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 – **II**

For Department Food Technology & Research

Tuljaram Chaturchand College, Baramati

To be implemented from Academic Year 2022-2023

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)			
UBFP111	Principles of Food Preservation	4	100
UBFP112	Food Microbiology - I	4	100
UBFP113	Food Science - I	4	100
Practical (Skill Component)			
UBFP1111	Principles of Food Preservation	6	150
UBFP1112	Computer Application	6	150
UBFP1113	Food Science-I	6	150

First Year: Semester-II

Subj. Code	Subject Name	No. of Credits	Marks
Theory (General Component)			
UBFP121	Nutrition Science	4	100
UBFP122	Food Microbiology-II	4	100
UBFP123	Food Science - II	4	100
Practical (Skill Component)			
UBFP1211	Nutrition Science	6	150
UBFP1212	Food Microbiology-II	6	150
UBFP1213	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 - 2022-2023)

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**	Understandthebasicconcepts,fundamentalprinciplesandexperimental findingsandthescientifictheoriesrelatedtofoodtechnology,foodscienceand foodtechnology&engineeringanditsotherfieldsrelatedtothe program.
PO-2	**Communication Skills**	Developvariouscommunicationskillssuchasreading,listeningandspeaking skills to express ideas and views clearly and effectively.
PO-3	**Critical Thinking**	Proposenovelideasinexplainingthescientificdata,factsandfiguresrelatedto scienceandtechnology.
PO-4	**Analytical Reasoningand Problem Solving**	Toenable the studentswithgoodscientific andengineeringknowledge soasto comprehend,design,andcreatefoodproductsanddevicesforthefoodindustry and provide solutions for the challenges in the food industry as well as in agriculture.
PO-5	**Senseof Inquiry**	Curiously ask relevant questions for better understanding of fundamental conceptsandprinciples,scientifictheoriesandapplicationsrelatedtothestudy.
PO-6	**UseofModern Tools**	Operatemoderntools,equipment,instrumentsandlaboratorytechniquesto 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	**Applicationof Knowledge**	Developascientificoutlookandapplytheknowledgewithrespecttofood technology.
PO-9	**Ethical Awareness**	Totrainstudentsinprofessionalandethicalattitude,effectivecommunication skills, teamworkskillsandmultidisciplinaryapproachesrelatedtofoodtechnology and engineering.
PO-10	**Teamwork**	Understandthebasicconcepts,fundamentalprinciplesandexperimental 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	**Environmentand Sustainability**	Developvariouscommunicationskillssuchasreading,listeningandspeaking skills to express ideas and views clearly and effectively.
PO-12	**LifelongLearning**	Propose novel ideas in explaining the scientific data, facts and figures related to science and technology.

First Year **Semester II**

TheoryPaper No, UBFP122Food Microbiology – II

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 beneficialmicrobes
CO5: Students will get knowledge aboutemerging 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: Culture media and Pure culture Techniques **12 Periods**
Culture Media & its Composition, Types of culture media depending upon composition, function & applications and agar concentrations, Methods for isolation of pure culture- Streak plate, Pour plate and Spread plate.

Unit-2: Microscopy and Staining Procedures **12 Periods**
Introduction & types of microscope, Definition of dye & stains, classification of stains- Acidic, Basic and Neutral, principles, procedure, mechanism & applications of staining procedures: simple staining, negative staining, differential staining- gram staining & acid fast staining.

Unit 3: Control of microorganisms **16Periods**
Quality of food, control at source- training, facilities and operations, equipment, cleaning and disinfection**,** Physical and chemical control methods.

Unit-4: Microbial spoilage of different foods& Recent trends **10 Periods**
Microbial spoilage of meat, poultry fish; fruits & vegetables; cereal & cereal products and milk & milk products, SCO, Prebiotic and Probiotic.

