Anekant Education Society's

Tuljaram Chaturchand College, Baramati

(Autonomous)

Four Year B.Voc Degree Program in
Food Technology & Research

(Faculty of Food Technology & Research)

CBCS Syllabus

FY B.Voc (Food Technology) Semester -II

For Department Food Technology & Research

Tuljaram Chaturchand College, Baramati

Choice Based Credit System Syllabus (2023 Pattern)

(As Per NEP2020)

To be implemented from Academic Year 2023-2024

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

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)

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

Anekant Education Society's

Tuljaram Chaturchand College,Baramati

(Autonomous)

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

From 2022-23 to 2024-25

Sr.No	Name of the BOS members	Designation
1.	**Dr. Wajid A. Khan** Head & Associate Professor, Department of Food Technology &Research. 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 Expert from other University
8.	**Dr. Rinku Agarwal** Assistant Professor, Dept. of Food Technology, MIT-ADT University	External Member Expert from other University
9.	**Ms. Meenaz Wadgaonkar**, General Manager- Operation, Gits Food Products Pvt. Ltd., Hadapsar	External Member Industry Expert
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 Elective Curses	Minor Curses	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 Mandatory	Major Elective	Minor	OE	VSC, SEC, (VSEC)	AEC, VEC, IKS	OJT, FP,CEP, CC, RP	Cum. Cr/Sem	Degree / Cum. Cr.
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-151-MJT-Nutrition Science (2C)		--	FTR-166-OE-Bakery Technology (2 C)	FTR-171-VSC Bakery Technology (T), (2 C)	FTR-181-AEC-Functional English-II (2 C)	**139 CC-II (2 Credits)**	22 C	
		FTR-152-MJT Fermentation Technology(2C)		FTR-161-MN-Food Processing Technology (2 C)	FTR-167-OE- Bakery Technology (P) (2 C)	FTR-176-SEC-Bakery Technology (P) (2 C)	FTR-185-VEC -Computer Applications (2 C)			
		FTR-153-MJP-Fermentation Technology (P)(2C)		--						

Sem	CourseType	Course Code	Course Name	Theory /Practical	Credits
I	MajorMandatory	FTR-101-MJM	Food Preservation Technology	Theory	02
	Major Mandatory	FTR-102-MJM	Food Science	Theory	02
	Major Mandatory	FTR-103-MJM	Food Preservation Technology	Practical	02
	Open Elective(OE)	FTR-116-OE	Basics of Food Science	Theory	02
	Open Elective(OE)	FTR-117-OE	Dairy Product Technology	Practical	02
	Vocational Skill Course(VSC)	FTR-121-VSC	Food Microbiology	Theory	02
	Skill EnhancementCourse(SEC)	FTR-126-SEC	Food Microbiology	Practical	02
	Ability Enhancement Course(AEC)	ENG-131-AEC	Functional English-I	Theory	02
	Value Education Course(VEC)	FTR-135-VEC	Environmental Pollution and Value Education	Theory	02
	Indian Knowledge System(IKS)	FTR-137-IKS	History of Indian Foods	Theory	02
	Co-curricular Course(CC)	--	To be selected from the Basket	Theory	02
				TotalCreditsSemester-I	**22**
II	Major Mandatory	FTR-151-MJM	Nutrition Science	Theory	02
	Major Mandatory	FTR-152-MJM	Bakery Technology	Theory	02
	Major Mandatory	FTR-153-MJM	Fermentation Technology	Theory	02
	Minor	FTR-161-MN	Food Processing Technology	Theory	02
	Open Elective (OE)	FTR-166-OE	Bakery Technology	Theory	02
	Open Elective (OE)	FTR-167-OE	Practicals of Bakery Technology	Practical	02
	Vocational Skill Course(VSC)	FTR-171-VSC	Practicals of Fermentation Technology	Practical	02
	Skill Enhancement Course(SEC)	FTR-176-SEC	Practicals of Bakery Technology	Practical	02
	Ability Enhancement Course (AEC)	ENG-181-AEC	Functional English-II	Theory	02
	Value Education Course(VEC)	FTR-185-VEC	Digital & Technological Solutions	Theory	02
	Co-curricular Course(CC)	139	To be selected from the Basket	Theory	02
				Total Credits Semester-II	22
				Cumulative Credits Semester-Iand II	**44**

CBCS Syllabus as per NEP 2020 for F.Y B.Voc. Food Technology & Research (2023 Pattern)

Name of the Programme: B.Voc. Food Technology & Research

Programme Code **:** FTR

Class **:** F.Y B.Voc.

Semester *II*

Course Type **:** Major Mandatory

Course Code **:** FTR-151-MJM

CourseTitle **:** Nutrition Science

No.ofCredits *:02*

No.of Teaching Hours 30

Learning Objectives:

1. To understand nutrients and food component that supply nourishment to the body.
2. To know about the functions, deficiency and toxicity of nutrients.
3. To understand malnutrition and its prevention.
4. To understand the basic knowledge of protein, carbohydrate & fat in terms of nutritent.
5. To understand the relation between nutrition & health.
6. To understand the national nutritional policies for malnutrition.

