Anekant Education Society's TULJARAM CHATURCHAND COLLEGE, BARAMATI, **DIST- PUNE - 413102 B. Voc. (Food Processing & Post Harvest Technology)** Revised Syllabus – F.Y 2019-20 (Autonomous)

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 methods of preservation of foods
- 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.
- The students will know the importance of various preservation techniques.
- **Unit-1: Introduction to Preservation**

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

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

Unit-3: Preservation by High & Low temperature

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 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

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

References:

- Food Facts & Principles N. ShakuntalaManay, 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 •

15 Periods

15 Periods

10 Periods

10 Periods

10 Periods

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

Maximum Marks: 100 Teaching Period: 4 /week

Learning Objectives:

- Learn about the morphology of different microorganisms.
- Study the spoilage caused by microorganism
- 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 in *w* certain processed products.

Unit-1 History & scope of Microbiology

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

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

Unit-3Microbial growth in food

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

Unit-4 Food spoilage

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

Food borne illness: Bacteria causing foodborne diseases, foodborne 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

12 Periods

13 Periods

10 Periods

10 Periods

10 Periods

Semester I

Credits: 4 Teaching Load: 60 Theory Period/Semester

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 Objectives:

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

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

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

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

Unit-4: Fruits & Vegetables

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

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

References:

- Food Facts & Principles N. ShakuntalaManay, 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)

Semester I

15 Periods

8 Periods

10 Periods

12 Periods

15 Periods

Firs	t Year	Semester I		
	PracticalPaper 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)		
1.	Study of laboratory instruments	1P		
2.	Study of blanching of different fruits & vegetables	1P		
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 ShakuntalaManay •
- 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	1P
2.	Preparation of rice flakes	2P
3.	Preparation of soya nuts	1P
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
19. Activities: a) Formulation and Standardization of Product	2P
b) Analysis of Product	

References:

- Food Science By Potter
- Food Science 3rd edition By B. Shrilakshmi
- Fruit & Vegetable Preservation By Srivastava Kumar
- Food, Facts and Principles By ShakuntalaManay
- 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	er 4Periods each)		
1. Introducing Computer and Operating system	1P		
2. MS-WORD	1P		
3. MS-EXCEL	1P		
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		
13. Activities: a) Preparation of Survey report by using computer skills	s 2P		
b) Preparation of Comparison Report of different Food	Products		

References:

- Microsoft Office 2000 by Vipra Computers, Vipraprinterspvt. 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&PritiSinha, 4th edition, BPB, publication.

Semester II

TheoryPaper No, FP-4, Nutrition Science

Maximum Marks: 100 **Teaching Period: 4 /week**

Credits: 4 **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

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

Food Constituents- Definition, Occurrence, Properties, Functions, Deficiency and metabolisms of Protein, Carbohydrates, lipids, Vitamins and Minerals

Unit-3 Basics for Diet planning

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

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

Malnutrition Causes, types, symptoms and presentation of Assessment of Nutrition status of the community, Nutritional assessment, planning and Policies

References:

- Bamji MS, Krishnaswamy K, Brahmam GNV (2009). Textbook of Human Nutrition, 3rd edition. Oxford and IBH Publishing Co. Pvt. Ltd.
- 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

12 Periods

12 Periods

12 Periods

12 Periods

12 Period

6

- Dr. M. Swaminathan (2006) Advanced Text book on Food and Nutrition, Volume 1, 2 and 3, 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.
- Introduction to Biochemistry of Foods, Z. Berk

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First Year

TheoryPaper No, FP-5, Food Microbiology – II

Maximum Marks: 100 Teaching Period: 4 /week

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

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

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

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

Microbial spoilage of meat, poultry fish; fruits & vegetables; cereal & cereal products and milk & milk products, SCO, Prebiotic and Probiotic.

Unit-5Beneficial micro-organisms

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

12 Periods

12 Periods

16Periods

10 Periods

15 Periods

Semester II

Credits: 4

Teaching Load: 60 Theory Period/Semester

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)
- Industrial Microbiology by A. H. Patel
- 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

Theory Paper No, FP-6, Food Science – II

Maximum Marks: 100 **Teaching Period: 4 /week**

Learning Objectives:

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

Learning Objectives:

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

White revolution, Sources, Composition & Nutritive value, Physical properties, Milk cookery, Milk substitute, Role of milk & milk products in cookery.

Unit-2 Sugar & Related Products

Sources, Types, Nutritive value, Characteristics & uses of sugar, Properties, sugar cookery & role of sugar in cookery, Sugar related products, Artificial sweeteners.

Unit -3 Fats & Oils

Sources, Composition & Nutritive value, Specific fats & Oils, Effect of heating, role of fat or oil in cookery.

Unit 4 Egg and Flesh foods

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

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. ShakuntalaManay, 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)

10 Periods

10 Periods

10 Periods

15 Periods

15 Periods

Semester II

Credits: 4

Teaching Load: 60 Theory Period/Semester

Semester II

Practical Paper 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	1P
2)	Introduction to diet planning using food exchange list	2P
3)	Diet Planning of adult male / female	2P
4)	Assessment of weight and height of self and calculation of BMI	2P
5)	Planning of Protein and Energy rich dish.	1P
6)	Calculation of Energy Value	1P
7)	Planning of Vitamin A rich dish.	1P
8)	Planning of Vitamin B1 rich dish.	1P
9)	Planning of Vitamin B2 rich dish.	1P
10)	Planning of Vitamin B3 rich dish.	1P
11)	Planning of Vitamin C rich dish.	1P
12)	Planning of Calcium rich dish.	1P
13)	Planning of Iron rich dish.	1P
14)	Nutritional assessment of students	1P
15)	Determination of Glucose level and Blood Group	1P
1 6)	Record diet of self using 24 hour dietary recall	2P
17)	Evaluation of own diet and weight status	2P
18)	Activities: a) Analyzing BMI of different age groups	2P
	b) Diet plan preparation	

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.

Semester II

Practical Paper No, FP-2.2, Food Microbiology-II

	Maximum Marks: 150	Credits: 6	
Τ	eaching Period: 2/week	Teaching Load: 24 Practical/Sen	nester (4 Period each)
1.	Introduction to the Basic Mici	obiology Laboratory Instruments.	2P
2.	Introduction to the Basic Micr	obiology Laboratory materials	1P
3.	Functioning and use of compo	ound microscope	1P
4.	Study of Aseptic Techniques	-	3P
5.	Preparation, Cleaning and ster	ilization of glassware and Media	2P
6.	Preparation of slant, stab and	plates using nutrient agar/ MacCon	keys Agar/ Potato
	Dextrose agar		2P
7.	Cultivation of microbes		2P
8.	Standard Plate Count Method		2P
9.	Monochrome staining		1P
10.	Gram's staining		1P
11.	Negative staining		1P
12.	MPN method for Coliform in	food samples as well as water sample	e. 3P
13.	Visit to microbiology laborato	ry	1P
14.	Preparation of report on visit		1P
15.	Activities: a)Spoiled Product	Study	
	b)Swab Test		

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

Semester II

First Year

Practical Paper 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 4P 1) Tenses 2) Verbs 3) Active & Passive Voice 4) Reported Speech 5) Prepositions 6) Conjunctions 7) Effective Sentence-Construction 8) Vocabulary **Unit 2 Fundamentals 5**P 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 2P Unit 4 Personality development** 3P **Unit 5 Interview and Group discussion 3P** Unit 6 Writing and comprehension skills **5**P 1) Letter (Formal) and Email 2) Report 3) Summarizing reports, articles, editorials 4) Making an abstract 5) Review writing 6) Writing resume 7) Research Paper Writing 8) Review paper Writing **Output Activity:** a) Preparation of Food Blogs **2P** b) Preparation of Poster/Pamphlet related to food

