Anekant Education Society's

TULJARAM CHATURCHAND COLLEGE,

BARAMATI, DIST-PUNE – 413102

Revised Proposed Syllabus

For

B. Voc.

(Food Processing &Post Harvest Technology)

F.Y.(Semester I & II)

(Autonomous)

Sponsored by

University Grant Commission

Under

National Skill Qualification Framework (NSQF)

To be implemented from

2022-23

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 SchoolCertificate (10+2) in any streamor 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.

First Year: Semester-I

Subj. Code	Subject Name	No. of Credits	Marks
Theory (General Component)			
UBFP-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	Processing of Cereals, Pulses & Oilseeds	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	Processing of Cereals, Pulses & Oilseeds	6	150
FP-3.3	Food Chemistry-I	6	150

Second Year: Semester-IV

Subj. Code	Subject Name	No. of Credits	Marks
Theory (General Component)			
FP-10	Bakery and Confectionery Technology	4	100
FP-11	Food Chemistry-II	4	100
FP-12	Food Analytical Techniques	4	100
Practical (Skill Component)			

FP-4.1	Bakery and Confectionary Technology	6	150
FP-4.2	Food Chemistry-II	6	150
FP-4.3	Fundamentals in Bio-Statistics	6	150

Third Year: Semester-V

Subj. Code	Subject Name	No. of Credits	Marks
Theory (General Component)			
FP-13	Dairy Technology Food Quality, Laws and Regulations Principle of Post-Harvest Technology	4	100
FP-14	Food Quality, Laws and Regulations	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-V

Subj. Code	Subject Name	No. of Credits	Marks
Theory (General Component)			
FP-16	Animal Product Technology	4	100
FP-17	Packaging Technology	4	100
FP-18	Food Safety, Hygiene and Sanitation	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

Note:

- One compulsory visit to field/industry/institute for practical papers in all semesters
- Report Submission and PPT presentation of visit report is mandatory
- Seminar Report preparation and PPT presentation mandatory for each theory papers.
- Group discussion/case study based on local/regional/national social economic aspects.

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:

1) To study methods of preservation of foods

2) To develop the skills for processing of food after postharvest and use of various preservation techniques in food processing industries

Learning Outcomes:

- Students will have a thorough understanding of various food processing techniques.ϖ
- The students will know the importance of various preservation techniques.ϖ

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 & freezingEffect 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. Chrishtian
- 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

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:

3) Learn about the morphology of different microorganisms.
4) Study the spoilage caused by microorganism
5) Learn about important microorganisms used in food processing industry.

Learning Outcome:

- Students will have a thorough understanding of various factors responsible for food spoilage.
- The students will know the specifications of various contamination sources and disease developed inϖ certain processed products.

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

First Year **Semester I**

TheoryPaper No, FP-3, Food Science – I

Maximum Marks: 100 **Credits: 4**
Teaching Period: 4 /week **Teaching Load: 60 Theory Period/Semester**

Learning Objectives:
- To make students aware about various cooking methods, food groups, composition,
- To make students understand the nutritive value and effect of cooking on foods

Learning Outcomes:
The student will be able to:
- To know about the basic cookery and the nutritive value of food products
- To classify the products according to composition
- To explain role of each food group products

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 valueof 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)

First Year **Semester I**

PracticalPaper No, FP-1.1, Principles of Food Preservation

Maximum Marks: 150 **Credits: 6**

Teaching Period: 2/week **Teaching Load:24Practicals/Sem (4 Periods each)**

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

First Year **Semester I**

PracticalPaper No, FP-1.2, Food Science

Maximum Marks: 150 **Credits: 6**

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

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. Udipi
- Food Processing Technology 2nd edition By P. J. Fellows

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)**

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 MeredithaFlynin, Nita Rukosky, BPB pub.
- Teach yourself Windows
- Fundaments of Computers - V. Rajaraman
- Computer Fundamentals by P. K. Sinha &Priti Sinha, 4th edition, BPB, publication.