Course Outcomes:

CO1: Utilize knowledge to understand the role of food and nutrients in health and disease processes.
CO2: Provide nutrition counseling and education to individuals, groups, and communities throughout the lifespan using a variety of communication strategies.
CO3: Evaluate nutrition information based on scientific reasoning for clinical, community, and food service application.
CO5: Know about the importance of protein, carbohydrate & fat in terms of nutritent.
CO6: Suggest the national nutritional policies for malnutrition.
CO7: Know about the importance of threpeutic diets.

Topics and Learning Points

Unit-1 Basics of Nutrition **8 Periods**

1.1 Introduction to nutrition science
1.2 Relationship between health and nutrition
1.3 Role of public nutritionist in health care
1.4 Interrelationship between nutrition and quality of life.
1.5 Malnutrition Causes, types, symptoms and presentation of Assessment of Nutrition status of the community
1.6 National Nutritional Policy

Unit-2 Food Constituents **8 Periods**

2.1 Food Constituents- Definition, Occurrence
2.2 Properties and metabolisms of Protein
2.3 Carbohydrates
2.4 lipids.

Unit-3 Basics for Diet planning **07 Periods**

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

Unit-4 Diet for different groups **07 Periods**

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

References:

- Bamji MS, Krishnaswamy K, Brahmam GNV (2009). *Textbook of Human Nutrition*, 3rd edition. Oxford and IBH Publishing Co. Pvt. Ltd.
- Srilakshmi (2007). *Food Science*, 4th Edition. New Age International Ltd. 29
- Wardlaw MG, Paul M Insel Mosby (1996). Perspectives in Nutrition, Third Edition.
- B. Srilakshmi (2007) Dietetics, Revised Fifth Edition, New Age International Publishers
- B. Srilakshmi (2011) Nutrition Science, Third Edition, New Age International Publishers
- Dr. M. Swaminathan (2006) Advanced Text book on Food and Nutrition, Volume 1 and 2, Second Edition, BAPPCO Publication.
- Jim Mann and A. Stewart Truswell (2010) Essentials of Human Nutrition, Third Edition, Oxford Publication.
- Michael J. Gibney, Hester H. Vorster and Frans J. Kok (2002) Introduction to Human Nutrition, First Indian Reprint, Blackwell Publishing.
- Biochemistry of Foods-N.A.M Eskin, H.M. Henderson, R.J. Townsend.
- Introduction to Biochemistry of Foods, Z. Berk

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

Justification for the mapping

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

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

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

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

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

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

PO5- Sense of Inquiry:- Curiously ask relevant questions for better understanding of fundamental concepts and principles, scientific theories and applications related to the study.
CO3: The students will explain role of each food group products
CO5: The students will have thorough knowledge of importance of nutrients in daily life.
CO6: The students will have thorough knowledge of effect of cooking on nutrients and the uses of the cooked food as well as the cooking equipment.

PO6- Use of Modern Tools:-
Operatemoderntools,equipment,instrumentsandlaboratorytechniquesto perform the experiments and write the programs in different languages.
CO2: Provide nutrition counseling and education to individuals, groups, and communities throughout the lifespan using a variety of communication strategies

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

PO8- Application of Knowledge:- Develop a scientific outlook and apply the knowledge with respect to food technology.
CO3: The students will explain role of each food group products
CO5: The students will have thorough knowledge of importance of nutrients in daily life.

PO9- Ethical Awareness- To train students in professional and ethical attitude, effective communication skills, team work skills and multidisciplinary approaches related to food technology and engineering.
CO1: The students will classify the products according to composition and nutritional value.
CO5: The students will have thorough knowledge of importance of nutrients in daily life.
CO6: The students will have thorough knowledge of effect of cooking on nutrients and the uses of the cooked food as well as the cooking equipment.

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

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

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

PO12:- Lifelong Learning:- Propose novel ideas in explaining the scientific data, facts and figures related to Science and technology.
CO4: The students will able to identify cause of deficiency diseases and their diagnostics and also get information about. balanced diet for healthy life and healthy body.

CBCS Syllabus as per NEP 2020 for F.Y B.Voc. Food Technology & Research (2023 Pattern)

Name of the Programme: B.Voc. Food Technology & Research

Programme Code **:** FTR

Class **:** F.Y B.Voc.

Semester *II*

Course Type **:** Major Mandatory

Course Code **:** FTR-152-MJM

Course Title **:** Bakery Technology

No. of Credits *:02*

No. of Teaching Hours 30

Learning Objectives:

1. To know about role, chemistry, manufacturing of various ingredients and products in bakery and confectionery industry.
2. To develop knowledge and skills in the preparation and storage of Bakery and Confectionery items
3. To develop the skills on development of popular snack foods present in Indian Market.
4. To learn about the different types of confectionary products.
5. To study the history of bakery & confectionary technology.
6. To know about the working of different bakery equipments in bakery industry.

