, Growth curve, Thermal Death Time, D, F, 12D and Z values

Unit-4 Food spoilage

10 Periods

Sources of contamination, causes of spoilage, Classification of food depending on ease of spoilage, Details of Spoilage of different food products such as Dairy, Animal Products fruits and Vegetables.

Unit-5: Food in relation to disease

10 Periods

Food borne illness: Bacteria causing food borne diseases, food borne poisoning, infections and intoxications: nonbacterial- mycotoxin, Rickettsia, sea food toxicants, Characteristics of organism & Toxin, Food sources, Symptoms and prophylaxis.

References:

- Food microbiology (IVth edition) - William C. Frazier and Dennis C. Westoff- Tata McGraw Hill Pub. Co. Ltd, New Delhi, 1995)
- Basic food microbiology-George G. Banwart (CBS publishers & distributors, New Delhi, 1987)
- Food microbiology- M. R. Adams & M. O. Moss (New Age International (P). Ltd. 2000)
- Jay, James M. Modern Food Microbiology, CBS Publication, New Delhi, 2000
- Introduction to Microbiology, M.H.Gajbhiye& S.J. Sathe et al, Career Publications, Nashik, 2015
- Garbutt, John. Essentials of Food Microbiology, Arnold, London, 1997

| • | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| CO1 | 3 | - | - | - | 4 | - | - | 2 | - | 3 | - | - |
| CO2 | 3 | 2 | 1 | - | 2 | - | - | 4 | | 3 | 2 | 1 |
| CO3 | 1 | - | - | 2 | 3 | - | - | - | - | 1 | - | - |
| CO4 | - | - | - | 4 | - | 5 | 3 | - | - | - | - | - |
| CO5 | 2 | 2 | 1 | 3 | - | 2 | - | - | - | 2 | 2 | 1 |
| CO6 | 2 | 2 | 1 | 4 | - | - | 1 | - | - | 2 | 2 | 1 |
| CO7 | - | 2 | 1 | - | - | - | - | - | - | - | 2 | 1 |

Justification for the mapping

PO1:- Disciplinary Knowledge - Understand the basic concepts, fundamental principles and experimental findings and the scientific theories related to food technology, food science and Food technology & engineering and its other fields related to the program.

CO1:Students will know role of microbes in food technology by getting information with practical.

CO2:Students will have a thorough understanding of microbes responsible for food spoilage like spoilage in milk and various food products.

CO3:The students will know the specifications of various contamination sources and disease developed in certain processed products like food poisoning.

CO5:Students will get knowledge about emerging technologies related to microbes through the thermal information.

CO6:Students will know production of various substances by using microbes

PO2:- Communication Skills:- Develop various communication skills such as reading, listening and speaking skills to express ideas and views clearly and effectively.

CO2:Students will have a thorough understanding of microbes responsible for food spoilage like spoilage in milk and various food products.

CO5:Students will get knowledge about emerging technologies related to microbes through the thermotical information.

CO6:Students will know production of various substances by using microbes

CO7:Students will know importance of microorganisms in food technology with different equipment and microorganisms.

PO3- Critical Thinking :- Propose novel ideas in explaining the scientific data, facts and figures related to Science and technology.

CO2:Students will have a thorough understanding of microbes responsible for food spoilage like spoilage in milk and various food products

CO5:Students will get knowledge about emerging technologies related to microbes through the thermotical information.

CO6:Students will know production of various substances by using microbes

CO7:Students will know importance of microorganisms in food technology with different equipment and microorganisms.

PO4- Analytical Reasoning and Problem Solving- To enable the students with good scientific and engineering knowledge so as to comprehend, design, and create food products and devices for the food industry and provide solutions for the challenges in the food industry as well as in agriculture.

CO3:To know the specifications of various contamination sources and disease developed in certain processed products.

CO4:Students will get thorough knowledge of harmful and beneficial microbes which used in food industries also get information about different equipment used to grow the microorganisms.

CO5:Students will get knowledge about emerging technologies related to microbes through the thermotical information.

CO6:Students will know production of various substances by using microbes and their uses in food industries.

PO5- Sense of Inquiry:- Curiously ask relevant questions for better understanding of fundamental concepts and principles, scientific theories and applications related to the study.

CO1: Students will know role of microbes in food technology by getting information with practical.

CO2: Students will have a thorough understanding of microbes responsible for food spoilage like spoilage in milk and various food products

CO3:To know the specifications of various contamination sources and disease developed in certain processed products.

PO6- Use of Modern Tools:-

Operate modern tools, equipment, instruments and laboratory techniques to perform the experiments and write the programs in different languages.

CO4: Students will get thorough knowledge of harmful and beneficial microbes which used in food industries also get information about different equipment used to grow the microorganisms.