Annexure-I

Semester I

10 Periods

12 Periods

15 Periods

11 Periods

M.Voc (Food Processing Technology) SYLLABUS

First Year

Theory Paper, FPT-1: Advances in Food MicrobiologyMaximum Marks: 100Credits: 4Teaching Period: 4 /weekTeaching Load: 60 Theory Period/Semester

Learning objectives:

• To describe the applications of microbes in industry, the design of bioreactors for different applications, design media, growth conditions and techniques for producing and recovering different types of products of commercial value

Learning Outcomes:

After learning this subject Students will be able to

- Get equipped with a theoretical practical understanding of industrial microbiology
- Understand the beneficial role of microorganisms in fermented foods and food processing.
- Appreciate how microbiology is applied in manufacture of industrial products
- Know how to source for microorganisms of industrial importance from the environment
- Know about design of bioreactors, factors affecting growth and production, heat transfer and oxygen transfer
- Appreciate the different types of fermentation processes and biochemistry of various fermentations
- Understand the techniques and underlying principles in downstream processing

Unit I:Overview of Industrial Microbiology

Introduction to industrial fermentations, Range of fermentation processes, Chronological development Compartmental part of fermentation processes

Unit II: Industrially Important Microorganisms and Their Growth 12 Periods

Criteria for Selection of Industrially Important Microorganisms Overview of strain improvement of Industrially Important Microorganisms Preservation of industrially important microorganisms, Microbial Growth Curve, Synchronous growth

Unit III: Fermentation Media

Media selection Medium Formulation Medium for industrial fermentation, Batch Fermentations, Continuous Fermentation, Fed Batch Fermentation, Production of Citric acid and Lactic acid

Unit IV: Bioreactor

Design: Basic functions, Parts of stirred tank fermenter: Aeration and agitation; agitator, Impeller, sparger systems, baffles and other accessories Types of reactor; Problems related to scale up of Process

Unit V: Upstream and Down Stream Processes:

Upstream processes Overview of Downstream Processing Methods of cell destruction Methods of purification of enzyme/product Concentration and Packaging

References

- Food Microbiology M.R.Adams&M.O.Moss, New Age International (P) Limited, New Delhi
- 2. Food Microbiology William C.Frazier, Tata McGraw Hill publishing Company limited, New Delhi. 4
- 3. General Microbiology Power &Daginawala, Himalaya Publishing House, Mumbai. (vol-II)
- 4. Basic Food Microbiology G. Banwart, CBS Publishing & Distributors.
- 5. Modern Food Microbiology Jay, James, Aspen publishers.

Theory Paper, FPT – 2:Advances in Food Chemistry & Analysis Maximum Marks: 100 Credits: 4 **Teaching Period: 4 /week Teaching Load: 60 Theory Period/Semester**

Learning objectives:

- To develop the skills for structure, functions, metabolism of various components of food
- To learn about working and principles of analytical instruments

Learning Outcomes:

After learning this subject Students will be able to

- Understand the properties of food components
- Develop an understanding of the principles of interactions of food molecules.
- To learn about analytical techniques and its importance in food industry
- Knowledge of proper procedures and methodologies in analytical.

Unit I: Introduction to basic concepts and carbohydrates

Overview of food chemistry, Introduction to food groups, moisture in food, physic-chemical properties of water and ice, water structure, water interactions, water activity

Unit II: Carbohydrates and proteins

Carbohydrates – sources, simple and complex sugars- basic chemistry, sugar derivatives, structures and properties of starch, cellulose, gums, hydrocolloids and dietary fibers.

Proteins - sources, properties and structure of amino acid, protein denaturation, functional properties of protein in food, wheat proteins (dough formation), common food proteins

Unit III: Lipids, enzymes and minerals

Lipids – introduction, nomenclature and structure, characteristics, classes, processing, lipid oxidation, physical properties

Enzymes – nature, chemistry, applications in food industry, control of enzyme action in food Minerals and vitamins – sources and structure, effect of processing and storage, pro vitamin A & D as antioxidants, food pigments and flavoring agents – importance, types and sources changes during processing and storage

Unit IV: Basics in food analysis

10 Periods

Introduction, sample preparations, sampling methods, importance of analysis in industry Basic Electrophoresis techniques used in food analysis

Chromatographic techniques - classification, Paper, TLC, HPLC, Column, Affinity, Ion exchange

15 Periods

10 Periods

Semester I

15 Periods

Unit V: Determinative Techniques

10 Periods

Methods used for Extraction, distillation, titration. Protein, fat, moisture, ash, fiber and carbohydrate analysis methods,

References:

- 1. Fennema, O.R. Ed. 1976. Principles of Food Science
- 2. Meyer, L.H. 1973. Food Chemistry. East-West Press Pvt. Ltd., New Delhi.
- 3. Belitz HD.1999. Food Chemistry. Springer Verlag.
- 4. DeMan JM. 1976. Principles of Food Chemistry. AVI.
- 5. Fennema OR.1996. Food Chemistry. Marcel Dekker.
- 6. Meyer LH. 1987. Food Chemistry. CBS Publication
- 7. Methods in Food Analysis. Joslyn, M.A. Ed. 1970. Academic Press, New York.

r Semester I Theory Paper, FPT-3: Advances in Food Processing Maximum Marks: 100 Credits: 4 Teaching Period: 4 /week Teaching Load: 60 Theory Period/Semester

Learning objectives:

To impart the basic knowledge of:

• Cold preservation and freezers, Dehydration, Irradiation, Food Packaging&Thermal Processing

Learning Outcomes: After learning this subject Students will be able to

- 1. Understand major food preservation principles and techniques.
- 2. Determine suitable methods of processing techniques for a chosen food
- 3. Understand Novel food processing methods like thermal processing, cold preservation etc.

Unit I:Cold Preservation

Freezing: requirements of refrigerated storage-controlled low temperature, air circulation and humidity, changes in food during refrigerated storage, progressive freezing, changes during freezing-concentration effect and ice crystal damage, freezer burn. Refrigeration load, factors determining freezing rate-food composition and non compositional influences.

Unit II:Food Irradiation and Microwave Heating

Ionizing radiation and sources, unit of radiations, direct and indirect radiation effects, safety and wholesomeness of irradiated food. Microwave heating and applications.

Unit III: Thermal Processing

10 Periods

10 Periods

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

Unit- IV Membrane technology: Introduction to pressure activated membrane processes, Types of membrane and configuration, Membrane Processes: Micro- filtration, UF, NF, RO and Electro-dialysis and their industrial applications in Food Industry. Supercritical fluid extraction

Unit-V

Dielectric and Ohmic heating of Foods, ISM frequencies, Microwave and Radio Frequency Processing: Definition, Advantages, Mechanism of Heat Generation, Applications in Food Processing, Limitations. High Pressure processing: Concept, equipments for HPP treatment, mechanism of microbial inactivation and its application in food processing. Ultrasonic processing: Properties of Ultrasonics, Application of Ultrasonics as Processing Techniques.

10 Periods

References:

- 1. Arsdel WB, Copley MJ & Morgan AI. 1973. Food Dehydration. 2nd Ed. Vols.I, II.AVI Publ.
- 2. Desrosier NW & James N.1977. Technology of Food Preservation.4th Ed. AVI.Publ.
- 3. Fellows PJ. 2005. Food Processing Technology: Principle and Practice. 2nd Ed. CRC
- 4. Painy, F.A. and Painy, H.Y. 1983. A Handbook of Food Packaging. Leonard Hill, Glasgow,
- 5. Scicharow, S. and Griffin, R.C. 1970. Food Packaging. AVI, Westport.