Course Outcomes:

CO1: Students will have a thorough understanding on effect of blending and baking on final product of bakery.
CO2: The students will know the various extruded bakery product development.
CO3: Students will able to prepare different bakery and confectionery products.
CO4: The students may plan to start their bakery and confectionery unit.
CO5: Students will know about the working of different bakery equipments in bakery industry.
CO6: Students may learn about the process of sugar & chocolate based confectionary products.
CO7: Students will know about manufacturing of various techniques in bakery and confectionery industry.

Topics and Learning Points

Unit-1: Wheat and bakery ingredients, Baking technology: **06 Periods**

1.1 Varieties & Qualities
1.2 Types of wheat
1.3 Grading system
1.4 Chemical constituents, physiological and rheological properties,
1.5 Enzymes in wheat flour,
1.6 Major and minor ingredients and their functions in bakery products.

Unit-2: Bakery Products and Equipments **06 Periods**

2.1 The reactions of baking (mixing, leavening, baking),
2.2 preparation methods of bread, cake, biscuits, cookies, pastry, buns, crackers,
2.3 types of quick bread,
2.4 Non-dairy creamer/toppings in bakery industries: Source, method of preparations.
2.5 Bakery Organization and Equipment

Unit-3: Introduction to confectionery **06 Periods**

3.1 History, traditional confectionery goods,
3.2 types of confectionary, classification, invert sugar, glucose syrup,
3.3 Manufacturing of food starches, heating of starch granules,
3.4 gelatinization, retro gradation,
3.5 factors affecting gelatinization.

Unit-4: Sugar based and chocolate based Confectionery **12 Periods**

4.1 Manufacturing of raw, refined and White sugar,
4.2 forms of sugar, liquid sweeteners, reactions of sugar,
4.3 crystalline and amorphous confectionery

4.1.Chocolate based confectionery:

4.1.1 History and development,
4.1.2 cocoa processes, cocoa butter, emulsifiers used in chocolate confectionery coatings and cocoa,
4.1.3 chocolate manufacture, chocolate bars and covered confectionery

4.2 Caramel, High boiled sweets, Toffee

4.2.1 Definition, composition,
4.2.2 caramel manufacture process,
4.2.3 properties of high boiled sweets, preparation of high boiled sweets,
4.2.4 types of toffee ingredient and their role,
4.2.5 Fondant, Fudge preparation.

References:

1. Matz S. A. (1996): Bakery technology and engineering, 1st edition, Arya book depot New delhi.
2. Practical Baking Cooking, 1st edition, Queen street house, U.K.
3. Kamel B. S. and Stauffer C. E. (1993): Advances in baking technology, 1st edition, Blackie academic and professional.
4. Aylwaed F. (2001): Food Technology Processing and Quality control \, 1st edition, Agrobios (India)
5. Harry W, Loesecke (2001): Outlines of food technology, 2nd edition, Agribios (India)
6. Khetarpaul N, Grewal R. B. and Jood S. (2005): Bakery Science and Cereal Technology, 1st edition, Daya publishing house, Delhi.
7. Manay S.N. and Shadaksharaswamy M. (2001); Food facts and principles, 2nd edn, New Age International (P) limited publishers.
8. Minife B.W. (1997): Chocolate, cocoa and confectionery science and technology, 3rd edition, CBS Publishers and Distributors, New Delhi.

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

Justification for the mapping

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

CO1: Students will have a thorough understanding on effect of blending and baking on final product of bakery.
CO2: Students will able to prepare different bakery products with different equipments.
CO4: The students may learn about the quality test of flour and what will be the effect of the flour quality on food.
CO6: Students may learn about the process of sugar & chocolate based confectionary products and they can easily classified the sugar & chocolate based confectionary products.

PO2:- Communication Skills:- Develop various communication skills such as reading, listening and speaking skills to express ideas and views clearly and effectively.
CO2: Students will able to prepare different bakery products with different equipments.
CO3: The students will be able to understand bakery and confectionery technology

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

CO4: The students may learn about the quality test of flour and what will be the effect of the flour quality on food.

PO4- Analytical Reasoning and Problem Solving- To enable the students with good scientific and engineering knowledge so as to comprehend, design, and create food products and devices for the food industry and provide solutions for the challenges in the food industry as well as in agriculture.
CO3: The students will be able to understand bakery and confectionery technology**.**
CO5: Students will know about the working of different bakery equipments in bakery industry.
CO6: Students may learn about the process of sugar & chocolate based confectionary products and they can easily classified the sugar & chocolate based confectionary products.
CO7: Students will know about manufacturing of various techniques in bakery and confectionery industry.

PO5- Sense of Inquiry:- Curiously ask relevant questions for better understanding of fundamental concepts and principles, scientific theories and applications related to the study.
CO3: The students will be able to understand bakery and confectionery technology**.**
CO7: Students will know about manufacturing of various techniques in bakery and confectionery industry.

PO6- Use of Modern Tools:-
Operatemoderntools,equipment,instrumentsandlaboratorytechniquesto perform the experiments and write the programs in different languages.
CO2: Students will able to prepare different bakery products with different equipments.
CO5: Students will know about the working of different bakery equipments in bakery industry.
CO6: Students may learn about the process of sugar & chocolate based confectionary products and they can easily classified the sugar & chocolate based confectionary products.
CO7: Students will know about manufacturing of various techniques in bakery and confectionery industry.