CO5: Students will get knowledge about emerging technologies related to microbes through the thermal information.

PO7- Research Skills:- Understand how to design, collect, analyze, interpret and evaluate information/data that is relevant to food technology.

CO4: Students will get thorough knowledge of harmful and beneficial microbes which used in food industries also get information about different equipment used to grow the microorganisms.

CO6: Students will know production of various substances by using microbes and their uses in food industries.

PO8- Application of Knowledge:- Develop a scientific outlook and apply the knowledge with respect to food technology.

CO1: Students will know role of microbes in food technology by getting information with practical.

CO2: Students will have a thorough understanding of microbes responsible for food spoilage like spoilage in milk and various food products.

PO9- Ethical Awareness- To train students in professional and ethical attitude, effective communication skills, team work skills and multidisciplinary approaches related to food technology and engineering.

PO10:- Team Work - Understand the basic concepts, fundamental principles and experimental findings and the scientific theories related to food technology, food science and Food technology & engineering and its other fields related to the program.

CO1: Students will have a thorough understanding of various food processing techniques, by using various equipment's and also by using traditional methods.

CO2: The students will know the importance of various preservation techniques like preservation by salt, sugar oil and other various preservation techniques.

CO4: Students will get practical skills for processing of food after postharvest like preparation of various food products.

CO5: Students will have a thorough understanding of types of food preservatives like natural preservatives, chemical preservatives and their uses, advantages disadvantages etc.

CO6: Students will get thorough knowledge of current scenario of food preservation.

PO11:- Environment and Sustainability:- Develop various communication skills such as reading, listening and speaking skills to express ideas and views clearly and effectively.

CO1:Students will know role of microbes in food technology by getting information with practical.

CO2:Students will have a thorough understanding of microbes responsible for food spoilage like spoilage in milk and various food products.

CO3:The students will know the specifications of various contamination sources and disease developed in certain processed products like food poisoning.

CO5:Students will get knowledge about emerging technologies related to microbes through the thermotical information.

CO6:Students will know production of various substances by using microbes

PO12:- Lifelong Learning:- Propose novel ideas in explaining the scientific data, facts and figures related to Science and technology.

CO2:Students will have a thorough understanding of microbes responsible for food spoilage like spoilage in milk and various food products

CO5:Students will get knowledge about emerging technologies related to microbes through the thermotical information.

CO6:Students will know production of various substances by using microbes

CO7:Students will know importance of microorganisms in food technology with different equipment and microorganisms.

First Year

Semester I

Theory Paper No, FP-3, Food Science – I

Maximum Marks: 100
Teaching Period: 4 /week

Credits: 4
Teaching Load: 60 Theory Period/Semester

Learning Objectives:

- To study different cooking methods and principle of heat transfer
- To make students aware about various food groups and composition
- To make students understand the nutritive value and effect of cooking on foods
- To study various nutrients and their importance
- To study deficiency diseases caused due to nutrients
- To study importance of balanced diet

Course Outcomes:

CO1:The students will know about the basic cookery and the nutritive value of food products

CO2:The students will classify the products according to composition

CO3:The students will explain role of each food group products

CO4: The students will able to identify cause of deficiency diseases

CO5:The students will have thorough knowledge of importance of nutrients

CO6:The students will have thorough knowledge of effect of cooking on nutrients

CO7:The students will know importance of balanced diet for healthy life

TOPIC-

Unit-1: Introduction to Food science

12 Periods

Scope and Opportunities in Food Industries, Definition, Functions of food, Food groups, mode of heat transfer, Cooking- objectives, Preparation & cooking methods

Unit-2: Cereals& Pulses

15 Periods

Cereals: Structure, Composition& nutritive value of Wheat, Rice & Maize, Cereal Cookery, Role of cereals in cookery, other important Cereals, Textured Vegetable Protein (TVP) Sources and Advantage

Pulses -Composition & Nutritive value, toxic constituents & its elimination, Germination and its Changes, Pulse cookery, Role of pulses in cookery

Unit-3: Nuts & Oilseeds

10 Periods

Composition & Nutritive value, important nuts & oilseeds, toxins, Role of nuts & oilseeds in cookery

Unit-4: Fruits & Vegetables

15 Periods

Fruits- Classification, Sources, Composition and Nutritive value, ripening of fruits, Browning of fruits

Vegetables -Classification, Composition and Nutritive value, Vegetable cookery, Role of vegetable in cookery

Unit -5: Spices & Aromatics**8 Periods**

Classification, General functions of spices, Herbs, role of spices in cookery

References:

- Food Facts & Principles – N. Shakuntala Manay, M. Shadaksharswamy
- Food Science – Sumati R. Mudambi, Shalini M. Rao, M.V.Rajagopal
- Essentials of Food Science – Vickie A. Vaclavik, Elizabeth W. Chrishtian
- Food Science (Vth edition) – Norman N. Potter and Joseph H. Hotchkiss (CSB Publishers and Distributors, New Delhi, 1996)

| CO/ PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|-----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| CO1 | 3 | - | - | - | - | - | - | - | 3 | 3 | - | - |
| CO2 | 1 | 1 | - | - | - | 3 | - | - | - | 1 | 1 | - |
| CO3 | - | 1 | - | 2 | 1 | - | - | 3 | - | - | 1 | - |
| CO4 | 1 | - | 2 | - | - | - | 1 | - | - | 1 | - | 2 |
| CO5 | 2 | 3 | - | - | 1 | - | - | 2 | 1 | 2 | 3 | - |
| CO6 | 3 | - | - | 4 | 1 | - | - | - | 3 | 1 | - | - |
| CO7 | - | - | 1 | - | - | - | - | - | 1 | - | - | - |

Justification for the mapping

PO1:- Disciplinary Knowledge - Understand the basic concepts, fundamental principles and experimental findings and the scientific theories related to food technology, food science and Food technology & engineering and its other fields related to the program.

CO1:The students will know about the basic cookery and the nutritive value of food products and get information about nutritious food.

CO2:To classify the products according to composition

CO4: The students will be able to identify cause of deficiency diseases & get knowledge about food diseases.

CO5:The students will have thorough knowledge of importance of nutrients & food.

CO6:The students will have thorough knowledge of effect of cooking on nutrients and cooking effect on nutrients which are present in food.

PO2:- Communication Skills:- Develop various communication skills such as reading, listening and speaking skills to express ideas and views clearly and effectively.

CO2:To classify the products according to composition

CO3:The students will explain role of each food group products and their importance in daily life.

CO5:The students will have thorough knowledge of importance of nutrients & food.

PO3- Critical Thinking :- Propose novel ideas in explaining the scientific data, facts and figures related to Science and technology.

CO4: The students will be able to identify cause of deficiency diseases & get knowledge about food diseases.

CO7: The students will know importance of balanced diet for healthy life and healthy body.

PO4- Analytical Reasoning and Problem Solving- To enable the students with good scientific and engineering knowledge so as to comprehend, design, and create food products and devices for the food industry and provide solutions for the challenges in the food industry as well as in agriculture.

CO3: The students will explain role of each food group products and their importance in daily life.

CO6: The students will have thorough knowledge of effect of cooking on nutrients and cooking effect on nutrients which are present in food.

PO5- Sense of Inquiry:- Curiously ask relevant questions for better understanding of fundamental concepts and principles, scientific theories and applications related to the study.

CO3: The students will explain role of each food group products and their importance in daily life.

CO5: The students will have thorough knowledge of importance of nutrients & food.

CO6: The students will have thorough knowledge of effect of cooking on nutrients and cooking effect on nutrients which are present in food.

PO6- Use of Modern Tools:-

Operate modern tools, equipment, instruments and laboratory techniques to perform the experiments and write the programs in different languages.

CO2: To classify the products according to composition

PO7- Research Skills:- Understand how to design, collect, analyze, interpret and evaluate information/data that is relevant to food technology.

CO4: The students will be able to identify cause of deficiency diseases & get knowledge about food diseases.

PO8- Application of Knowledge:- Develop a scientific outlook and apply the knowledge with respect to food technology.

CO3: The students will explain role of each food group products and their importance in daily life.

CO5: The students will have thorough knowledge of importance of nutrients & food.

PO9- Ethical Awareness- To train students in professional and ethical attitude, effective communication skills, team work skills and multidisciplinary approaches related to food technology and engineering.

CO1:The students will know about the basic cookery and the nutritive value of food products and get information about nutritious food.

CO5:The students will have thorough knowledge of importance of nutrients & food.

CO6:The students will have thorough knowledge of effect of cooking on nutrients and cooking effect on nutrients which are present in food.

CO7:The students will know importance of balanced diet for healthy life and healthy body.

PO10:- Team Work - Understand the basic concepts, fundamental principles and experimental findings and the scientific theories related to food technology, food science and Food technology & engineering and its other fields related to the program.

CO1:The students will know about the basic cookery and the nutritive value of food products and get information about nutritious food.

CO2:To classify the products according to composition

CO4: The students will be able to identify cause of deficiency diseases & get knowledge about food diseases.

CO5:The students will have thorough knowledge of importance of nutrients & food.

CO6:The students will have thorough knowledge of effect of cooking on nutrients and cooking effect on nutrients which are present in food.

