

SYLLABUS

FOR

**Bachelor of Vocational Degree,
(B. Voc Food Technology)
AUTONOMOUS**

Under

UGC's National Skill Qualification Framework
(NSQF)

At

TC College, Baramati

Affiliated

To

Savitribai Phule Pune University, Pune

YEAR 2023-2024

Preamble:

AES's, Tuljaram Chaturchand College of Arts, Science and Commerce (Autonomous) has made the decision to change the syllabi of across various faculties from June, 2023 by incorporating the guidelines and provisions outlined in the National Education Policy (NEP), 2020. The NEP envisions making education more holistic and effective and to lay emphasis on the integration of general (academic) education, vocational education and experiential learning. The NEP introduces holistic and multidisciplinary education that would help to develop intellectual, scientific, social, physical, emotional, ethical and moral capacities of the students. The NEP 2020 envisages flexible curricular structures and learning based outcome approach for the development of the students. By establishing a nationally accepted and internationally comparable credit structure and courses framework, the NEP 2020 aims to promote educational excellence, facilitate seamless academic mobility, and enhance the global competitiveness of Indian students. It fosters a system, where educational achievements can be recognized and valued not only within the country but also in the international arena, expanding opportunities and opening doors for students to pursue their aspirations on a global scale.

In response to the rapid advancements in science and technology and the evolving approaches in various domains of Food Technology and related subjects, the Board of Studies in Dept. of Food Technology and Research at Tuljaram Chaturchand College of Arts, Science and Commerce (Autonomous), Baramati - Pune, has developed the curriculum for the first semester of F.Y. B.Voc. Food Technology, which goes beyond traditional academic boundaries. The syllabus is aligned with the NEP 2020 guidelines to ensure that students receive an education that prepares them for the challenges and opportunities of the 21st century. This syllabus has been designed under the framework of the Choice Based Credit System (CBCS), taking into consideration the guidelines set forth by the National Education Policy (NEP) 2020, LOCF (UGC), NCrF, NHEQF, Prof. R.D. Kulkarni's Report, Government of Maharashtra's General Resolution dated 20th April and 16th May 2023, and the Circular issued by SPPU, Pune on 31st May 2023.

A Food Technology Graduates degree equips students with the knowledge and skills necessary for a diverse range of fulfilling career paths. Food Technology graduate students find opportunities in various fields, including procurement, Testing and quality control, Processing and Production, Research and Development, Storage and Supply Chain Management, Food Regulatory Agencies, Auditing, Academics, Competitive exams, Biostatistics, Database analysis, Entrepreneurship Development, and many other food and food related organizations. Throughout their Three-year degree program, students explore the significance of Farm to Fork processing by utilization of post harvest technology. They learn tools, techniques, and processes which is required to set up agencies including pickles, jam and jelly, fruit processing, vegetable processing, organic product, dairy products, Animal Product processing Bakery and Confectionery products producing industries.

Overall, revising the Food Technology syllabi in accordance with the NEP 2020 ensures that students receive an education that is relevant, comprehensive, and prepares them to navigate the dynamic and interconnected world of today. It equips them with the knowledge, skills, and competencies needed to contribute meaningfully to society and pursue their academic and professional goals in a rapidly changing global landscape.

Programme Specific Outcomes (PSOs)

PSO1. Knowledge and understanding of: 1. The structure, Composition, function & health benefits 2. The agriculture revolution. 3. Identification and classification and of variety of food products 4. Post harvest handling & techniques. 5. Advances in food processing system

PSO2. Intellectual skills – able to: 1. Assimilate knowledge and ideas based on wide reading and through the internet. 3. Transfer of appropriate knowledge and methods from one concept to another within the subject. 4. Understand the evolving state of knowledge in a rapidly developing research field. 5. Plan, conduct and write a report on an independent term project.