PO7- Research Skills:- Understand how to design, collect, analyze, interpret and evaluate information/data that is relevant to food technology.
CO4: The students may learn about the quality test of flour and what will be the effect of the flour quality on food.
CO5: Students will know about the working of different bakery equipments in bakery industry.
CO6: Students may learn about the process of sugar & chocolate based confectionary products and they can easily classified the sugar & chocolate based confectionary products.

PO8- Application of Knowledge:- Develop a scientific outlook and apply the knowledge with respect to food technology.
CO3: The students will be able to understand bakery and confectionery technology**.**
CO7: Students will know about manufacturing of various techniques in bakery and confectionery industry.

PO9- Ethical Awareness- To train students in professional and ethical attitude, effective communication skills, team work skills and multidisciplinary approaches related to food technology and engineering.
CO1: Students will have a thorough understanding on effect of blending and baking on final product of bakery.
CO6: Students may learn about the process of sugar & chocolate based confectionary products and they can easily classified the sugar & chocolate based confectionary products.

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

CO1: Students will have a thorough understanding on effect of blending and baking on final product of bakery.
CO2: Students will able to prepare different bakery products with different equipments.
CO4: The students may learn about the quality test of flour and what will be the effect of the flour quality on food.
CO6: Students may learn about the process of sugar & chocolate based confectionary products and they can easily classified the sugar & chocolate based confectionary products.

PO11:- Environment and Sustainability:- Develop various communication skills such as reading, listening and speaking skills to express ideas and views clearly and effectively.
CO2: Students will able to prepare different bakery products with different equipments.
CO3: The students will be able to understand bakery and confectionery technology

PO12:- Lifelong Learning:- Propose novel ideas in explaining the scientific data, facts and figures related to Science and technology.
CO4: The students may learn about the quality test of flour and what will be the effect of the flour quality on food.

CBCS Syllabus as per NEP 2020 for F.Y B.Voc. Food Technology & Research (2023 Pattern)

Name of the Programme: B.Voc. Food Technology & Research

Programme Code **:** FTR

Class **:** F.Y B.Voc.

Semester *II*

Course Type **:** Major Mandatory

Course Code **:** FTR-153-MJM

CourseTitle **:** Fermentation Technology

No.ofCredits *:02*

No.ofTeachingHours 30

LearningObjectives:

1. To learn about the fermentation technology
2. To study the history & innovations in fermentation
3. To study about the scope of food fermentation
4. To learn about important fermentation techniques and equipments
5. To know about processing of different types of fermented alcoholic beverages.
6. To learn about principles of downstream processing and product recovery.
7. Tolearn about different oriented product

CourseOutcomes:

CO1: Students will get knowledge about the different types of traditional fermented foods.
CO2: Students will have a thorough understanding of different fermentation techniques.
CO3: The students will know the classification of fermented foods and beverages.
CO4: Student will learn about the preservation by using fermentation.
CO5: Students will study about the scope of food fermentation.
CO6: The students may learn about the history & innovations in fermentation.
CO7: Students will know about the working of different fermentation equipments.

Topics and Learning Points

Unit-1 Introduction and Microbes used **08 Periods**

1.1 Introduction, History
1.2 Microbes used, Rate of microbial growth & death
1.3 Types of Fermentation- Submerged, Solid state, Batch/ Continues

Unit – 2Equipments& methods of Food Fermentations **06 Periods**

2.1 Fermenter its Design, Operation, measurement and control
2.2 Aeration and Agitation in fermentation

Unit -3 Fermentation of Alcoholic Beverages **07 Periods**

3.1 Malt beverages
3.2 Distilled liquors: Wine, Beer, vinegar etc.
3.3 Principles of downstream processing and product recovery

Unit - 4 Oriental fermented foods - **09 Periods**

4.1 Milk based fermented product: Kefir,yoghurt, cheese
4.2 Meat based fermented products: dry semidry sausage, salami, fermented fish, preserved egg.
4.3 Plant based fermented product: Sauerkraut, kombucha, miso, Kimchi, temphesoysauce, idli, minchin, soybean cheese, natto.

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

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	6	-	-	-	-	-	-	-	2	2	-	-
CO2	-	-	2	6	5	6	6	-	-	-	-	6
CO3	-	-	-	-	-	-	-	-	-	-	-	2
CO4	-	2	-	-	2	-	-	4	-	-	6	-
CO5	-	-	2	-	2	2	-	2	-	2	-	-
CO6	4	-	-	-	2	-	-	-	-	2	-	-
CO7	2	-	1	4	2	6	-	-	-	-	-	-

Justification for the mapping

PO1:- Disciplinary Knowledge - Understand the basic concepts, fundamental principles and experimental findings and the scientific the ories related to food technology, food science and Food technology & engineering and its other fields related to the program.
CO1: Students will get knowledge about the different types of traditional fermented foods and their notional value.
CO6: The students may learn about the history & innovations in fermentation.
CO7: Students will know about the working of different fermentation equipments.