Semester I

Theory Paper, FPT-4: Total Quality Management

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

Learning objectives:

- 1. To build fundamental knowledge on total quality management
- 2. To buildfundamental knowledge and realize the significance of TQM in food industry
- 3. To build capability of preparing Quality management documents to get certifications
- 4. To minimize all resource wastages and support growth of company
- 5. To build ecofriendly culture in current generation

Learning Outcomes: After completing this course Students will be able to

- 1. Implement customized quality management systems in different food industries and improve the productivity of plant
- 2. Identify current public health problems nationally and globally.
- 3. Analyse issues (Case study and health issues, Food safety, water safety exercise and obesity, exposure to toxins)
- 4. Compare public health infrastructures in developed and developing countries.

UNIT I INTRODUCTION

Introduction to quality management - Definition, Scope, Significance and Objectives of Quality management; Dimensions of quality in foods, Food quality evaluation techniques, Quality control Vs Quality assurance.

UNIT II ADULTERATION AND QUALITY CONTROL IN PROCESS 12 Periods

Adulteration - Types of adulterants, Adulterant identification techniques, Quality assurance for raw materials, work in process and finished goods, Safe handling of food product, equipments and machineries; personal hygiene- MPL for adulterants

UNIT III QUALITY MANAGEMENT TOOLS

12 Periods

12 Periods

Seven old and new Quality management tools, Statistical process control – Mean & range chart, P chart and C chart, Seven deadly wastages, PDCA cycle, Quality circle, Quality audit, Internal audit, Continuous improvement of productivity- proficiency testing for product quality- Six Sigma Concept.

UNIT - IV QUALITY MANAGEMENT CERTIFICATIONS AND REGULATIONSFOR FOOD INDUSTRY12

Periods

Implementation procedure for HACCP (ISO 22000), QMS, ISO 9000, BIS, APEDA and Six sigma certifications; AGMARK and Codex Alimentary Commission regulations; Packaging and labeling regulations for food products; Regulations for food products export and imports.

UNIT V ENVIRONMENTAL QUALITY MANAGEMENT SYSTEM 12 Periods

Environmental quality management system (ISO14000), Effluent treatment plant location and maintenance- Eco friendly food processing system, green plant, packaging methods, Challenges in quality management and green processing system implementation.

References

1. Poornimacharantimath, Total quality management, Dorling Kindersley, Publishers South Asia Ltd., 2009.

2. Sohrab, 2001 Integrated ISO 9001 HACCP for food processing industries, allied publishers ltd, Mumbai

3. Krammer, A. and Twigg, B.A. 2006. Quality control for the food industry, Volume 2 Applications. The AVI Publishing Company. Inc., Westport, Connecticut.

4. Ranganna, S. 1994. Hand book of analysis and Quality control for fruits and vegetable products. Tata McGraw hill. New Delhi

First Year S	emester I		
Practical Paper, FPT-1.1: Advances in Food Micro	obiology		
Maximum Marks: 150 Credits: 6	(4 D! - dl -)		
1 To study the bacterial growth curve in batch culture	em (4 Periods each)		
2 To study the thermal death characteristics of known bacterial cul	11 ture 1D		
2. To study the thermal death characteristics of known bacteriar cur			
4. Isolation and screening of amylolytic microorganisms	21 2D		
 Isolation and screening of protease producing microorganisms 	21 2D		
5. Isolation and screening of protease producing microorganisms	21 2D		
7 To correct out quantitative estimation of protocologillisms	3F 2D		
7. To carry out quantitative estimation of protease	2F 2D		
8. To carry out quantitative estimation of any lase 0 . To many out quantitative estimation of any lase	2F 1D		
9. To measurement C.O.D. of enfuent	1D		
11. To correct out the athenol formantation by S. corrections	1F 2D		
12. To produce citric acid by A piger	3F 2D		
12. To produce chine actu by A. higer	3P 2D		
First Voor	Semester		
First Year I	Semester		
Practical Paper, FPT –1.2. Advances in Food Chemistry & Analysis			
Maximum Marks: 150 Credits: 6	·		
Teaching Period: 3/week Teaching Load: 24 Practicals/Se	em (4 Periods each)		
1. Working principle of instruments used in food analysis	1P		
2. Estimation of moisture by oven method	1P		
3. Estimation of ash by muffle furnace	1P		
4. Estimation of fat by Soxhlet method	1P		
5. Estimation of protein by	3P		
a) Kjeldahls'			
b) Biuret method			
6. Estimation of iron in food sample	1P		
7 Determination of nigmants in food sample	1 D		
 Determination of pigments in 1000 sample 2 Determination of Vitamin C in food sample 	1F 2D		
0. Determination of acidity of bayerages and inices	2r 1D		
9. Determination of actuary of beverages and junces			
10. Determination of reducing and non – reducing sugars	2 P		

- 11. Analysis of oil:
 - a) Saponification value
 - b) Acid value
 - c) Iodine Number
 - d) peroxide value
- 12. Determination of essential amino acids

5P

2**P**

13. Quality analysis of food products

14. Analysis of water

1P 2P

First Year Semester I			
	Practical Paper, FPT-1.3: Advances in Food processing		
Maximum Marks: 150 Credits: 6			
	Teaching Period: 3/week Teaching Load: 24 Practicals/Sem (4 Period	ds each)	
1.	Comparison of conventional and microwave processing of food	1P	
2.	Low Temperature processing	2P	
	• Experiment on storage of leafy vegetables, fruits, perishable produce at		
	refrigerated temperature, cold storage, and chilling temperature.		
	• By using appropriate pre-processing and various packaging materials.		
3.	Frozen food processing	2P	
	• Experiments on processing of Fruit pulp ,fruits, vegetables, eatables by us	ing	
	appropriate packaging and freezing		
	Quality evaluation and storage studies		
4.	Drying of food using tray dryer/ other dryers	1P	
5.	Preservation of food by using canning (Fruit/Vegetable)	2P	
6.	Osmotic dehydration	2P	
7.	To study the performance the Reverse Osmosis Appratus	1P	
8.	To study and compare RO and Municipal Water	1P	
9.	To study and Compare the properties of RO water, tap water and distilled water	1P	

First Year Theory Paper, FPT- 5: Post harvest Management & Supply Chain Maximum Marks: 100 Credits: 4 **Teaching Period: 4 /week Teaching Load: 60 Theory Period/Semester**

Learning Objective:

- To know the post-harvest management techniques of Fresh fruits, vegetables and plantation crops.
- To get aware about post-harvest loss and their control measures
- To recognize marketing channel and possible losses.

Learning outcomes

- Understand the post harvest technology of spices, fruits and vegetables
- Understand cold chain management
- Processing of horticulture crops with industrial importance
- Understand latest technologies in harvest technology

Unit I: Introduction to post harvest management

Introduction and terminologies, Importance, advancements in post harvest technologies, post harvest losses, causes and types, marketing channels, post harvest chain, climacteric and non climacteric fruits, physiological and biochemical changes in fruits and vegetables, cold chain management

Unit II: Concepts in post harvest management

Post harvest procedures for different vegetables, harvesting, maturity indices, curing, cleaning, washing, sorting and quality grading, transportation, storage, respiration rate, perishable rate, zero energy, ripening process, pre harvest factor affecting quality on post harvest life, Factors responsible for deterioration, methods of storage, CA and MA storage **10 Periods**

Unit III: Plantation crops I

Tea – introduction, types, characteristics, processing, storage and packaging Coffee- introduction, types, processing, curing, characteristics, products

Cocoa- introduction and processing

Unit IV: Plantation crops II

Spice processing technologies of pepper, cardamom, cove, cinnamon, clove, nutmeg, turmeric, garlic, coriander, fennel, fenugreek, vanilla, herbal spices, ginger and tamarind, value addition

Unit VI:

Logistics and supply chain management - Scope, Significance and Drivers; Basic Model - Primary and Secondary Activities; Role and Challenges of Logistics and supply chain management in food industry.