PO11:- Environment and Sustainability:- Develop various communication skills such as reading, listening and speaking skills to express ideas and views clearly and effectively.

CO2:To classify the products according to composition

CO3:The students will explain role of each food group products and their importance in daily life.

CO5:The students will have thorough knowledge of importance of nutrients & food.

PO12:- Lifelong Learning:- Propose novel ideas in explaining the scientific data, facts and figures related to Science and technology.

CO4: The students will be able to identify cause of deficiency diseases & get knowledge about food diseases.

CO7:The students will know importance of balanced diet for healthy life and healthy body.

First Year

Semester I

Practical Paper No, FP-1.1, Principles of Food Preservation

Maximum Marks: 150

Credits: 6

Teaching Period: 2/week

Teaching Load: 24 Practicals/Sem (4 Periods each)

Learning Objectives:

- To study importance of shelf life and preservation of foods
- To study traditional methods of food preservation
- To study different modern methods of food preservation
- To develop the practical skills for processing of food after postharvest
- To learn various types of food preservatives
- To study current scenario of food preservation techniques

Course Outcomes:

CO1: Students will have a thorough understanding of various food processing techniques.

CO2: The students will get practical knowledge of various preservation techniques.

CO3: The students will know about traditional methods of food preservation

CO3: Students will have thorough knowledge of emerging preservation techniques

CO4: Students will get practical skills for processing of food after postharvest

CO5: Students will have a thorough understanding of types of food preservatives

CO6: Students will get thorough knowledge of current scenario of food preservation

CO7: Students will know importance of various packaging and processing methods in food preservation

TOPIC-

| | | |
|-----|--|----|
| 1. | Study of laboratory instruments | 2P |
| 2. | Study of blanching of different fruits & vegetables | 2P |
| 3. | Preservation by using sugar (Jam/Jelly/Marmalade) | 2P |
| 4. | Preservation by using salt (Vegetable Pickle) | 1P |
| 5. | Preservation by using oil & spices (Pickles) | 1P |
| 6. | Preservation by fermentation (Idli, Dhokla, Jalebi and Sauerkraut) | 2P |
| 7. | Preservation by vinegar | 1P |
| 8. | Preservation by using chemical preservatives | 2P |
| 9. | Preservation by high temperature (canning) | 2P |
| 10. | Preservation by low temperature (Peas Preservation) | 1P |
| 11. | Preservation by drying (Fruits and Vegetable) | 3P |
| 12. | Study of Osmotic dehydration (Fruit Candy) | 3P |
| 13. | Visit to Industry | 1P |
| 14. | Preparation of report on Industrial Visit | 1P |
| 15. | Activities (Market Survey) | 2P |

References:

- Food Science By Potter
- Food Science 3rd edition By B. Shrilakshmi
- Fruit & Vegetable Preservation By Srivastava Kumar
- Food, Facts and Principles By Shakuntala Manay
- Food Processing and Preservation By G. Subbulakshmi, Shobha A Udipi
- Food Processing Technology 2nd edition By P. J. Fellows

- FSSAI Manual

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| CO1 | 3 | - | - | - | 4 | - | - | - | 3 | 3 | - | - |
| CO2 | 1 | 1 | 2 | - | - | 3 | - | - | - | 1 | 1 | - |
| CO3 | - | 1 | - | 2 | 1 | - | - | 3 | - | - | 1 | - |
| CO4 | 1 | - | 2 | - | - | - | 1 | - | - | 1 | - | 2 |
| CO5 | 2 | - | - | - | 1 | - | - | 2 | 1 | 2 | - | - |
| CO6 | 1 | 5 | - | - | 1 | - | - | - | 1 | 1 | 5 | - |
| CO7 | - | - | 1 | - | - | - | - | - | 1 | - | - | - |

Justification for the mapping

PO1:- Disciplinary Knowledge - Understand the basic concepts, fundamental principles and experimental findings and the scientific theories related to food technology, food science and Food technology & engineering and its other fields related to the program.

CO1: Students will have a thorough understanding of various food processing techniques, by using various equipment's and also by using traditional methods.

CO2: The students will know the importance of various preservation techniques like preservation by salt, sugar oil and other various preservation techniques.

CO4: Students will get practical skills for processing of food after postharvest like preparation of various food products.

CO5: Students will have a thorough understanding of types of food preservatives like natural preservatives, chemical preservatives and their uses, advantages disadvantages etc.

CO6: Students will get thorough knowledge of current scenario of food preservation.

PO2:- Communication Skills:- Develop various communication skills such as reading, listening and speaking skills to express ideas and views clearly and effectively.

CO2: The students will know the importance of various preservation techniques like preservation by salt, sugar oil and other various preservation techniques.