CO3: The students will know the classification of fermented foods and beverages.
CO6: The students may learn about the history & innovations in fermentation.

PO2:- Communication Skills:- Develop various communication skills such as reading, listening and speaking skills to express ideas and views clearly and effectively.
CO4: Student will learn about the preservation by using fermentation and their health benefits.

PO3- Critical Thinking :- Propose novel ideas in explaining the scientific data, facts and figures related to Science and technology.
CO2: Students will have a thorough understanding of different fermentation techniques
CO5: Students will study about the scope of food fermentation.
CO7: Students will know about the working of different fermentation equipments.

PO4- Analytical Reasoning and Problem Solving- To enable the students with good scientific and engineering knowledge so as to comprehend, design, and create food products and devices for the food industry and provide solutions for the challenges in the food industry as well as in agriculture.
CO2: Students will have a thorough understanding of different fermentation techniques and provide solutions for the challenges in the food industry.
CO7: Students will know about the working of different fermentation equipments.

PO5- Sense of Inquiry:- Curiously ask relevant questions for better understanding of fundamental concepts and principles, scientific theories and applications related to the study.
CO2: Students will have a thorough understanding of different fermentation techniques
CO4: Student will learn about the preservation by using fermentation and their health benefits.
CO5: Students will study about the scope of food fermentation
CO7: Students will know about the working of different fermentation equipments and their handling .
CO6: The students may learn about the history & innovations in fermentation.

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

CO2: Students will have a thorough understanding of different fermentation techniques
CO5: Students will study about the scope of food fermentation

CO7: Students will know about the working of different fermentation equipments and their handling

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

CO2: Students will have a thorough understanding of different fermentation techniques and Understand designs of various equipments.

PO8- Application of Knowledge:- Develop a scientific out look and apply the knowledge with respect to food technology.
CO4: Student will learn about the preservation by using fermentation and their health benefits.
CO5: Students will study about the scope of food fermentation apply the knowledge with respect to food technology.
PO9- Ethical Awareness- To train students in professional and ethical attitude, effective communication skills, team work skills and multidisciplinary approaches related to food technology and engineering.

CO2: Students will have a thorough understanding of different fermentation techniques and Understand designs of various equipments also develop the team work skills and multidisciplinary approaches related to food technology and engineering.

PO10:- Team Work - Understand the basic concepts, fundamental principles and experimental findings and the scientific the ories related to food technology, food science and Food technology & engineering and its other fields related to the program.
CO1: Students will get knowledge about the different types of traditional fermented foods and their notional value.
CO6: The students may learn about the history & innovations in fermentation.
CO7: Students will know about the working of different fermentation equipments.
CO3: The students will know the classification of fermented foods and beverages.
CO6: The students may learn about the history & innovations in fermentation.

PO11:- Environment and Sustainability:- Develop various communication skills such as reading, listening and speaking skills to express ideas and views clearly and effectively.
CO4: Student will learn about the preservation by using fermentation and their health benefits.

Po12:- Lifelong Learning:- Propose novel ideas in explaining the scientific data, facts and figures related to Science and technology.
CO2: Students will have a thorough understanding of different fermentation techniques
CO5: Students will study about the scope of food fermentation.
CO7: Students will know about the working of different fermentation equipments.

CBCS Syllabus as per NEP 2020 for F.Y B.Voc. Food Technology & Research (2023 Pattern)

Name of the Programme: B.Voc. Food Technology & Research

Programme Code **:** FTR

Class **:** F.Y B.Voc.

Semester *II*

Course Type **:** Minor

Course Code **:** FTR-161-MN

Course Title **:** Food Processing Technology

No.ofCredits *:02*

No.of Teaching Hours 30

Learning Objectives:

1. To learn about the food groups
2. To study about the cooking methods
3. To know about working of various equipment used in food processing industries.
4. To get a knowledge about food preservation techniques.
5. To study about the history food processing technology.
6. To learn about theScope & opportunities in food industries.

Course Outcomes:

CO1: Student willlearn about the food groups.
CO2: Student willstudy about the different cooking methods
CO3: the students may know about working of various equipment used in food processing industries.
CO4: Students will study about the history food processing technology.
CO5: The students will learn about the Scope & opportunities in food industries.
CO6: Students will get a knowledge about food preservation techniques.
CO7: The students will know about the advantages & disadvantages of cooking methods.

Topics and Learning Points

Unit-1: Basic Food Processing Technology:

1.1 History, Scope & opportunities in food industries
1.2 Defination, Functions of food
1.3 Food groups- functions of food & nutrients

Unit-2: Utensils &Equipments:

2.1 Measuring cups, measuring spoon, knife, pots,chopping boards, plates, bowls, etc.
2.2 Equipments- Hot air oven, dehydration & canning equipments

Unit-3: Heat Transfer & Cooking:

3.1 Defination
3.2 modes of heat transfer
3.3 methods of cooking- advantages & disadvantages

Unit-4: Food Preservation Techniques:

4.1 Preservation by low temperature-
4.1.1 Chilling
4.1.2 Cooling
4.1.3 Refrigeration
4.1.4 Freezing
4.2 Preservation by High Temperature-
4.2.1 Pasteurization
4.2.2 Sterilization
4.2.3 Irradiation
4.2.4 Canning
4.2.5 Drying & Dehydration

References:

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

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

Justification for the mapping

PO1:- Disciplinary Knowledge - Understand the basic concepts, fundamental principles and experimental findings and the scientific the ories related to food technology, food science and Food technology & engineering and its other fields related to the program.
CO1: Student willlearn about the food groups.
CO2: Student willstudy about the different cooking methods
CO6: Students will get a knowledge about food preservation techniques.