References:

- 1. Kadar AA.1992. Post-harvest Technology of Horticultural Crops.2nd Ed. University of California.
- 2. Lal G, Siddapa GS & Tandon GL.1986. Preservation of Fruits and Vegetables. ICAR

15 Periods

10 Periods

Semester II

15 Periods

10 Periods

- 3. Pantastico B. 1975. Post Harvest Physiology, Handling and Utilization of Tropical and Subtropical Fruits and Vegetables. AVI Publ.
- 4. Salunkhe DK, Bolia HR & Reddy NR. 1991. Storage, Processing and Nutritional Quality of Fruits and Vegetables. Vol. I. Fruits and Vegetables. CRC
- 5. Thompson AK. 1995. Post Harvest Technology of Fruits and Vegetables. Blackwell Sci.
- 6. Verma LR. & Joshi VK. 2000. Post Harvest Technology of Fruits and Vegetables. Indus Publ

Theory Paper, FPT- 6: Novel Food Packaging Technology Maximum Marks: 100 Credits: 4

Teaching Period: 4 /week

Learning Objective:

- To know the Novel Food Technology, function of packaging, types of packaging.
- To get aware about the packaging materials
- To understand properties of packaging materials their methods of testing and evaluation

Learning outcomes

- Students will be able to understand operations involved in packaging material manufacturing
- Students will be able to understand major packaging material and methods used in food packaging

Unit I: Novel Food Packaging Technology

Introduction to principles of Food Packaging, Functions of packaging, Types of Package. Packaging materials, Desirable properties of Packaging Materials, Selection of packaging material for different foods.

Unit II: Methods of packaging and packaging equipments

Different forms of packaging such as Rigid, Semi rigid, Flexible forms. Properties of packaging materials their methods of testing and evaluation; Barrier properties of packaging materials: Permeability,Gas transmission rate (GTR), Water vapour transmission rate (WVTR) and their measurement.

Unit-III Glass

Glass: composition, properties, types of closures, methods of bottle making; Metals: Tinplate containers, tinning process, components of tinplate, tin free steel (TFS), types of cans, Aluminum containers, lacquers.

Unit-IV Plastics

Plastics: types of plastic films, laminated plastic materials, coextrusion, edible films, biodegradable plastics. Active and Intelligent packaging techniques: Concept, techniques and uses in Food Industry, Current use of novel packaging techniques, Consumers and novel packaging.

12 Periods

12 Periods

12 Periods

12 Periods

Semester II

Teaching Load: 60 Theory Period/Semester

Unit-V Scavengers Periods

Oxygen, ethylene Carbon dioxide and other scavengers: Scavenging technology, and its applications. Different packaging system for different foods, Prediction of Shelf Life of foods.

References:

- 1. Kadoya T. (Ed). 1990. Food Packaging. Academic Press.
- 2. Mahadeviah M & Gowramma RV. 1996. Food Packaging Materials. Tata McGraw Hill.
- 3. Palling SJ. (Ed). 1980. Developments in Food Packaging. App. Sci. Publications
- 4. Painy FA. 1992. A Handbook of Food Packaging. Blackie Academic.

5. Sacharow S & Griffin RC. 1980. Principles of Food Packaging. AVI Publications

Semester II **Theory Paper, FPT-7: Beverages and Snack Food Technology** Maximum Marks: 100 Credits: 4 **Teaching Load: 60 Theory Period/Semester Teaching Period: 4 /week**

Learning objectives:

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

Learning Outcomes:

After learning this subject

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

UnitI: Introduction to Beverages

History, importance of beverages and status of beverage industry, Types of Beverages, packaged drinking water Processing

Unit II: Processing of beverages

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

Unit III: Quality of Beverages

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

Unit IV: Grain Based Snacks

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

Unit V: Other Snack Foods

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

29

12 Periods

12 Periods

10 Periods

12 Periods

14 Periods

References

- 1. Edmund WL. Snack Foods Processing. AVI Publ.
- 2. Frame ND .1994. The Technology of Extrusion Cooking. Blackie Academic.
- 3. Gordon BR.1997 Snack Food.AVI Publ
- 4. Dubey SC. 2002. Basic Baking. The Society of Indian Bakers, New Delhi.
- 5. Francis FJ. 2000. Wiley Encyclopedia of Food Science & Technology. John Wiley& Sons.
- 6. Manley D. 2000. Technology of Biscuits, Crackers & Cookies. 2nd Ed. CRC Press.
- 7. Pyler EJ. Bakery Science & Technology.3rd Ed. Vols.I, II.Sosland Publ.

Semester-II

Theory Paper, FPT – 8:Statistical and Research Methodology Maximum Marks: 100 Credits: 4

Teaching Period: 4 /week

Teaching Load: 60 Theory Period/Semester

Learning Objectives:

- The purpose of the course is to impart knowledge on different advanced statistical methods for its applications in Food & Nutrition related disciplines.
- To understand some basic concept of Research and its Methodology
- The emphasis will be more on solving practical problems with basic understanding of the theoretical concepts.

Learning Outcomes: At the end of the course, the students should able to understand,

1. Analysis of data to draw valid inferences.

2. To understand the working of statistical methods and its applications to several situations.

3. To develop statistical models and to study the several characteristics of data structures.

Unit I: Introduction to statistics

Definition concepts for understanding statistical measures, popular concepts and misuse of statistics ,Normal distribution and its property's ,Normal distribution Binomial distribution Probability, use of normal probability tables, area under normal distribution ,,Data management planning of data analysis-coding of response, preparation of code book ,Coding of data ,Use of statistical programmes -Ms-excel,SPSS

Unit II:Data analysis

Quantitative analysis - descriptive statistics, descriptive statistics, inferential statistics, uses and limitations, summation sign and its properties proportions, percentage ,ratios

Measures of central tendency –mean, median, mode-arithmetic mean and its uses, mid – range geometric mean, weighted mean Measures of dispersion /variation ,kurtosis,skewness

Grouped data –frequency distribution, histogram, frequency polygons, percentiles, quartiles, tertiles, ogiveLarge and small samples tests and interpretation,Z–test for single proportions and difference between proportions, large sample test for single mean and difference between means 'Small sample

Unit III: Chi square test and its interpretation

General features ,goodness of fit, independence of attributes, Correlation and Regression and its interpretation - Basic concepts, Linear regression and correlation coefficient, regression and prediction, Rank correlation, product –moment method, Analysis of variance and its interpretation - one factor analysis of variance, two-factor analysis of variance

Unit IV: Presentation of data

Tabulation and Organization of data frequency distributions, cumulative frequency distribution, tables Graphical presentation of data –histograms, frequency polygon ,ogive ,stem and leaf plot,box and whiskers plot , Graphs for nominal and ordinal data –pie

diagram, bar graphs of different types, graphs for relation between two variables, lines diagrams. Use of illustrations, Caution in visual display of data

Unit V: The Research Report

Basic components of a research report –prefatory material, introduction and review of related literature, methodology, results, discussion, conclusion, summery, abstract,Bibliography and appendices.

References:

- 1. Fundamentals of biostatistics- Veer Bala Rastogi, Ane books publication
- 2. Biostatistics- P Rama Krishanan, Saras publication
- 3. An introduction to biostatistics- N. Gurumani, MJP publication.