PSO3. Practical skills: Students learn to carry out practical work, in the field and in the laboratory, with minimal risk. They gain introductory experience in applying each of the following skills and gain greater proficiency in a selection of them depending on their choice of optional modules. 1. Development of various food products. 2. Food analysis. 3. Analysis of chemical compounds in food material. 4. Analyze data using appropriate statistical methods and computational software 5. Soft skill development & computer application

PSO4. Transferable skills: 1. Use of IT (word-processing, use of internet, statistical & Research methodology). 2. Communication of scientific ideas in writing and orally. 3. Ability to co-ordinate as part of team. 4. Ability to use library resources. 5. Time management. 6. Career planning.

PSO5. Scientific Knowledge: Apply the knowledge of basic food science, food microbiology, nutrition science, food preservation technology, dairy technology, packaging technology and fundamental process of food technology to study and analyze their shelf life, chemical compounds & statistical data.

PSO6. Problem analysis: Identify the chemical compounds in food material, formulate the research literature with substantiated conclusions using techniques in food processing.

PSO7. Design/development of new product: Develop the new innovative product with their health benefits to solve health problems, disorders and disease of human beings which fulfill the specified needs to appropriate consideration for the public health.

PSO8. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and development of the information to provide scientific conclusions.

PSO9. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern instruments and equipment for chemical estimation, food microbiology, food analytical techniques experiments with an understanding of the application and limitations.

PSO10. Environment and sustainability: Understand the impact of the food processing technology in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable agricultural and environmental development.

PSO11. Ethics: Apply ethical principles and commit to environmental ethics and responsibilities and norms of the biodiversity conservation.

PSO12. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary task settings.

PSO13. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and interpret effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PSO14. Project management and finance: Apply knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary eco-friendly environments.

PSO15. Life-long learning: Identify the necessity, and have the preparation and ability to engage in independent and life-long learning in the broadest context of upcoming advanced technological.

PSO16. The AFSTI Society: Apply reasoning informed by the contextual knowledge to assess food diversity, its importance for society, health, safety, legal and environmental issues and the consequent responsibilities relevant to the biodiversity conservation practice.

Anekant Education Society's

Tuljaram Chaturchand College, Baramati

(Autonomous)

Board of Studies (BOS) B.Voc Food Technology & Research

Sr.No	Name of the BOS members	Designation
1.	Dr. Wajid A. Khan Head & Associate Professor, Department of Food Technology & Research, T. C. College, Baramati	Chairman
2.	Ms. Vaibhavi A. Bhosale Assistant Professor, Dept of Food Tech. & Research T. C. College, Baramati	Internal Member
3.	Ms. Asawari D. Katekar Assistant Professor, Dept of Food Tech. & Research T. C. College, Baramati	Internal Member
4.	Ms. Tilotama R. Pawar Assistant Professor, Dept of Food Tech. & Research T. C. College, Baramati	Internal Member
5.	Ms. Shreeja R. Deokar Assistant Professor, Dept of Food Tech. & Research T. C. College, Baramati	Internal Member
6.	Ms. Gayatri T. Deshmukh Assistant Professor, Dept of Food Tech. & Research T. C. College, Baramati	Internal Member
7.	Dr. A.K. Sahoo, Professor, Dept. of Food Technology, Shivaji University, Kolhapur	External Member VC nominee
8.	Dr. Rinku Agarwal Assistant Professor, Dept. of Food Technology, MIT- ADT University	External Member VC nominee
9.	Ms. Meenaz Wadgaonkar, General Manager- Operation, Gits Food Products Pvt. Ltd., Hadapsar	External Member VC nominee
10.	Mr. Sagar Salunkhe Plant Manager, Bauli India Bakes & Sweets, MIDC, Baramati	Meritorious Alumni

Information:

1. One semester = 15 weeks (12 weeks actual teaching and 3 weeks for internal evaluation, tutorials, problem solutions, student's difficulty solution, etc.)

2. As per NCrF :

- Theory course: A minimum of 15 hours of teaching per credit is required.
- Laboratory course: A minimum of 30 hours in laboratory activities per credit is required.

3. 1-credit theory = 15 hours i.e. for 1 credit, 1 hour per week teaching is to be performed.