Unit-5: Beneficial micro-organisms **15 Periods**

Introduction & types, general principle of culture preparation & maintenance, fermented foods – Yogurt, Wine, Idli, Soya sauce & SauerkrautSCP, Production of amino acids, enzymes, antibiotics & other substances added to food

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
- Pelczar MJ, Chan E.C.S and Krieg, Noel R. Microbiology, 5th Ed., TMH, New Delhi, 1993

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	-	4	3	-	2	-	-	-	-
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	1	-	2	2	1
CO7	3	2	1	-	-	-	-	-	-	3	2	1

Justification for the mapping

PO1:- Disciplinary Knowledge - Understand the basic concepts, fundamental principles and experimental findings and the scientific the ories 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 thermotical 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: Toknow 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:-
Operatemoderntools,equipment,instrumentsandlaboratorytechniquesto 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 thermotical 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 out look 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 the ories 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 II**

TheoryPaper No, UBFP123, Food Science – II

Maximum Marks: 100 **Credits: 4**
Teaching Period: 4 /week **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-1Milk & Milk Products **10 Periods**
Composition & Nutritive value, physical properties, Milk cookery, White revolution, Milk substitute, Role of milk & milk products in cookery.

Unit-2 Sugar & Related Products **10 Periods**
Nutritive value, Properties, types, Characteristics & uses of sugar, sugar cookery & role of sugar in cookery, Sugar related products, Artificial sweeteners.

Unit -3 Fats & Oils **10 Periods**
Composition & Nutritive value, Specific fats & Oils, Effect of heating, role of fat or oil in cookery.

Unit 4 Egg and Flesh foods **15 Periods**
Egg: Structure of egg, composition & nutritive value, Egg cookery,role of egg in cookery.
Flesh Foods: Composition, nutritive value and cookery of meat, poultry & fish.

Unit 5Beverages & appetizers **15 Periods**
Classification - Coffee, Tea, Cocoa and its processing,introduction to other beverages.

References:

- Outline of dairy technology by Sukumar De, Oxford University Press, New Delhi
- 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 the ories 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 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 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:-
Operatemoderntools,equipment,instrumentsandlaboratorytechniquesto 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 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 the ories 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 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 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 II**

Practical Paper No, UBFP-121-1, Nutrition Science

Maximum Marks: 150 **Credits: 6**
Teaching Period: 2/week **Teaching Load: 24 Practical/Semester (4 Period each)**

Learning Objectives:

- To understand nutrients and food component that supply nourishment to the body
- To study various nutrients and their importance
- To study deficiency diseases caused due to nutrients
- To study importance of balanced diet
- To know about the functions, deficiency and toxicity of nutrients
- To understand malnutrition and its prevention

Course Outcomes:

CO1: The students will classify the products according to composition
CO2: Provide nutrition counseling and education to individuals, groups, and communities throughout the lifespan using a variety of communication strategies
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)	Identification of food sources for various nutrients	2P
2)	Introduction to diet planning using food exchange list	3P
3)	Diet Planning of adult male / female	3P
4)	Assessment of weight and height of self and calculation of BMI	3P
5)	Planning of Protein and Energy rich dish.	2P
6)	Planning of Vitamin A rich dish.	1P
7)	Planning of Vitamin B1 rich dish.	1P
8)	Planning of Vitamin B2 rich dish.	1P
9)	Planning of Vitamin B3 rich dish.	1P
10)	Planning of Vitamin C rich dish.	1P
11)	Planning of Calcium rich dish.	1P
12)	Planning of Iron rich dish.	1P
13)	Record diet of self using24 hour dietary recall	2P
14)	Evaluation of own diet and weight status	2P

References:

- Bamji MS, Krishnaswamy K, Brahmam GNV (2009). *Textbook of Human Nutrition,* 3rd edition. Oxford and IBH Publishing Co. Pvt. Ltd.
- Srilakshmi (2007). *Food Science*, 4th Edition. New Age International Ltd. 29
- Wardlaw MG, Paul M Insel Mosby (1996). Perspectives in Nutrition, Third Edition.
- B. Srilakshmi (2007) Dietetics, Revised Fifth Edition, New Age International Publishers
- B. Srilakshmi (2011) Nutrition Science, Third Edition, New Age International Publishers
- Dr. M. Swaminathan (2006) Advanced Text book on Food and Nutrition, Volume 1 and 2, Second Edition, BAPPCO Publication.

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	-	-	-	1	-	-	2	1	2	-	-
CO6	1	-	-	-	1	-	-	-	1	1	-	-
CO7	-	-	1	-	-	-	-	-	-	-	-	-

Justification for the mapping

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

CO1: The students will classify the products according to composition and nutritional value.
CO2: Provide nutrition counseling and education to individuals, groups, and communities throughout the lifespan using a variety of communication strategies
CO4: The students will able to identify cause of deficiency diseases and their diagnostics.
CO5: The students will have thorough knowledge of importance of nutrients in daily life.
CO6: The students will have thorough knowledge of effect of cooking on nutrients and the uses of the cooked food as well as the cooking equipment.