First Year Semester	II
Practical Paper, FPT-2.1: Post Harvest Management & Supply Cl	nain
Maximum Marks: 150 Credits: 6	
Teaching Period: 3/weekTeaching Load: 24 Practicals/Sem (4 Period)	riods each)
1. Morphological features of some selected fruits and vegetables	1P
2. Determination of angularity of banana and its correlation with maturity	1P
3. Preservation of foods by sugar	3P
a) Jam	
b) Jelly	
c) Marmalade	
4. Fruit Preserves	2P
a) Tuti Fruity (Papaya)	
b) Ginger Murabba (Ginger).	
5. Preservation of foods by salt and acid	1P
6. Tomato ketchup	1P
7. Lemon pickle	1P
8. Study on inactivation of enzyme by blanching	1P
9. Determination of total soluble solids of fruits	1P
10. Determination of juice content of fruits	1P
11. Determination of Titrable acidity of fruit and its correlation with ripening	1P
12. Studies on starch content and its correlation ripening of fruit	1P
13. Determination of fruit firmness and its correlation with ripening	1P
14. Wax coating of selected fruits	1P
15. Ripening of banana using ether	2P
16. Studies on effect of different storage temperatures on quality of fruits	1P
17. Effect of storage transpiration rate of fruit	2P
18. Packaging of fruits and vegetables	1P
19. Effect of blanching of polyphenol oxidase activity	1P

First YearSemester IIPractical Paper, FPT-2.2: Novel Food Packaging Technology
Maximum Marks: 150Credits: 6Teaching Period: 3/weekTeaching Load: 24 Practicals/Sem (4 Periods each)

Identification and testing of packaging materials	1P
Determination of tensile strength of given packaging material	1P
Cut out analysis of canned food	1P
Determining water absorption capacity of packaging material	1P
Determining bursting strength of packaging material	1P
Determining tearing strength of packaging material	1P
To perform vacuum packaging of food sample and carry out its storage study	1P
Testing of lacquered tin plate sheets	1P
Determination of water vapour transmission rate of package films	1P
Pre-packaging practices followed for packaging fruits and vegetables	1P
Packaging and labelling of the product-packaging design, graphics, labelling	1P
Visit to packaging industry.	3P
	Identification and testing of packaging materials Determination of tensile strength of given packaging material Cut out analysis of canned food Determining water absorption capacity of packaging material Determining bursting strength of packaging material Determining tearing strength of packaging material To perform vacuum packaging of food sample and carry out its storage study Testing of lacquered tin plate sheets Determination of water vapour transmission rate of package films Pre-packaging practices followed for packaging fruits and vegetables Packaging and labelling of the product-packaging design, graphics, labelling Visit to packaging industry.

First Year Semester II	
Practical Paper, FPT-2.3: Beverages and Snack Food Technolog	y
Maximum Marks: 150 Credits: 6	-
Teaching Period: 3/weekTeaching Load: 24 Practicals/Sem (4 Periods	s each)
1. Quality analysis of water from different sources and treatments	1P
2. Determination of aqueous extraction of tea/coffee	1P
3. Detection of sodium benzoate in beverage	1P
4. Measurement of pH and acidity of beverage	1P
5. Detection of E. coli in beverage	1P
6. Measurement of CO2 content of carbonated beverage	1P
7. Determination of caffeine in beverages	1P
8. Determination of tannins in wine	1P
9. Preparation of Instant Tea/coffee	1P
10. Preparation of carbonated beverage	1P
11. Specifications for different fruit beverages and preparation of fruits squash	1P
12. Preparation of artificial lemon juice	1P
13. Preparation of beverage using artificial sweetener	1P
14. Preparation of cereals based fried snack foods	1P
15. Preparation of legume based fried snack foods	1P
16. Preparation of cereal grain based puffed products	1P
17. To study the effect of frying time and temperature on potato chips	1P
18. Preparation of cereal and legume based roasted snack	1P
19. Determination of shelf-life and packaging requirements of snack food products	2P
20. Visit to carbonation unit	1P
21. Visit to mineral water plant	1P
22. Visit to industriesManufacturing snack foods.	2P

Second Year

Semester III

Practical Paper, FPT-3.1 Experiential Learning ProgrammeMaximum Marks: 300Credits: 12Teaching Period: 3/weekTeaching Load: 24 Practicals/Sem (4 Periods each)

a) Concept The word 'experiential' essentially means that learning and development are achieved through personally determined experience and involvement, rather than on received teaching or training, typically in group, by observation, study of theory or hypothesis, and bring in innovation or some other transfer of skills or knowledge. Experiential learning is a business curriculum-related endeavour which is interactive. EL is for building (or reinforcing) skills in project development and execution, decisionmaking, individual and team coordination, approach to problem solving, accounting, marketing Theprogramme has end to end approach. Carefully calibrated activities move participants to explore and discover their own potential. Both activities and facilitation play a critical role in enhancing team performance.

b) **Objectives** EL provides the students an excellent opportunity to develop analytical and entrepreneurial skills, and knowledge through meaningful hands on experience, confidence in their ability to design and execute project work. The main objectives of EL are:

- To promote professional skills and knowledge through meaningful hands on experience.
- To build confidence and to work in project mode.
- To acquire enterprise management capabilities

Second Year

Semester III

Practical Paper, FPT-3.1 Experiential Learning Programme

Maximum Marks: 300 Teaching Period: 3/week

Credits: 18 Teaching Load: 24 Practicals/Sem (4 Periods each)

PURPOSE: To undertake research in an area related to the program of study

INSTRUCTIONAL OBJECTIVE: The student shall be capable of identifying a problem related to the program of study and carry out wholesome research on it leading to findings which will facilitate development of a new/improved product, process for the benefit of the society.

M.Tech projects should be socially relevant and research oriented ones. Each student is expected to do an individual project/Group Project. At the completion of a project the student will submit a project report, which will be evaluated (end semester assessment) by duly appointed examiner(s). This evaluation will be based on the project report and a viva voce/Presentation examination on the project.

Second Year

Semester IV

Practical Paper, FPT-4.1 Industrial Tour

Maximum Marks: 150

Credits: 6

Teaching Period: 3/week Teaching Load: 24 Practicals/Sem (4 Periods each)

Industrial Tour of Two-Three weeks to various industries within and outside the state of the university and submission of report on industrial tour

Objectives:

The objective of an industrial visit is to provide

- 1. An insight regarding internal working of companies.
- 2. To understand that theoretical knowledge is not enough for a successful professional career. With an aim to go beyond academics, industrial visit provides students a practical perspective of the work place.
- 3. An opportunity to learn practically through interaction, working methods and employment practices.
- 4. To an exposure to current work practices as opposed to possibly theoretical knowledge being taught at college.
- 5. An excellent opportunity to interact with industries and know more about industrial environment. Industrial visits are arranged by colleges for us with an objective of providing us an opportunity to explore different sectors like IT, Manufacturing, services, finance and marketing. Industrial visit helps to combine theoretical knowledge with practical knowledge. Industrial realities are opened to the students through industrial visits.

Second Year

Semester IV

FPT-4.2 Internship/ In-plant Training

Maximum Marks: 600 Teaching Period: 3/week

Credits: 24 Teaching Load:

Students should undergo Internship/In-plant training, during Semester VI. The Department in consultation with the food industries arranges the programme. The purpose of the programme is to get hands-on experience on various aspects of food industries that form the strong foundation for the young food technologists. Student should report for the programme on the stipulated date. On completion, each student should prepare a report duly certified by the supervisor in the industry. Consequently, a seminar should be conducted in the department to present the finding of the report. The external examiner will evaluate the bonafide project report attested by the head of the department and a viva voce will be conducted.