15 hours of 1-credit are splinted as 12 hours actual teaching + 3 hours Tutorial (practice problem solving sessions, repeated discussion on difficult topics, and discussion on student's difficulties, questions discussion and internal evaluation)

4. 1-credit practical = 30 hours. Thus, 1 credit practical = 2 contact hours in laboratory per week

30 hours splinted as 24 hours' actual table work and 6 hours for journal competition, oral on each practical and other internal evaluation.

5. Each theory courses of any type (Major, Minor, VSC, VEC, OE/GE, VEC, SEC, CC, etc.) **is of 2 credits.**

a. Theory per semester: Contact hours = 24 teaching + 6 tutorials (problem solving sessions, repeated discussion on difficult topics, difficult solution, questions discussion and internal evaluation)

b. Each course will be of two modules, One module = 15 hours

c. Each module may consist of one or more than one chapter.

6. Each practical course of any course is of 2 credits = 60 hours per semester

a. Minimum 12 laboratory sessions must be conducted in one semester.

b. Each laboratory sessions should be 4 hours.

c. If practical is short, then two short practicals should be included in one laboratory sessions.

d. In 12 laboratory sessions maximum 2 demonstration sessions or table work sessions may be included and must be designed carefully for 4 hours' sessions.

e. 4 hours' laboratory sessions include - performing table work (practical), calculation, writing results and conclusion, and submission of practical in written form to practical in charge.

f. Pre-laboratory reading and post laboratory work / questions should be assigned on each practical and this will be the part of internal evaluation.

7. Design syllabus of each theory and practical course as per above guidelines.

a. Theory syllabus should be given module wise and chapter wise.

b. Theory syllabus should include name of topic, number of teaching hours allotted, detailed point wise syllabus, page numbers, references book no.

- c. It is recommended that, **design syllabus of one theory course from maximum two references books** and they will be called as main reference books/text books. Below that, you can add names of more reference books and they will be supplementary reference books.
- d. **Syllabus of practical** must be given practical wise. Name of experiment and aim of the experiment should be clearly mentioned. Mention reference book number or bibliography for each practical. At least 16 practicals' must be included in syllabus from which 12 practicals will be actually conducted. If practical is short, then two short practicals' will be considered as one practical.
- e. At the end of syllabus of theory and practical course, a list of references book should be given number wise.
- f. **At the end of each theory and practical course 6 CO should be given.**

A. Names of UG and PG courses related to Specialization

Important Note: For specialized subjects wherever designing of practical course is not adequate then included, theory course of 2 credits in place of practical course.

Semester	Major Courses	Major Courses	Elective	Minor Courses	VSC	IKS
I	2 theory + 1 Practical				1 Theory	1 Theory
II	2 theory + 1 Practical			1 Theory + 1 Practical	1 Practical	0
III	3 theory + 1 Practical			1 Theory + 1 Practical	1 Theory	0
IV	3 theory + 1 Practical			1 Theory + 1 Practical	1 Practical	0
V	3 theory + 2 Practical	1 Theory + 1 Practical		1 Theory + 1 Practical	1 Theory	0
VI	3 theory + 2 Practical	1 Theory + 1 Practical			1 Practical	0
VII and VIII Sem honours degree with major						
VII	5 theory + 2 Practical	1 Theory + 1 Practical		0	0	0
VIII	5 theory + 2 Practical	1 Theory + 1 Practical		0	0	0
VII and VIII Sem honours degree with research						
VII	4 theory + 1 Practical	1 Theory + 1 Practical		0	0	0
VIII	4 theory + 1 Practical	1 Theory + 1 Practical		0	0	0

* In elective course 2T+2P are related to each other. In this case students have to choose more than 1 option i.e. in elective part, at least 2 courses each consisting of 1 theory 1 practical courses in combination.