CO3: The students will know about traditional methods of food preservation and they can express their new ideas for preservation.

CO6: Students will get thorough knowledge of current scenario of food preservation, and they can communicate with the industries.

PO3- Critical Thinking :- Propose novel ideas in explaining the scientific data, facts and figures related to Science and technology.

CO2: The students will know the importance of various preservation techniques like preservation by salt, sugar oil and other various preservation techniques.

CO4: Students will get practical skills for processing of food after postharvest like preparation of various food products and get knowledge about machines.

CO7: Students will know importance of various packaging and processing methods in food preservation so they can think about more packaging materials and processing.

PO4- Analytical Reasoning and Problem Solving- To enable the students with good scientific and engineering knowledge so as to comprehend, design, and create food products and devices for the food industry and provide solutions for the challenges in the food industry as well as in agriculture.

CO2:The students will know the importance of various preservation techniques like preservation by salt, sugar oil and other various preservation techniques.

PO5- Sense of Inquiry:- Curiously ask relevant questions for better understanding of fundamental concepts and principles, scientific theories and applications related to the study.

CO1: Students will have a thorough understanding of various food processing techniques, by using various equipment's and also by using traditional methods.

CO3: Students will have thorough knowledge of emerging preservation techniques

CO5: Students will have a thorough understanding of types of food preservatives like natural preservatives, chemical preservatives and their uses, advantages disadvantages etc.

CO6: Students will get thorough knowledge of current scenario of food preservation.

PO6- Use of Modern Tools:-

Operate modern tools, equipment, instruments and laboratory techniques to perform the experiments and write the programs in different languages.

CO2:The students will know the importance of various preservation techniques like preservation by salt, sugar oil and other various preservation techniques.

PO7- Research Skills:- Understand how to design, collect, analyze, interpret and evaluate information/data that is relevant to food technology.

CO4: Students will get practical skills for processing of food after postharvest like preparation of various food products.

PO8- Application of Knowledge:- Develop a scientific outlook and apply the knowledge with respect to food technology.

CO3: Students will have thorough knowledge of emerging preservation techniques so they can get knowledge about different scientific preservation techniques.

CO5: Students will have a thorough understanding of types of food preservatives like natural preservatives, chemical preservatives and their uses, advantages disadvantages etc.

PO9- Ethical Awareness- To train students in professional and ethical attitude, effective communication skills, team work skills and multidisciplinary approaches related to food technology and engineering.

CO1: Students will have a thorough understanding of various food processing techniques, by using various equipment's and also by using traditional methods.

CO5: Students will have a thorough understanding of types of food preservatives like natural preservatives, chemical preservatives and their uses, advantages disadvantages etc.

CO6: Students will get thorough knowledge of current scenario of food preservation.

CO7: Students will know importance of various packaging and processing methods in food preservation so they can think about more packaging materials and processing.

PO10:- Team Work - Understand the basic concepts, fundamental principles and experimental findings and the scientific theories related to food technology, food science and Food technology & engineering and its other fields related to the program.

CO1: Students will have a thorough understanding of various food processing techniques, by using various equipment's and also by using traditional methods.

CO2: The students will know the importance of various preservation techniques like preservation by salt, sugar oil and other various preservation techniques.

CO4: Students will get practical skills for processing of food after postharvest like preparation of various food products.

CO5: Students will have a thorough understanding of types of food preservatives like natural preservatives, chemical preservatives and their uses, advantages disadvantages etc.

CO6: Students will get thorough knowledge of current scenario of food preservation.

PO11:- Environment and Sustainability:- Develop various communication skills such as reading, listening and speaking skills to express ideas and views clearly and effectively.

CO2: The students will know the importance of various preservation techniques like preservation by salt, sugar oil and other various preservation techniques.

CO3: The students will know about traditional methods of food preservation and they can express their new ideas for preservation.

Po12:- Lifelong Learning:- Propose novel ideas in explaining the scientific data, facts and figures related to Science and technology.

CO2: The students will know the importance of various preservation techniques like preservation by salt, sugar oil and other various preservation techniques.

CO4: Students will get practical skills for processing of food after postharvest like preparation of various food products and get knowledge about machines.

CO7: Students will know importance of various packaging and processing methods in food preservation so they can think about more packaging materials and processing.