PO2:- Communication Skills:- Develop various communication skills such as reading, listening and speaking skills to express ideas and views clearly and effectively.
CO2: Student willstudy about the different cooking methods
CO5: The students will learn about the Scope & opportunities in food industries.

PO3- Critical Thinking :- Propose novel ideas in explaining the scientific data, facts and figures related to Science and technology.
CO4: Students will study about the history food processing technology.

PO4- Analytical Reasoning and Problem Solving- To enable the students with good scientific and engineering knowledge so as to comprehend, design, and create food products and devices for the food industry and provide solutions for the challenges in the food industry as well as in agriculture.
CO3: the students may know about working of various equipment used in food processing industries.

PO5- Sense of Inquiry:- Curiously ask relevant questions for better understanding of fundamental concepts and principles, scientific theories and applications related to the study.
CO3: the students may know about working of various equipment used in food processing industries.
CO5: The students will learn about the Scope & opportunities in food industries.
CO6: Students will get a knowledge about food preservation techniques.

PO6- Use of Modern Tools:-
Operatemoderntools,equipment,instrumentsandlaboratorytechniquesto perform the experiments and write the programs in different languages.
CO2: Student willstudy about the different cooking methods
CO6: Students will get a knowledge about food preservation techniques.

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

CO4: Students will study about the history food processing technology.

PO8- Application of Knowledge:- Develop a scientific out look and apply the knowledge with respect to food technology.
CO3: the students may know about working of various equipment used in food processing industries.
CO5: The students will learn about the Scope & opportunities in food industries.

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

CO1: Student will learn about the food groups also multidisciplinary approaches related to food technology and engineering.
CO5: The students will learn about the Scope & opportunities in food industries.
CO7: The students will know about the advantages & disadvantages of cooking methods.

PO10:- Team Work - Understand the basic concepts, fundamental principles and experimental findings and the scientific the ories related to food technology, food science and Food technology & engineering and its other fields related to the program.
CO1: Student willlearn about the food groups.
CO2: Student willstudy about the different cooking methods
CO6: Students will get a knowledge about food preservation techniques.

PO11:- Environment and Sustainability:- Develop various communication skills such as reading, listening and speaking skills to express ideas and views clearly and effectively.
CO2: Student willstudy about the different cooking methods
CO5: The students will learn about the Scope & opportunities in food industries.

Po12:- Lifelong Learning:- Propose novel ideas in explaining the scientific data, facts and figures related to Science and technology.
CO4: Students will study about the history food processing technology and propose novel ideas in explaining.

CBCS Syllabus as per NEP 2020 for F.Y B.Voc. Food Technology & Research (2023 Pattern)

Name of the Programme: B.Voc. Food Technology & Research

Programme Code **:** FTR

Class **:** F.Y B.Voc.

Semester *II*

Course Type **:** Open Elective (OE)

Course Code **:** FTR-166-OE

CourseTitle **:** Bakery Technology

No.ofCredits *:02*

No.ofTeachingHours 30

LearningObjectives:

1 To understand bakery and confectionery industry
2 To study the role of different types of major and minor ingredients
3 To provide the knowledge about different bakery equipments
4 To learn process for manufacturing bakery and confectionery products.
5 To learn about the plant design of bakery industry.
6 To develop knowledge and skills in the preparation and storage of Bakery and Confectionery items

CourseOutcomes:

CO1: The students will be able to understand bakery and confectionery technology
CO2: Students will have a thorough understanding on effect of blending and baking on final product of bakery.
CO3: Students will able to prepare different bakery and confectionery products.
CO4: The students may plan to start their bakery and confectionery unit.
CO5: Students will know about the working of different bakery equipments in bakery industry.
CO6: Students may learn about the process of sugar & chocolate based confectionary products.
CO7: Students will know about manufacturing of various techniques in bakery and confectionery industry.