Course Structure for F. Y. B. Voc. (Food Technology) 2023-204

Level	Semester	Major		Minor	OE	VSC, SEC, (VSEC)	AEC, VEC, IKS	OJT, FP,C EP, CC, RP	Cum. Cr/Sem	Degree / Cum. Cr.
		Mandatory	Elective							
4.5	I	FTR-101-MJT-Food Preservation Technology		--	FTR-116-OE-Basics of Food Science(2C)	FTR-121-VSC-Food Microbiology (T), (2 C)	FTR-131-AEC-Functional English-I (2 C)	CC-I (2 Credits)	22 C	UG Certificate 44 Credits
		FTR-102-MJT-Food Science		--	FTR-117 OE - Dairy Product Technology (P) (2 C)	FTR-126-SEC Food Microbiology (P)(2 C)	FTR-135-VEC-Environmental Science(2C)			
		FTR-103-MJP Food Preservation Technology		--			FTR-137-IKS-History of Indian Foods			
	II	FTR-201-MJT-Nutrition Science		--	FTR-116-OE-Bakery Technology (2 C)	FTR-121-VSC Bakery Technology (T), (2 C)	FTR-181-AEC-Functional English-II (2 C)	CC-II (2 Credits)	22 C	
		FTR-202-MJT Fermentation Technology		FTR-161-MN-Food Chemistry (2 C)	FTR-117-OE- Bakery Technology (P) (2 C)	FTR-126-SEC-Bakery Technology (P) (2 C)	FTR-135-VEC -Computer Applications (2 C)			
		FTR-203-MJP-Fermentation Technology (P)		--						

First Year

Semester I

Theory Paper No, FTR-101-MJT, Food Preservation Technology

Maximum Marks: 50

Credits: 2

Teaching Period: 3/week

Teaching Load: 30 Theory Period/Semester

Learning Objectives:

- To understand the need to preserve food
- To study principle and importance of food preservation
- To understand the underlying principles of methods of food preservation used in the home
- To study different modern methods of food preservation

Learning Outcomes:

- Students will have a thorough understanding of history
- Illustrates reasons of microbial, physical and chemical food Spoilage
- The students will know the importance of various preservation techniques
- The student will be able to analyze and criticize the problems of the food processing industries

Unit-I: Introduction to Preservation

08 Periods

Introduction & History of food preservation, Definition, principles & Need, Traditional methods of Food Preservation, Types of preservatives- Class I & Class II, Bio preservation, Enzymes as a food preservatives

Unit-II: Preservation by high temperature

07 Periods

Principle of high temperature preservation, methods of high temperature preservation: Blanching, Drying, pasteurization, Sterilization & Canning.

Unit-III: Preservation by Low temperature

07 Periods

Principle of high temperature preservation, methods of low temperature preservation: Chilling, Refrigeration, freezing and irradiation, Effect of low temperature preservation methods on food & microorganisms

Unit-IV: Modern methods of food preservation

08 Periods

Non-thermal methods of food preservation: Pulse electric heating, high pressure processing, ohmic heating, etc. hurdle technology and nanotechnology

References:

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

First Year

Semester I

Theory Paper No, FTR-102-MJT, Food Science

Maximum Marks: 50

Credits: 2

Teaching Period: 3/week

Teaching Load: 30 Theory Period/Semester

Learning Objectives:

- To make students aware about various cooking methods.
- To make students understand the nutritive value and effect of cooking on foods.
- To study about the composition of different food groups.
- To learn about the scope and opportunities in food industries.

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.
- To know the functions of food.

Unit-1: Introduction to Food science

07 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

08 Periods

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

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

Unit-3: Fruits & Vegetables

08 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 -4: Nuts, Oilseeds, Spices & Aromatics

07 Periods

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

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. Christian
- Food Science (Vth edition) – Norman N. Potter and Joseph H. Hotchkiss (CSB Publishers and Distributors, New Delhi, 1996)

First Year

Semester I

Practical Paper No-FTR-103-MJT, Food Preservation Technology

Maximum Marks: 50

Credits: 2

Teaching Period: 3 /week

Teaching Load: 60 periods of practicals / Semester

Learning Objectives:

- To learn about the instruments used in food preservation.
- To study the different cooking methods.
- To study about the different types of preservative.
- To learn about Preparation of various products.