M.Voc. Proposal Application under the UGC Scheme for providing Skill Based Education under National Skill Qualification Framework

1.	Name of the College	TuljaramChaturchand College of Arts, Science			
	(as given in list u/s 12(B) of UGC Act	and Commerce, Baramati			
2.	Full Postal Address:	Box No. 51, A/P. Tal. Baramati Dist. Pune Pin:			
		413102			
3.	Name of the Affiliating University	SavitribaiPhule Pune University, Pune			
4.	Whether covered under Section 2 (f)	Yes			
	and 12 (B) of the UGC Act, 1956				
5.	Whether Autonomous	Yes			
6.	Whether recognized as college with	Yes			
	Potential for Excellence/University				
	with Potential for Excellence				
7.	NAAC/NBA Accreditation details.	NAAC- Accredited "A ⁺ " (CGPA-3.55) Grade,			
	(Date, Grade, CGPA, Validity)	2017 and ISO Certified 9001-2008			
8.	Whether the institution is aided and	Yes aided, UGC-GDA			
	receiving General Development				
	Assistance from UGC or Self				
	Financing?				
9.	Name, designation and contact	Dr. Chandrashekhar V. Murumkar			
	details(Telephone/fax/mobile/email)	Tel: (02112)-222728, Fax: (02112)-222728,			
	ofHead of the Institution.	Mobile: 9850640140			
		Email: principal.tccollege@gmail.com			
10.	Website URL of the College	www.tccollege.org			
	/University				
11.	Any other relevantinformation	TuljaramChaturchand College of Arts, Science			
	(Maximum 100words) College /	and Commerce, Baramati was established in 1962			
	Universitymay like to provide	and is affiliated to SavitribaiPhule Pune			
		University, Pune. The College has Jain Religious			
		minority status from Government of Maharashtra.			
		The college has: (A^{+2}) and (A^{+2}) and (A^{+2})			
		NAAC Re-accredited with A grade (CCDA 2.55)			
		(CGPA-5.55)			
		 DRT Star Collage Scheme 			
		$\blacktriangleright \text{ DST FIST '0' Level}$			
		\sim UGC-COC			
		 Best College Award- SSPU 2017 			
		 Best Concernward-SSI 0 2017 Best Principal Award-SPPI 2017 			
		\blacktriangleright IIG (25) and PG (18) courses in Arts			
		Commerce and Science faculty			
		 Post Graduate Research Centre (03) 			
		The research projects are funded by DST			
		UGC, BCUD (University of Pune).			

1. Details of the College:

2. Details of the Proposed Programmes

(a) PG Program

S. No	ie ector	e le (s) na & egree)	Duration	n	lits	and posed		ntake
	Name of th Trade or S	Name of th Programm (PG Diplor M.Voc. De	No. of Hours	No. of Semester	No. of cred	Job Roles : Levels proj (*)	Partners Industry	Proposed i of students
1.			450	Ι	30	Level-8		24
	v	la le	450	II	30	Level-8		
	ing. log.	lom					auli lapr	
	Food Process Technol	PG Dip Prograu					td, Dairies, B Foods, M ali Group	
2.			450	III	30	Level-9	t. L ix I RS Ranj	
	ing	ree	450	IV	30	Level-9	Pv am Pat	
	Food Process Technology	M. Voc. Deg					Imsofer India ScheriberDyn India Pvt. Ltd &Malas Wai, Ahmed Nagar	

3. Basis for choosing the course specialisation(s):

- a) Skills Gap requirements.
- b) College has expertise in the specialisation; and
- c) College has committed industry partner(s) for design, delivery, internship and placement.

<i>3.1</i> .	Skill	Gaps	Identified:
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01217									
S.	Trade (S)	Skill Gaps Identified (Quantitative, Qualitative, Source)							
No.									
1.	M. Voc. in Food	> There is strong demand for uplifting agriculture base							
	Processing	through Technological & Managerial Support.							
	Technology	→ There is potential for producers of processed food at							
		regional, national and international level.							
		> Food processing technology will be nurturing farmer's							
		economics and will help in his economicupliftment.							
		> Availability of Fruits, vegetable, milk, meat and poultry							
		in the entire western Maharashtra but Food Processing							
		industry are very limited.							
		There is scope for emerging entrepreneurs							
		> Skilled manpower is not available in existing food							
		processing industry in this region.							
		(i) Western Maharashtra is predominant area of milk and							

milk produce and a large number of dairy and milk
processing units are running/coming up. Also the area is
potential milk supplier to Delhi, Mumbai, Pune and
export also. So, the setting up of a new department of
Dairy Technology at TC College, Baramati, is the need of
hour.
(ii) There is need of preservation dairy and dairy products.
(iii)Value addition to dairy products, by-products and residues
(iv)To develop diet milk, fortified milk and other such niche categories which are expected to grow.
(v) Packaging and handling of traditional and other new products will be developed by adopting latest
technologies and processes

3.2. Existing expertise / core competence of the College in the proposed trade(s):

S.	Specialisation	Existing Expertise (Which can be leveraged by the					
No.		institution)					
1.	M. Voc. in Food	Dr. Wazid Ali Khan, M. Tech. (Food Engineering) and Ph.					
	Processing	D (Post Harvest Engg. & Technology)					
	Technology	Miss S.S. Nair, M.Sc. Food Science & Technology					
		Miss. A.A. Zambare, Food Science & Technology					
		Mrs. A.S. Phule, M.Tech. Food Technology					
		Miss Pooja D. Jirobe, B.Tech. (Food Technology) & M.Sc.					
		(Food and Nutrition)					
	English	We have highly experienced & qualified staff in English					
	Communication Skills	Dept.					
	Group Discussion	Separate team for conducting soft skill programme					
	On job training	Project work undertaken in collaboration with agricultural					
		and Food Processing industries					
	Institution Expertise	Institute has COCProgramme, College has post-graduation					
		Programme (Botany, Chemistry & Microbiology) and					
		Separate Management College.					
	Industrial Support	Real Dairy, Nandan Dairy, Dynamix Dairy, Baramati					
		Fresho Ice-cream,Imsopher India Pvt. Ltd. Taj frozen food,					
		United Sprits, Bauli, Baramati Agro, VRS Foods, Sonai					
		Dairy, rj foods, Modi Foods, Personna Foods, Gits, Morde,					
		ITC, Varna dairy, GokulDaidy and Govind etc.					

4. Curriculum Design

- 4.1. Has the Curriculum for each programme been developed in consultation with the:
- a) Sector Skill Council? YES / NO: No
- b) Industry partner? YES / NO: Yes

4.2. Please provide details of Industry/Sector Skills Council (SSC) Representatives (Name/Designation/Address) involved in design and preparation of curriculum for each of the proposed programme (s):

S.	Name of the	Details of the Industry & SSC Representative (S)					
No	Programme	Name	Name of Contact Details (Mobile, ema				
	-		Organization	website)			
			& Address				
1.	M. Voc. Food	Support	NIASM,	Dr. N.P. Singh, Director, NIASM ,			
	Processing	Services	Malegaon	Baramati 413 115, Pune Maharashtra,			
	Technology		U	Phone : (02112)			
				254057/58/59www.niam.res.in			
		Support	NRC on	Dr. NileshGaikward, Sr. Scientist,			
		Service	Pomegranate,	NRC on Pomegranate, Solapur,			
			Solapur	Maharashtra 7756935301			
		Curriculum	Agricultural	Dr. Syed Shakir Ali, Incharge, KVK,			
		design,	Development	Baramati			
		Academic	Trust	8380090282 <u>kvkbmt@yahoo.com</u> ,			
		Partners		www.kvkbaramati.com			
		Academic	PDKV Akola	Prof. P.A. Borkar, Head Processing			
		Support		& Post-Harvest Tech.Mobile:			
				09822716481			
		Support	Technical	Mr. PrashantRaut, Baramati			
		Service	Director	Email:prashantraut.1@gmail.com			
			Ceres Organics				
			Pvt.Ltd.				
		Curriculum	ICAR	Dr. R.P. Kachru, Ex- ADG Process			
		Design		Engg. and Advisor, PHT Scheme,			
				Govt. of India,			
		Academic	BARC,	"Padamshree"Dr. S.P. Kale			
		Support	Mumbai	Ex-Associate Director, BSG			
				BARCTrombay, Mumbai 400085			
		Academic	SNDT	Dr. S. M. Naikare, Pashan, Pune			
		Support	College, Pune	9823360944			
		Support	Nichrome	Mr. C. V. Joshi, Chairman,			
		Service	India Ltd.	Nichrome India Ltd. Pune			
			Pune				
		Support	Imsofer,	Mr.ChetanShinde, Production			
		Service	Service Baramati Manager, Imsofer, Baran				
		Academic	Dr. B. K.	Dept. of Food Technology, Dr.			
		Service	Sakhale	BAMU, Aurangabad			
		Academic	Academic Dr. Rahul Dr. BSKKV, Dapoli				
		Support	Ranveer	9967309295			
		Academic	Dr. P.K. EX Dean, CAE&PHT, Ranipool,				
		Support	Srivastava	Gangtok			