PO2:- Communication Skills:- Develop various communication skills such as reading, listening and speaking skills to express ideas and views clearly and effectively.
CO2: Provide nutrition counseling and education to individuals, groups, and communities throughout the lifespan using a variety of communication strategies
CO3: The students will explain role of each food group products

PO3- Critical Thinking :- Propose novel ideas in explaining the scientific data, facts and figures related to Science and technology.
CO4: The students will able to identify cause of deficiency diseases and their diagnostics and also get information about. 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

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
CO5: The students will have thorough knowledge of importance of nutrients in daily life.
CO6: The students will have thorough knowledge of effect of cooking on nutrients and the uses of the cooked food as well as the cooking equipment.

PO6- Use of Modern Tools:-
Operatemoderntools,equipment,instrumentsandlaboratorytechniquesto perform the experiments and write the programs in different languages.

CO2: Provide nutrition counseling and education to individuals, groups, and communities throughout the lifespan using a variety of communication strategies

PO7- Research Skills:- Understand how to design, collect, analyze, interpret and evaluate information/data that is relevant to food technology.
CO4: The students will able to identify cause of deficiency diseases and their diagnostics and also get information about. balanced diet for healthy life and healthy body.

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
CO5: The students will have thorough knowledge of importance of nutrients in daily life.

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 classify the products according to composition and nutritional value.
CO5: The students will have thorough knowledge of importance of nutrients in daily life.
CO6: The students will have thorough knowledge of effect of cooking on nutrients and the uses of the cooked food as well as the cooking equipment.

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

CO1: The students will classify the products according to composition and nutritional value.
CO2: Provide nutrition counseling and education to individuals, groups, and communities throughout the lifespan using a variety of communication strategies
CO4: The students will able to identify cause of deficiency diseases and their diagnostics.
CO5: The students will have thorough knowledge of importance of nutrients in daily life.
CO6: The students will have thorough knowledge of effect of cooking on nutrients and the uses of the cooked food as well as the cooking equipment.

PO11:- Environment and Sustainability:- Develop various communication skills such as reading, listening and speaking skills to express ideas and views clearly and effectively.
CO2: Provide nutrition counseling and education to individuals, groups, and communities throughout the lifespan using a variety of communication strategies
CO3: The students will explain role of each food group products

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

CO4: The students will able to identify cause of deficiency diseases and their diagnostics and also get information about. balanced diet for healthy life and healthy body.

First Year **Semester II**

Practical Paper No, UBFP121-2, Food Microbiology-II

Maximum Marks: 150 **Credits: 6**

Teaching Period: 2/week **Teaching Load: 24 Practical/Semester (4 Period each)**

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 beneficialmicrobes
CO5: Students will get knowledge aboutemerging 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-

1.	Introduction to the Basic Microbiology Laboratory Instruments.	2P
2.	Introduction to the Basic Microbiology Laboratory materials	1P
3.	Functioning and use of compound microscope	1P
4.	Study of Aseptic Techniques	2P
5.	Preparation, Cleaning and sterilization of glassware	2P
6.	Preparation and sterilization of media	2P
7.	Preparation of slant, stab and plates using nutrient agar	2P
8.	Cultivation of microbes	2P
9.	Standard Plate Count Method	2P
10.	Monochrome staining	1P
11.	Gram's staining	1P
12.	Negative staining	1P
13.	MPN method for Coliform in food samples as well as water sample.	3P
14.	Visit to microbiology laboratory	1P
15.	Preparation of report on visit	1P

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

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	-	4	3	-	2	-	-	-	-
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	1	-	2	2	1
CO7	3	2	1	-	-	-	-	-	-	3	2	1

Justification for the mapping

PO1:- Disciplinary Knowledge - Understand the basic concepts, fundamental principles and experimental findings and the scientific the ories 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 thermotical 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: Toknow 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:-

Operatemoderntools,equipment,instrumentsandlaboratorytechniquesto 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 thermotical 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 out look 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 the ories 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 II**

PracticalPaper No, UBFP121-3, Soft Skill Development

Maximum Marks: 150 **Credits: 6**
Teaching Period: 2/week **Teaching Load: 24 Practical/Semester (4 Period each)**