Learning Outcome:

- Students will get knowledge about the instruments used in food preservation.
- Students will have a thorough understanding of different cooking methods.
- The students will know the different types of preservative.
- Student will learn about the preparation of various products.

Practicals:

To study instruments used in food preservation.	2P
To study the utensils used in food preservation.	2P
To study the different cooking methods.	3P
To study the stages in preparation of sugar syrup	3P
Study of curing of different fruits & vegetables	4P
Study of blanching of different fruits & vegetables	3P
Preservation by using salt (Vegetable Pickle)	3P
Preservation by using chemical preservatives	3P
Preservation by using oil & spices	3P
Preservation by fermentation (Idli, Dhokla, Jalebi and Sauerkraut)	4P
Preservation by vinegar	3P
Preservation by low temperature (Peas Preservation)	4P
Preservation by drying (Fruits and Vegetable)	3P
Study of Osmotic dehydration (Fruit Candy)	4P
Preparation of condensed milk	2P
Preparation of potato/ banana chips	2P
Preparation of instant soup mix	2P

Reference:

- Srivastava R.P, Kumar Sanjeev (1994), Fruits and vegetable preservation, first edition, International book distributing co.

First Year

Semester I

Theory Paper No, FTR-116-OE, Basics of Food Science

Maximum Marks: 50

Credits: 2

Teaching Period: 3/week

Teaching Load: 30 Theory Period/Semester

Learning Objectives:

- To learn about the scope of Food Preservation of India
- To study the functions of food
- To study about the Indian Standards & International Organization.
- To learn about energy metabolism & balance diet.

Learning Outcome:

- Students will get knowledge about the food science & technology.
- Students will have a thorough understanding of Indian Standards & International Organization.
- The students will know the classification & health benefits of food.
- Student will learn about the basic of nutrients.

Unit I: History of Food Processing in India:

07 Periods

Introduction, History, Scope of Food Preservation of India

Unit-2: Introduction to food processing & Technology

07 Periods

Definition of food, food science & technology and its objectives, acceptability of food, functions of food

Unit-3: nutrients & function food

08 Periods

- A. Basic of nutrients- Macro & Micronutrients, energy metabolism, balance diet
- B. Function of food- classification, health benefits and its examples

Unit -4: Food law & Regulations

08 Periods

Indian standards - BIS, AGMARK, FSSAI, International Standards, CAC & ISO, International Organization- WHO, FAO, WTO

References:

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

First Year

Semester I

Practical Paper No-FTR-117-OE-Milk Product Technology

Maximum Marks: 50

Credits: 2

Teaching Period: 3 /week

Teaching Load: 60 periods of practicals / Semester

Learning Objectives:

- To know the compositional and technological aspects of milk.
- To study processed milk products.
- To study the equipments used in dairy industry.
- To learn about the benefits of milk product.

Learning Outcomes:

1. Students will learn about different processing methods used in dairy industry.
2. Students will learn about different types of milk product.
3. The students will get knowledge of benefits of milk product.
4. Students will learn about the equipments used in dairy industry.

Practicals:

Preparation of Condensed Milk	3P
Preparation of Dahi	2P
Preparation of Butter & Butter milk	2P
Preparation of Lassi	2P
Preparation of Khoa	4P
Preparation of Gulabjamun	4P
Preparation of Chhana	3P
Preparation of Shrikhand	3P
Preparation of Panner	4P
Preparation of Basundi	3P
Preparation of Ice-Cream	4P
Preparation of flavour milk	2P
Preparation of Kalakand	4P
Preparation of Rasgulla	4P
Preparation of Rabadi	4P

References:-

1. De Sukumar, Outlines of Dairy Technology, Oxford University Press, Oxford.2007
2. Robinson, R.K. (2 vol.) 1986. Modern Dairy Technology. Elsevier Applied Science, UK.
3. Warner, J.M. 1976. Principles of Dairy Processing. Wiley Eastern Ltd., New Delhi.
4. Yarpar, W.J. and Hall, C.W. 1975. Dairy Technology and Engineering. AVI, Westport.