TopicsandLearningPoints

Unit-1: Baking technology: **08 Periods**

1.1 What is bakery technology
1.2 ingrdeinets in bakery technology
1.3 equipmnetns used in bakery technology and bakery products

Unit-2: Confectionery Technology **08 Periods**

2.1 Confectionery technology
2.2 types of confectionery technology
2.3 ingredients in confectionery technology
2.4 manufacturing process of confectionery technology

Unit-3: Diffenent bakery and confectionery products **07 Periods**

3.1 Sugar based products
3.2 Cholocate based products
3.3 Locally available products

Unit 4: Bakery plant development **07 Periods**

4.1 Bakery Organization and Equipment

References:

1. Matz S. A. (1996): Bakery technology and engineering, 1st edition, Arya book depot New delhi.
2. Practical Baking Cooking, 1st edition, Queen street house, U.K.
3. Kamel B. S. and Stauffer C. E. (1993): Advances in baking technology, 1st edition, Blackie academic and professional.
4. Aylwaed F. (2001): Food Technology Processing and Quality control \, 1st edition, Agrobios (India)
5. Harry W, Loesecke (2001): Outlines of food technology, 2nd edition, Agribios (India)
6. Khetarpaul N, Grewal R. B. and Jood S. (2005): Bakery Science and Cereal Technology, 1st edition, Daya publishing house, Delhi.
7. Manay S.N. and Shadaksharaswamy M. (2001); Food facts and principles, 2nd edn, New Age International (P) limited publishers.
8. Minife B.W. (1997): Chocolate, cocoa and confectionery science and technology, 3rd edition, CBS Publishers and Distributors, New Delhi.

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

Justification for the mapping

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

CO1: Students will have a thorough understanding on effect of blending and baking on final product of bakery.
CO2: Students will able to prepare different bakery products with different equipments.
CO4: The students may learn about the quality test of flour and what will be the effect of the flour quality on food.
CO6: Students may learn about the process of sugar & chocolate based confectionary products and they can easily classified the sugar & chocolate based confectionary products.

PO2:- Communication Skills:- Develop various communication skills such as reading, listening and speaking skills to express ideas and views clearly and effectively.
CO2: Students will able to prepare different bakery products with different equipments.
CO3: The students will be able to understand bakery and confectionery technology

PO3- Critical Thinking :- Propose novel ideas in explaining the scientific data, facts and figures related to Science and technology.
CO4: The students may learn about the quality test of flour and what will be the effect of the flour quality on food.

PO4- Analytical Reasoning and Problem Solving- To enable the students with good scientific and engineering knowledge so as to comprehend, design, and create food products and devices for the food industry and provide solutions for the challenges in the food industry as well as in agriculture.
CO3: The students will be able to understand bakery and confectionery technology**.**
CO5: Students will know about the working of different bakery equipments in bakery industry.
CO6: Students may learn about the process of sugar & chocolate based confectionary products and they can easily classified the sugar & chocolate based confectionary products.
CO7: Students will know about manufacturing of various techniques in bakery and confectionery industry.

PO5- Sense of Inquiry:- Curiously ask relevant questions for better understanding of fundamental concepts and principles, scientific theories and applications related to the study.
CO3: The students will be able to understand bakery and confectionery technology**.**
CO7: Students will know about manufacturing of various techniques in bakery and confectionery industry.

PO6- Use of Modern Tools:-
Operatemoderntools,equipment,instrumentsandlaboratorytechniquesto perform the experiments and write the programs in different languages.
CO2: Students will able to prepare different bakery products with different equipments.

CO5: Students will know about the working of different bakery equipments in bakery industry.
CO6: Students may learn about the process of sugar & chocolate based confectionary products and they can easily classified the sugar & chocolate based confectionary products.
CO7: Students will know about manufacturing of various techniques in bakery and confectionery industry.

PO7- Research Skills:- Understand how to design, collect, analyze, interpret and evaluate information/data that is relevant to food technology.
CO4: The students may learn about the quality test of flour and what will be the effect of the flour quality on food.
CO5: Students will know about the working of different bakery equipments in bakery industry.
CO6: Students may learn about the process of sugar & chocolate based confectionary products and they can easily classified the sugar & chocolate based confectionary products.

PO8- Application of Knowledge:- Develop a scientific outlook and apply the knowledge with respect to food technology.
CO3: The students will be able to understand bakery and confectionery technology**.**
CO7: Students will know about manufacturing of various techniques in bakery and confectionery industry.

PO9- Ethical Awareness- To train students in professional and ethical attitude, effective communication skills, team work skills and multidisciplinary approaches related to food technology and engineering.
CO1: Students will have a thorough understanding on effect of blending and baking on final product of bakery.
CO6: Students may learn about the process of sugar & chocolate based confectionary products and they can easily classified the sugar & chocolate based confectionary products.

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

CO1: Students will have a thorough understanding on effect of blending and baking on final product of bakery.
CO2: Students will able to prepare different bakery products with different equipments.
CO4: The students may learn about the quality test of flour and what will be the effect of the flour quality on food.
CO6: Students may learn about the process of sugar & chocolate based confectionary products and they can easily classified the sugar & chocolate based confectionary products.

PO11:- Environment and Sustainability:- Develop various communication skills such as reading, listening and speaking skills to express ideas and views clearly and effectively.
CO2: Students will able to prepare different bakery products with different equipments.
CO3: The students will be able to understand bakery and confectionery technology

PO12:- Lifelong Learning:- Propose novel ideas in explaining the scientific data, facts and figures related to Science and technology.
CO4: The students may learn about the quality test of flour and what will be the effect of the flour quality on food.