First Year

Semester I

Practical Paper No, FP-1.2, Food Science

Maximum Marks: 150

Credits: 6

Teaching Period: 2/week

Teaching Load: 24 Practical/Semester (4 Period each)

Learning Objectives:

- To study different cooking methods and principle of heat transfer
- To make students aware about various food groups and composition
- To make students understand the nutritive value and effect of cooking on foods
- To study various nutrients and their importance
- To study deficiency diseases caused due to nutrients
- To study importance of balanced diet

Course Outcomes:

CO1: The students will know about the basic cookery and the nutritive value of food products

CO2: The students will classify the products according to composition

CO3: The students will explain role of each food group products

CO4: The students will able to identify cause of deficiency diseases

CO5: The students will have thorough knowledge of importance of nutrients

CO6: The students will have thorough knowledge of effect of cooking on nutrients

CO7: The students will know importance of balanced diet for healthy life

TOPIC-

| | |
|--|----|
| 1. Study of different cooking methods | 2P |
| 2. Preparation of rice flakes | 2P |
| 3. Preparation of soya nuts | 2P |
| 4. Extraction of edible oil | 2P |
| 5. Preparation of Coated masala Groundnuts | 1P |
| 6. Study of Germination/Malting | 1P |
| 7. Preparation of Garlic/Ginger Paste | 1P |
| 8. Preparation of condensed milk | 1P |
| 9. Preparation of chips & wafers | 2P |
| 10. Preparation of Tuti fruity | 2P |
| 11. Preparation of instant soup mix | 1P |
| 12. Study of stages in preparation of sugar syrup | 1P |
| 13. Preparation of hard boiled candy | 1P |
| 14. Preparation of curry powder | 1P |
| 15. Preparation of turmeric powder | 2P |
| 16. Preparation of powdered drinks | 1P |
| 17. Visit to industry | 1P |
| 18. Preparation of report on industrial visit & presentation | 2P |

References:

- Food Science By Potter
- Food Science 3rd edition By B. Shrilakshmi
- Fruit & Vegetable Preservation By Srivastava Kumar
- Food, Facts and Principles By Shakuntala Manay
- Food Processing and Preservation By G. Subbulakshmi, Shobha A. Udupi
- Food Processing Technology 2nd edition By P. J. Fellows

| CO/ PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|-----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| CO1 | 1 | - | - | - | 1 | - | 3 | - | 3 | 3 | - | - |
| CO2 | 1 | 1 | - | - | - | 3 | - | - | - | 1 | 1 | - |
| CO3 | - | 1 | - | 2 | 1 | - | - | 3 | - | - | 1 | - |
| CO4 | 2 | - | 2 | - | - | - | 1 | - | - | 1 | - | 2 |
| CO5 | 2 | 3 | - | - | 1 | - | - | 2 | 1 | 2 | 3 | - |
| CO6 | 3 | - | - | 4 | 1 | 1 | 3 | 4 | 3 | 1 | - | - |
| CO7 | - | - | 1 | - | - | - | - | - | 1 | - | - | - |

Justification for the mapping

PO1:- Disciplinary Knowledge - Understand the basic concepts, fundamental principles and experimental findings and the scientific theories related to food technology, food science and Food technology & engineering and its other fields related to the program.

CO1:The students will know about the basic cookery and the nutritive value of food products and get information about nutritious food.

CO2:To classify the products according to composition

CO4: The students will be able to identify cause of deficiency diseases & get knowledge about food diseases.

CO5:The students will have thorough knowledge of importance of nutrients & food.

CO6:The students will have thorough knowledge of effect of cooking on nutrients and cooking effect on nutrients which are present in food.

PO2:- Communication Skills:- Develop various communication skills such as reading, listening and speaking skills to express ideas and views clearly and effectively.

CO2:To classify the products according to composition

CO3:The students will explain role of each food group products and their importance in daily life.

CO5:The students will have thorough knowledge of importance of nutrients & food.

PO3- Critical Thinking :- Propose novel ideas in explaining the scientific data, facts and figures related to Science and technology.

CO4: The students will be able to identify cause of deficiency diseases & get knowledge about food diseases.

CO7: The students will know importance of balanced diet for healthy life and healthy body.

PO4- Analytical Reasoning and Problem Solving- To enable the students with good scientific and engineering knowledge so as to comprehend, design, and create food products and devices for the food industry and provide solutions for the challenges in the food industry as well as in agriculture.

CO3: The students will explain role of each food group products and their importance in daily life.

CO6: The students will have thorough knowledge of effect of cooking on nutrients and cooking effect on nutrients which are present in food.

PO5- Sense of Inquiry:- Curiously ask relevant questions for better understanding of fundamental concepts and principles, scientific theories and applications related to the study.

CO3: The students will explain role of each food group products and their importance in daily life.

CO5: The students will have thorough knowledge of importance of nutrients & food.

CO6: The students will have thorough knowledge of effect of cooking on nutrients and cooking effect on nutrients which are present in food.

PO6- Use of Modern Tools:-

Operate modern tools, equipment, instruments and laboratory techniques to perform the experiments and write the programs in different languages.