5. Rosenmal, I. 1991. Milk and Milk Products. VCH. New York.
6. Webb and Johnson, Fundamentals of Dairy Chemistry

First Year

Semester I

Theory Paper No- FTR-121-VSC-Food Microbiology

Maximum Marks: 50

Credits: 2

Teaching Period: 3 /week

Teaching Load: 30 Theory Period/Semester

Learning Objectives:

- To learn about the morphology of different microorganisms.
- To study the spoilage caused by microorganism
- To study about the factors affecting the growth of micro-organisms.
- To learn about important microorganisms used in food processing industry.

Learning Outcome:

- Students will get knowledge about the historical contribution of microbiology.
- 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 certain processed products.
- Student will learn about the morphology of micro-organisms.

Unit-1 History & scope of Microbiology

08 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-2 Morphology & cytology of bacteria

06 Periods

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

Unit-3 Microbial growth in food

07 Periods

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

Unit-4 Beneficial & Harmful Micro-organisms in food

09 Periods

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

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

Practical Paper No-FTR-126-SEC Food Microbiology

Maximum Marks: 50

Credits: 2

Teaching Period: 3 /week

Teaching Load: 60 periods of practicals / Semester

Learning Objectives:

- To learn about the basic laboratory practices.
- To study the basic laboratory instruments, material & glasswares.
- To study about the functioning & use of microscope.
- To learn about Preparation of media & inoculation techniques.

Learning Outcome:

- Students will get knowledge about the laboratory practices.
- Students will have a thorough understanding of different types of staining process.
- The students will know the cultivation of microbes by using various food samples.
- Student will learn about the working of microscope.

Practicals:

Introduction to basic laboratory practices.	2P
Introduction to basic laboratory instruments.	2P
Introduction to basic material & glass wear.	2P
Functioning & use of microscope.	2P
To Study of aseptic techniques.	2P
Preparation cleaning & sterilization of glass wear.	2P
Preparation of saline.	2P
Preparation& sterilization of media.	6P
Preparation of slant/ stabs/ plates using different types of media.	6P
Preparation of smear.	2P
Cultivation of microbes by using various food samples.	4P
To study Inoculation Techniques.	3P
To study the different types of staining process.	5P
Standard Plate Count Method.	2P
Maintaining of stock cultures.	6P

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 I

Theory Paper No- FTR-137-IKS-History of Indian Foods

Maximum Marks: 50

Credits: 2

Teaching Period: 3 /week

Teaching Load: 30 Theory Period/Semester

Learning Objectives:

- To learn about the agricultural revolution
- To study the history & philosophy of Indian food.
- To study about the scope of food preservation of India
- To learn about important cooking techniques and equipments used in ancient era.

Learning Outcome:

- Students will get knowledge about the different types of Indian cuisine.
- Students will have a thorough understanding of different measurements used in food
- The students will know the classification of food.
- Student will learn about the Harappa civilization.

Unit-1 Climate crop and prehistory of food in India:

08 Periods

The physical environment, The climate, development of agriculture- pulses, grains, millets, fruits & vegetables, spices, prehistory- The Harappa civilization

Unit-2 Introduction to food:

06 Periods

Define- Food, philosophy of Indian food, the pre-ancient era, the ancient era, the agricultural revolution, classification of food

Unit-3 History of Food Processing in India:

07 Periods

Introduction, History, Scope of Food Preservation of India

Unit-4 Indian Cuisine and Cooking Techniques:

09 Periods

An overview of Indian cuisine, the meal, cooking techniques and equipments, Measurements in food

References:

- Food Facts & Principles – N. Shakuntala Manay, M. Shadaksharswamy
- A History of Food in India- Colleen Taylor Sen
- Srivastava R.P, Kumar Sanjeev (1994), Fruits and vegetable preservation, first edition, International book distributing co.
- Food Science and Nutrition (Third Edition) - Sunetra Rodey