First Year **Semester II**

TheoryPaper No, FP-4, Nutrition Science

Maximum Marks: 100 **Credits: 4**
Teaching Period: 4 /week **Teaching Load: 60 Theory Period/Semester**

Learning Objectives:

- To understand nutrients and food component that supply nourishment to the body.
- To know about the functions, deficiency and toxicity of nutrients
- To understand malnutrition and its prevention

Learning Outcomes:

Students will be able to:

- Utilize knowledge from the physical and biological sciences as a basis for understanding the role of food and nutrients in health and disease processes.
- Provide nutrition counseling and education to individuals, groups, and communities throughout the lifespan using a variety of communication strategies.
- Evaluate nutrition information based on scientific reasoning for clinical, community, and food service application.

Unit-1 Basics of Nutrition **12 Periods**

Introduction to nutrition science, relationship between health and nutrition, role of public nutritionist in health care, interrelationship between nutrition and quality of life.

Unit-2 Food Constituents **12 Periods**

Food Constituents- Definition, Occurrence, Properties and metabolisms of Protein, Carbohydrates and lipids.

Unit-3 Basics for Diet planning **12 Periods**

Role of nutrients, Balance diet, Food exchange list and Principle of Meal Planning, Energy Balance- BMR, Recommended dietary allowances, Balanced diet for different age groups (infant to old age)

Unit-4 Diet for different groups **12 Periods**

Nutrition for Fitness and Sports, Therapeutic diets and effective nutritional counseling, Diet during Energy Imbalance and Diet for different diseases

Unit-5 Problems associated with Nutrition **12 Period**

Malnutrition Causes, types, symptoms and presentation of Assessment of Nutrition status of the community, National Nutritional Policy

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.
- Jim Mann and A. Stewart Truswell (2010) Essentials of Human Nutrition, Third Edition, Oxford Publication.
- Michael J. Gibney, Hester H. Vorster and Frans J. Kok (2002) Introduction to Human Nutrition, First Indian Reprint, Blackwell Publishing.
- Biochemistry of Foods-N.A.M Eskin, H.M. Henderson, R.J. Townsend.
- Introduction to Biochemistry of Foods, Z. Berk

First Year **Semester II**

TheoryPaper No, FP-5, Food Microbiology – II

Maximum Marks: 100 **Credits: 4**
Teaching Period: 4 /week **Teaching Load: 60 Theory Period/Semester**

Learning Objectives:

To enable the students to:

- Understand the various types of poisoning and infection caused by microorganism.
- Study various techniques used to study microorganisms.

Learning Outcomes:

Students should be able to:

- Explain the interactions between microorganisms and the food environment, and factors influencing their growth and survival.
- Explain the effects of fermentation in food production and how it influences the microbiological quality and status of the food product.
- Describe the characteristics of foodborne, waterborne and spoilage microorganisms, and methods for their isolation, detection and identification.

Unit-2: 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-3: 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 4: Control of microorganisms **16Periods**

Quality of food, control at source- training, facilities and operations, equipment, cleaning and disinfection**,** Physical and chemical control methods.

Unit-5: 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-5Beneficial 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

First Year **Semester II**

TheoryPaper No, FP-6, Food Science – II

Maximum Marks: 100 **Credits: 4**
Teaching Period: 4 /week **Teaching Load: 60 Theory Period/Semester**

Learning Objectives:

- To make students aware about various cooking methods, food groups, composition, nutritive value and effect of cooking on foods

Learning Outcomes:

The student will be able to:

- To know about the basic cookery and the nutritive value of food products
- To classify the products according to properties
- To explain role of each food group products

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)

First Year **Semester II**

PracticalPaper No, FP-2.1, Nutrition Science

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

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.

First Year **Semester II**

PracticalPaper No, FP-2.2, Food Microbiology-II

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

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

First Year **Semester II**

PracticalPaper No, FP-2.3, Soft Skill Development

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

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