CO2: To classify the products according to composition

PO7- Research Skills:- Understand how to design, collect, analyze, interpret and evaluate information/data that is relevant to food technology.

CO4: The students will be able to identify cause of deficiency diseases & get knowledge about food diseases.

PO8- Application of Knowledge:- Develop a scientific outlook and apply the knowledge with respect to food technology.

CO3: The students will explain role of each food group products and their importance in daily life.

CO5: The students will have thorough knowledge of importance of nutrients & food.

PO9- Ethical Awareness- To train students in professional and ethical attitude, effective communication skills, team work skills and multidisciplinary approaches related to food technology and engineering.

CO1:The students will know about the basic cookery and the nutritive value of food products and get information about nutritious food.

CO5:The students will have thorough knowledge of importance of nutrients & food.

CO6:The students will have thorough knowledge of effect of cooking on nutrients and cooking effect on nutrients which are present in food.

CO7:The students will know importance of balanced diet for healthy life and healthy body.

PO10:- Team Work - Understand the basic concepts, fundamental principles and experimental findings and the scientific theories related to food technology, food science and Food technology & engineering and its other fields related to the program.

CO1:The students will know about the basic cookery and the nutritive value of food products and get information about nutritious food.

CO2:To classify the products according to composition

CO4: The students will be able to identify cause of deficiency diseases & get knowledge about food diseases.

CO5:The students will have thorough knowledge of importance of nutrients & food.

CO6:The students will have thorough knowledge of effect of cooking on nutrients and cooking effect on nutrients which are present in food.

PO11:- Environment and Sustainability:- Develop various communication skills such as reading, listening and speaking skills to express ideas and views clearly and effectively.

CO2:To classify the products according to composition

CO3:The students will explain role of each food group products and their importance in daily life.

CO5:The students will have thorough knowledge of importance of nutrients & food.

PO12:- Lifelong Learning:- Propose novel ideas in explaining the scientific data, facts and figures related to Science and technology.

CO4: The students will be able to identify cause of deficiency diseases & get knowledge about food diseases.

CO7:The students will know importance of balanced diet for healthy life and healthy body.

First Year

Semester I

Practical Paper No, FP-1.3, Computer Application

Maximum Marks: 150

Credits: 6

Teaching Period: 2/week

Teaching Load:24Practical/Semester 4Periods each)

Learning Objectives:

- To know importance of computer
- To make students aware about different operating systems of computer
- To make students understand different applications of computer
- To study various uses of internet
- To study conversion of various files from one form to another
- To study importance of computer knowledge

Course Outcomes:

CO1: The students will know about the basics of computer

CO2: The students will understand different applications of computer

CO3: The students will understand different aspects of computer like Photoshop, Corel draw etc.

CO4: The students will able to do and operate E-mail, MS-word, Excel, Powerpoint

CO5: The students will have thorough knowledge of Photoshop, Corel draw

CO6: The students will have thorough knowledge of searching various documents, PDF, etc.

CO7: The students will know importance of computer skills

TOPIC-

| | |
|--|----|
| 1. Introducing Computer and Operating system | 1P |
| 2. MS-WORD | 2P |
| 3. MS-EXCEL | 2P |
| 4. MS-POWERPOINT | 2P |
| 5. Introduction to the internet, search engine | 2P |
| 6. E-Mails, Google Docs and Forms | 3P |
| 7. Introduction to Pagemaker | 3P |
| 8. Introduction to Corel Draw | 3P |
| 9. Introduction to Photoshop | 3P |
| 10. Web development: HTML and Scripting language | 3P |
| 11. How to search paper in PDF | 1P |
| 12. Conversion to PDF to Word and Wise Versa | 1P |

References:

- Microsoft Office 2000 by Vipra Computers, Vipra printers pvt. Ltd.
- Advanced Microsoft Office 2000 by MeredithFlynnin, Nita Rukosky, BPB pub.
- Teach yourself Windows
- Fundamentals of Computers - V. Rajaraman
- Computer Fundamentals by P. K. Sinha &Priti Sinha, 4th edition, BPB, publication.

| CO/ PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|-----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| CO1 | 5 | - | - | - | - | - | - | - | 3 | 3 | - | - |
| CO2 | 4 | 1 | - | - | - | - | - | - | - | 1 | 1 | - |
| CO3 | 2 | 1 | - | 2 | 1 | - | - | 3 | - | - | 1 | - |
| CO4 | 1 | - | 2 | - | - | - | 1 | - | - | 1 | - | 2 |
| CO5 | 2 | 3 | - | - | 1 | - | - | 2 | 1 | 2 | 3 | - |
| CO6 | 3 | - | - | 4 | 1 | - | - | - | 3 | 1 | - | - |
| CO7 | - | - | 1 | - | - | - | - | - | 1 | - | - | - |

Justification for the mapping

PO1:- Disciplinary Knowledge - Understand the basic concepts, fundamental principles and experimental findings and the scientific theories related to food technology, food science and Food technology & engineering and its other fields related to the program.