Learning Objectives:

- To know importance of soft skills
- To make students aware about different soft skills and their uses
- To make students aware about importance of reading, speaking, etc.
- To study various applications of soft skills
- To study introduction skills
- To study importance of soft skills in today's life

Course Outcomes:

CO1: The students will know about the uses of soft skills
CO2: The students will practically use soft skills
CO3: The students will understand different aspects of soft skills
CO4: The students will able to use various soft skills
CO5: The students will have thorough knowledge of communication skills
CO6: The students will have thorough knowledge of English language
CO7: The students will know importance of soft skills

TOPIC -

Unit 1 Fluency in Grammar Usage **5P**
1) Tenses
2) Verbs
3) Active & Passive Voice
4) Reported Speech
5) Prepositions
6) Conjunctions
7) Effective Sentence-Construction
8) Vocabulary

Unit 2 Fundamentals **5P**
1) Greeting and taking leave
2) Introducing yourself
3) Introducing people to one another
4) Making requests and asking for directions
5) Congratulating, expressing sympathy and offering condolence
6) Making suggestions and offering advice
7) Making and accepting an apology

Unit 3 Situational dialogues **3P**
Unit 4 Personality development **3P**
Unit 5 Interview and Group discussion **3P**
Unit 6 Writing and comprehension skills **5P**
1) Letter (Formal) and Email

2) Report
3) Summarizing reports, articles, editorials
4) Making an abstract
5) Review writing
6) Writing resume

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

Justification for the mapping

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

CO1: they will know about the uses of soft skills and importance.
CO2: The students will practically use soft skills in various induristies and for job interview also in daily life.
CO3: The students will understand different aspects of soft skills and they can use it in daily life.
CO4: The students will able to use various soft skills in their own business.
CO5: The students will have thorough knowledge of communication skills so they can easily tackle with any companies.
CO6: The students will have thorough knowledge of English language.
CO7: The students will know importance of soft skills.

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 practically use soft skills in various induristies and for job interview also in daily life.
CO5: The students will have thorough knowledge of communication skills so they can easily tackle with any companies.
CO6: The students will have thorough knowledge of English language.
CO7: The students will know importance of soft skills.

PO3- Critical Thinking :- Propose novel ideas in explaining the scientific data, facts and figures related to Science and technology.
CO2: The students will practically use soft skills in various induristies and for job interview also in daily life.
CO5: The students will have thorough knowledge of communication skills so they can easily tackle with any companies.
CO6: The students will have thorough knowledge of English language.
CO7: The students will know importance of soft skills.

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 soft skills and they can use it in daily life.
CO4: The students will able to use various soft skills in their own business.
CO5: The students will have thorough knowledge of communication skills so they can easily tackle with any companies.
CO6: The students will have thorough knowledge of English language.

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: they will know about the uses of soft skills and importance.
CO2: The students will practically use soft skills in various induristies and for job interview also in daily life.
CO3: The students will understand different aspects of soft skills and they can use it in daily life.

PO6- Use of Modern Tools:-
Operatemoderntools,equipment,instrumentsandlaboratorytechniquesto perform the experiments and write the programs in different languages.

CO1: they will know about the uses of soft skills and importance.
CO4: The students will able to use various soft skills in their own business.
CO5: The students will have thorough knowledge of communication skills so they can easily tackle with any companies.

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

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

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 the ories related to food technology, food science and Food technology & engineering and its other fields related to the program.

CO1: they will know about the uses of soft skills and importance.
CO2: The students will practically use soft skills in various induristies and for job interview also in daily life.
CO3: The students will understand different aspects of soft skills and they can use it in daily life.
CO4: The students will able to use various soft skills in their own business.
CO5: The students will have thorough knowledge of communication skills so they can easily tackle with any companies.
CO6: The students will have thorough knowledge of English language.
CO7: The students will know importance of soft skills.

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 practically use soft skills in various induristies and for job interview also in daily life.
CO5: The students will have thorough knowledge of communication skills so they can easily tackle with any companies.
CO6: The students will have thorough knowledge of English language.
CO7: The students will know importance of soft skills.

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

CO2: The students will practically use soft skills in various induristies and for job interview also in daily life.
CO5: The students will have thorough knowledge of communication skills so they can easily tackle with any companies.
CO6: The students will have thorough knowledge of English language.
CO7: The students will know importance of soft skills.