	and Mational Skill Qualification Trainework.							
S.	Name of the	Semester		Job role (s) Covered	NSQ	Remarks		
No.	Sector/Programme				F			
1.	Food Processing Techn	ology						
	Post Graduate	I&II	\checkmark	Quality control Executive	Level	Post		
	Programme in Food		\triangleright	Supply Chain and Logistics	-8	Graduate		
	Processing Technology			Professionals		Diploma		
		Supervisor and Others			in FPT			
		Technical Officer						
			\triangleright	Food Consultant				
	M. Voc. Degree Food	III & IV	\checkmark	Production Manager and	Level	M. Voc.		
	Processing Technology			Process Engineer	-9	Degree		
			Research & Development			_		
				Specialists				
			\triangleright	Regulatory & Legal Experts				
		Academic Professionals						
			\triangleright	Sensory Evaluator				

4.3. Alignment with National Occupational Standard of the Sector Skills Council and National Skill Qualification Framework:

4.4 Whether the curriculum has been vetted by respective Sector Skill Council (s):No

5. Proposed subjects / papers in each of the semester of proposed programmes to be offered in Centre separately for the General Education & Skill component.

5.1 Food Processing Technology (M. Voc. Programme)

First year: Semester I

Sr. No.	Subject Name	No. of Credits	Marks					
Theory (General Education Component)								
FPT-1	Advances in Food Microbiology	3	75					
FPT-2	Advances in Food Chemistry & Analysis	3	75					
FPT-3	Advances in Food Processing	3	75					
FPT-4	Total Quality Management	3	75					
Practicals (Skill Component)								
FPT- 1.1	Advances in Food Microbiology	6	150					
FPT-1.2	Advances in Food Chemistry & Analysis	6	150					
FPT-1.3	Advances in Food Processing	6	150					

Semester II

Sr. No.	Subject Name	No. of Credits	Marks		
Theory (General Education Component)					
FPT-5	Post Harvest Management & Supply Chain	3	75		
FPT-6	Novel Food Packaging Technology 3				
FPT-7	Beverage and Snack Food Technology	3	75		
FPT-8	Statistical & Research Methodology	3	75		
Practicals	(Skill Component)				
FPT- 2.1	Post Harvest Management& Supply Chain	6	150		
FPT- 2.2	Packaging Technology	6	150		
FPT- 2.3	Beverage and Snack Food Technology 6				

Second year: Semester III

Sr. No.	Subject Name	No. of Credits	Marks
Skill Com	ponent		
FPT 3.1	Experiential Learning Programme	12	300
FPT-3.2	Research Project	18	450

Second Year: Four Semester IV

S. No.	Subject Name	No. of Credits	Marks
FPT 4.1	Industrial Tour- Ten Days	06	150
FPT 4.2	Internship/In-Plant Training	24	600

Note:

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

5.2 Detailed Syllabus: Please Refer Annexure-I

6. Details of Existing Faculty/Departments:(We are running two B.Voc. courses under Food and Dairy Technology namely 1. Food Processing and Post-Harvest Technology and 2. Dairy Technology

S. No.	Faculty/Departments	Sanctioned Faculty Strength	Existing Faculty Members	Total number of Students
1.	B. Voc. Food Processing and Post-	01	04	150
	Harvest Technology			
2.	B.Voc. Dairy Technology	01	02	50

7. Existing Industrial Linkages:

	Name of the Industry/Industry	Nature of Existing Collaboration
	Associations	
F	or Food Processing Technology	
\blacktriangleright	NRC on Pomegranate, Solapur (MS)	Training, Research and Development
\blacktriangleright	Real Dairy, Baramati	In-plant Training and Placement
\blacktriangleright	CAU, Gangtok Sikkim	Research and Development
\checkmark	Sunder Sikkim, Gangtok	In Plant Training and Research,
\blacktriangleright	BFIT, Dehradun	Academic Support
\blacktriangleright	Modi Foods, Baramati	In Plant Training and Placement
\blacktriangleright	YISD, Pune	Academic Support
F	or Dairy Technology	
\triangleright	Real Dairy, Baramati	In-plant Training and Placement

8. Proposed Industry Partners/NSDC Training Partners for Skill Training for Proposed Programmes:

Name of the Industry Partner	Nature of work, specialization and Size of Operations
Food Processing Technology (M. Voc. Progr	camme)

VRS Foods, Ahmednagar	Training and Placement
Agriculture Development Trust, Baramati	Academic and Research
Dr. BSK Agriculture University, Dapoli	Curriculum Design
United Sprit, Pimpli	In-plant Training and Placement
ARTI, Phaltan	In-plant Training and Placement
Ceres Organics Pvt. Ltd. Mumbai	In-plant Training and Placement
Nichrome India Ltd. Pune	In-Plant Training and Placement
 Gits Food Private Limited, Pune 	In-plant Training and Placement
SNDT, Pune	Academic development
Modi Foods, Baramati	Training and Placement
SchriberDynamix Dairy	Academic Support, Training &
	Placement
VRS Foods, Ahmad Nagar	Academic Support, Training &
	Placement
Pantajali Foods, Ahmad Nagar	Academic Support, Training &
	Placement
Real Dairy Baramati	Training and Placement
Nandan Dairy Baramati	Training and Placement
Bauli India Pvt. Ltd.	Academic support, Training &
	Placement
Imsofer India Pvt. Ltd	Training and Placement
Name and Details of NSDC Skills Training	Partners (if any): Nil
To be contacted	

9. Details of B.Voc. /Community College: (Applicable only if the Institution is approved under UGC Community Colleges/B.Voc./DDU KAUSHAL during XII Plan)

Programmes	Key Achievements (Enrolment, Industry
	Collaboration, Placements etc)
B. Voc.	
(UGC reference No. D.O. No. F. 2-2/2014	
(B.Voc) dated 05 th May, 2014 and grants	
approved-185.00 Lakhs)	
Food Processing and Post-Harvest	Enrolment-44 Students in 2014-15
Technology	Enrolment 50 Students in 2015-16
	Enrolment 50 Students in 2016-17
	Enrolment 50 Students in 2017-18
	Enrolment 50 Students in 2018-19
	Industry Collaboration -6 MoU Signed
	80% placed in industries
	20% self employed and higher education
Community College	Nil
DDU Kaushal	Nil