CO1: The students will know about the basics of computer like MS- word, power point presentation.

CO2: The students will understand different applications of computer and how they work.

CO3: The students will understand different aspects of computer like Photoshop, Corel draw etc.

CO4: The students will be able to do and operate E-mail, MS-word, Excel, Power point, different applications as well as all history about computer.

CO5: The students will have thorough knowledge of Photoshop, Corel draw and different photo video editing applications.

CO6: The students will have thorough knowledge of searching various documents, PDF, etc.

PO2:- Communication Skills:- Develop various communication skills such as reading, listening and speaking skills to express ideas and views clearly and effectively.

CO2: The students will understand different applications of computer and how they work.

CO3: The students will understand different aspects of computer like Photoshop, Corel draw etc.

CO5: The students will have thorough knowledge of Photoshop, Corel draw and different photo video editing applications.

PO3- Critical Thinking :- Propose novel ideas in explaining the scientific data, facts and figures related to Science and technology.

CO4: The students will be able to do and operate E-mail, MS-word, Excel, Power point, different applications as well as all history about computer.

CO7: The students will know importance of computer skills and they will understand the future need of computer.

PO4- Analytical Reasoning and Problem Solving- To enable the students with good scientific and engineering knowledge so as to comprehend, design, and create food products and devices

for the food industry and provide solutions for the challenges in the food industry as well as in agriculture.

CO3: The students will understand different aspects of computer like Photoshop, Corel draw etc.

CO6: The students will have thorough knowledge of searching various documents, PDF, etc.

PO5- Sense of Inquiry:- Curiously ask relevant questions for better understanding of fundamental concepts and principles, scientific theories and applications related to the study.

CO3: The students will understand different aspects of computer like Photoshop, Corel draw etc.

CO5: The students will have thorough knowledge of Photoshop, Corel draw and different photo video editing applications.

CO6: The students will have thorough knowledge of searching various documents, PDF, etc.

PO6- Use of Modern Tools:

Operate modern tools, equipment, instruments and laboratory techniques to perform the experiments and write the programs in different languages.

PO7- Research Skills:- Understand how to design, collect, analyze, interpret and evaluate information/data that is relevant to food technology.

CO4: The students will be able to do and operate E-mail, MS-word, Excel, Power point, different applications as well as all history about computer.

PO8- Application of Knowledge:- Develop a scientific outlook and apply the knowledge with respect to food technology.

CO3: The students will understand different aspects of computer like Photoshop, Corel draw etc.

CO5: The students will have thorough knowledge of Photoshop, Corel draw and different photo video editing applications.

PO9- Ethical Awareness- To train students in professional and ethical attitude, effective communication skills, team work skills and multidisciplinary approaches related to food technology and engineering.

CO1: The students will know about the basics of computer like MS- word, power point presentation.

CO5: The students will have thorough knowledge of Photoshop, Corel draw and different photo video editing applications.

CO6: The students will have thorough knowledge of searching various documents, PDF, etc.

CO7: The students will know importance of computer skills and they will understand the future need of computer.

PO10:- Team Work - Understand the basic concepts, fundamental principles and experimental findings and the scientific theories related to food technology, food science and Food technology & engineering and its other fields related to the program.

CO1: The students will know about the basics of computer like MS- word, power point presentation.

CO2: The students will understand different applications of computer and how they work.

CO3: The students will understand different aspects of computer like Photoshop, Corel draw etc.

CO4: The students will be able to do and operate E-mail, MS-word, Excel, Power point, different applications as well as all history about computer.

CO5: The students will have thorough knowledge of Photoshop, Corel draw and different photo video editing applications.

CO6: The students will have thorough knowledge of searching various documents, PDF, etc.

PO11:- Environment and Sustainability:- Develop various communication skills such as reading, listening and speaking skills to express ideas and views clearly and effectively.

CO4: The students will be able to do and operate E-mail, MS-word, Excel, Power point, different applications as well as all history about computer.

CO7: The students will know importance of computer skills and they will understand the future need of computer.

PO12:- Lifelong Learning:- Propose novel ideas in explaining the scientific data, facts and figures related to Science and technology.

CO2: The students will understand different applications of computer and how they work.

CO3: The students will understand different aspects of computer like Photoshop, Corel draw etc.

CO5: The students will have thorough knowledge of Photoshop, Corel draw and different photo video editing applications.