10. Availability of Faculty

S.	Name of the		Name	of the Fa	Faculty Name of		Name of the Industry
No.	Programme	Req uire d	Available with Host Instituti on	Guest Faculty to be hired	Guest Fac to be prov by indu Partners	culty 'ided 1stry	Partner Providing guest faculty
1.	Post Graduate Diploma & M.Voc. Degree in Food Processing Technology	07			02		Real Dairy, Paras Dairy&SchrieberDynamix Dairy Baramati, Ceres Organics Pvt. Ltd. Mumbai, NRConPomegranateSolapur, Ferrero India Pvt. Ltd.
11.7	Training needs of	Faculty					
S. No.	Name of the Pro	gramm	e (s)	Details of required duration	f Training &	Tra (NS	ining Provider (s) DC/Industry)
Food	Processing Techn	ology				1	
1.	1. Quality Systems in food industry		ndustry	02 days to 06 days NIS' Lim		NIS Lim	T Institute Private hited, Pune and Mumbai
2.	2. Testing & quality evaluation of packaging materials		ion of	2 days to 0	5 days	IIP,	Mumbai
3.	Food Processing	Fechnol	ogy	07 to 15 d	ays	NA	FARI, Pune
4.	Instrumentation in processing	n food		15 days		IICI	PT, Tamil Nadu
5.	Flavour & Ferme	ntation '	Fech.	15 days		FFD	DC Kannouj, UP
6.	Vegetable oil products &	<u>cessing,</u> analysi	<u>value</u> <u>s</u>	05 days		CFI	TRI, Mysore
7.	 <u>Thermal processing of foods</u> principles, packaging and practices 		ods	03 days		CFI	FRI, Mysore
8.	3. Functional food product / ingredient development from fruits and vegetables		05 days		CFI	TRI, Mysore	
9.	Advance knowledge with new technology development		new	Two week	t per year	Rah Rah	uuriKrushiVidyapeeth, uuri
10.	 Practical training on different method of food processing 		rent g	Tow week	t per year	Agr Mal	icultural College, legaon, Baramati
11.	PHT on Fruits &	Vegetat	oles	07 days to	15 days	NIP	PHT, Talegaon, Pune
12.	Food Safety & St	andard		1, 2 & 3 E	Days	FoS	TAC, Mumbai & Pune
13.	Cheese Technolog	gy				ND	DB, Hisar

12. Details of infrastructure available with university/college for KAUSHAL

Particulars	Details
Administrative/faculty office	06 No. (14'.3"X11'.9")
Classrooms	09 No. (29.0"X24'.3")
Labs/Workshops	06 No. (29'X49'.3")

Note: Separate building for the B.Voc. Programme is Available

13. Please provide plan for meeting the requirements of physical infrastructure for programmes to be offered:

S.	Name of the	Α	vailability of Physical i	nfrastructure
No.	Programme	Infrastructure	Available in Host	To be provided by
			College/University	industry Partner/NSDC
				Training Partners
1.	Food	Classroom	03 No.	
	Processing		(29.0"X24'.3")	
	Technology	Laboratory	02 No. (29'X49'.3")	
		Workshop	Yes (Central facility)	
		Library*	Yes 01 (16'X18.3)	
		ICT Facility*	Yes 01 (29'X25')	
		Others	Yes	Research Activity & Inplant
				Training by Real Dairy-
				Baramati,Mapro-
				Wai,Nichrome Industry,
				Pune, NRC on Pomegranate-
				Solapur

Note: Separate building will be made available after sanctioning of the M.Voc. Programme. *Central library and central ICT facility are also available

14. Placement Plan:

14.1 Please provide details of plans, for enabling placement of students of the Centre in partner industries:

S.	Name of the	Details of Proposed Placement of learner	Details of Proposed Placement of learners		
No. Programme		Industry Partners name (s)	Expected Placement Numbers by the partner industry at the end of the programme		
1.	Food	ITC, Bauli, Gits, Imsofer, VRS Foods,	24 Students		
	Processing	Patanjali Foods, Real Dairy, Nandan			
	Technology	Dairy, ITC, Sonai Dairy etc. Schrieber			
		Dynamix Dairy Baramati, Goverdhan			
		Dairy etc.			

Note: Partnership in process

14.2 How would the Centre set up an effective mechanism for placement of students?

TC College Baramati would play a critical role in addressing the issues of talent gaps in various industries by way of continuing education and training programmes. College will coordinate between the Industry, Academia and Government to create the required ecosystem for skill development. The institute will forge broad based partnership and be a primary driver in matching the talent requirement of the Industry. It will focus on the skill deficit in industry by planning and delivering innovative training solution. The college will conduct training programmes under placement cell through:

- 1. Executive Development Programmes
- 2. Entrepreneurship Development Programme
- 3. Skill Development Programmes

Procedure for placement Activity in the Campus

1. In-Plant Industrial Training:

2. Pre-placement talk:

Pre-placement preparation regarding the written test, group discussion and presentations from the students will be mandatory. We will provide information to the students about company business, work culture, organizational structure, and career and growth opportunities of the industries. Finally 20 minute presentations with 10 minute Q&A Session will be form the students.

3. On Campus Requirement:

We will approach to food processing industry and industry may plan to visit TC college campus for conducting placement interviews and making job offers to students. Separate training and placement facilities will be provided for all students.

15. Roadmap for implementation of the Scheme: For Food Processing Technology:

Work to be done		2020-	2021-	2022-
	20	21	22	23
1. To establish the department with state-of-the-art				
laboratories namely				
Dairy Technology Laboratory (Partially)	\checkmark			
Food Quality and Research Laboratory	\checkmark			
Food Engineering Laboratory		\checkmark		
2. To establish smart class rooms.				
3. Adoption of villages for entrepreneurship			\checkmark	
development with the collaboration of food processing				
industry and research institution.				
5. Assistance for Creation of Infrastructural Facilities		\checkmark		
under the Scheme for Human Resource Development				
sponsored by Ministry of Food Processing Industries Govt.				
of India, New Delhi total cost of the project - Rs. 100/-				
Lakhs.				
Objective of the Proposal: To cater to the growing need of				
the food processing industries for trained manpower				
(including entrepreneurs, managers, technologists, skilled				
workers) and also keep abreast with latest technology &				
diversification and new ways of managing and marketing to				
face global competition.				
6. To setting up of regional level food testing laboratory		\checkmark	\checkmark	\checkmark

sponsored by Ministry of Food Processing Industries					
Govt. of India, New Delhi (up to Rs. 5 Crore investment)					
This laboratory would benefit all stake holders including					
domestic industry (Domestic and exports), entrepreneurs,					
small and medium enterprises, food standards setting bodies					
and Government. The objectives of the laboratory:					
\succ To analyse the samples received from food processing					
industries and others stake holders.					
\succ To reduce the time of analysis of samples by reducing					
transportation time of samples.					
\succ To ensure compliance of standards in case of exports as					
well as imports.					
To establish a surveillance system for monitoring the					
quality and composition of food					

10. Duuget Nequirements for All plan period.				
S. No.	Particulars	Amount Required		
1.	Start-up Assistance	02.50 Crore		
2.	Staff	02 Crore, One Professor, Two Associate Professor, Four Assistant Professor and One Technical Assistant and One Multitasking Staff (As per UGC norms)		
3.	Operative Cost	01Crore		

16. Budget Requirements for XII plan period:

17. Year wise Key Milestones/Plans: For Food Processing Technology (M.Voc.)

S.	Key Plans/Milestones	Person Responsible	nsible Expected	
No.			Completion Date	
1.	Publicity	Mr.J.P. Rane/Mr. R.V. Pandit	31 st July, 2019	
2.	Admission Process	Mr. S.D.	31 st August, 2019	
		Deokar/Mr.A.M.Solankar		
3.	Teaching	Dr. Wazid Ali Khan & Miss	As per University	
		A.A. Zambre	norms	
4.	Organization of Guest	Dr. Wazid Ali Khan, Miss	Throughout the year	
	Lecture of Industry expert	A.A. Zambre		
5.	Internal evaluation	Dr. Wazid Ali Khan & Miss	Continuous	
		A.A. Zambre	Assessment Process	
6.	Online training	Dr. Wazid Ali Khan, Miss	Continuous Training	
		A.A. Zambre	Process	
7.	Examination (Theory &	Dr. Wazid Ali Khan &	15 th May of Every	
	Practical)	Miss A.A. Zambre	Year	
8.	Declaration of Results	Mr. S. H. Gawade- Controller	Within 40 days after	
		of Examination	completion of	
			examination	

18. Any other information which the University/College May like to provide.

Dr. Wazid Ali Khan

Head, Department of Food and Dairy Technology