CBCS Syllabus as per NEP 2020 for F.Y B.Voc. Food Technology & Research (2023 Pattern)

Name of the Programme: B.Voc. Food Technology & Research

Programme Code **:** FTR

Class **:** F.Y B.Voc.

Semester *II*

Course Type **:** Open Elective (OE)

Course Code **:** FTR-167-OE

Course Title **:** Practicals of Bakery Technology

No.ofCredits *:02*

No.ofTeachingHours **:** 30

LearningObjectives:

1. To study the role of different types of major and minor ingredients
2. To provide the knowledge about different bakery equipments
3. To learn process for manufacturing bakery and confectionery products.
4. To learn about different types of bakery & confectionary products.
5. To learn about the quality test of flour.
6. To develop knowledge and skills in the preparation and storage of Bakery and Confectionery items

CourseOutcomes:

CO1: Students will have a thorough understanding on effect of blending and baking on final product of bakery.
CO2: Students will able to prepare different bakery products.
CO3: The students will be able to understand bakery and confectionery technology
CO4: The students may learn about the quality test of flour.
CO5: Students will know about the working of different bakery equipments in bakery industry.
CO6: Students may learn about the process of sugar & chocolate based confectionary products.
CO7: Students will know about manufacturing of various techniques in bakery and confectionery industry.

Topics and Learning Points

Sr. No.	Practical Name	Periods
1.	Quality testing of flour and yeast	**2P**
2.	Preparation of simple cakes	**2P**
3.	Preparation of black forest pastries	**2P**
4.	Preparation of chocolate muffins	**2P**
5.	Preparation of Biscuits	**2P**
6.	Preparation of cookies	**2P**
7.	Preparation of bread	**2P**
8.	Preparation of candy	**2P**
9.	Preparation of chikki	**2P**
10.	Preparation of chocolate	**2P**
11.	Preparation of toffee	**2P**
12.	Preparation of fondant	**1P**
13.	Preparation of fudge	**2P**
14.	Preparation of chocolate mousse	**2P**
15.	Preparation of Icing (Royal and Butter incing)	**3P**

References:

1. Matz S. A. (1996): Bakery technology and engineering, 1st edition, Arya book depot New delhi.
2. Practical Baking Cooking, 1st edition, Queen street house, U.K.
3. Kamel B. S. and Stauffer C. E. (1993): Advances in baking technology, 1st edition, Blackie academic and professional.
4. Aylwaed F. (2001): Food Technology Processing and Quality control \, 1st edition, Agrobios (India)
5. Harry W, Loesecke (2001): Outlines of food technology, 2nd edition, Agribios (India)
6. Khetarpaul N, Grewal R. B. and Jood S. (2005): Bakery Science and Cereal Technology, 1st edition, Daya publishing house, Delhi.
7. Manay S.N. and Shadaksharaswamy M. (2001); Food facts and principles, 2nd edn, New Age International (P) limited publishers.
8. Minife B.W. (1997): Chocolate, cocoa and confectionery science and technology, 3rd edition, CBS Publishers and Distributors, New Delhi.

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

Justification for the mapping

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

CO1: Students will have a thorough understanding on effect of blending and baking on final product of bakery.
CO2: Students will able to prepare different bakery products with different equipments.
CO4: The students may learn about the quality test of flour and what will be the effect of the flour quality on food.
CO6: Students may learn about the process of sugar & chocolate based confectionary products and they can easily classified the sugar & chocolate based confectionary products.

PO2:- Communication Skills:- Develop various communication skills such as reading, listening and speaking skills to express ideas and views clearly and effectively.
CO2: Students will able to prepare different bakery products with different equipments.
CO3: The students will be able to understand bakery and confectionery technology

PO3- Critical Thinking :- Propose novel ideas in explaining the scientific data, facts and figures related to Science and technology.
CO4: The students may learn about the quality test of flour and what will be the effect of the flour quality on food.

PO4- Analytical Reasoning and Problem Solving- To enable the students with good scientific and engineering knowledge so as to comprehend, design, and create food products and devices for the food industry and provide solutions for the challenges in the food industry as well as in agriculture.
CO3: The students will be able to understand bakery and confectionery technology**.**
CO5: Students will know about the working of different bakery equipments in bakery industry.
CO6: Students may learn about the process of sugar & chocolate based confectionary products and they can easily classified the sugar & chocolate based confectionary products.
CO7: Students will know about manufacturing of various techniques in bakery and confectionery industry.

PO5- Sense of Inquiry:- Curiously ask relevant questions for better understanding of fundamental concepts and principles, scientific theories and applications related to the study.
CO3: The students will be able to understand bakery and confectionery technology**.**
CO7: Students will know about manufacturing of various techniques in bakery and confectionery industry.

PO6- Use of Modern Tools:-
Operatemoderntools,equipment,instrumentsandlaboratorytechniquesto perform the experiments and write the programs in different languages.
CO2: Students will able to prepare different bakery products with different equipments.
CO5: Students will know about the working of different bakery equipments in bakery industry.
CO6: Students may learn about the process of sugar & chocolate based confectionary products and they can easily classified the sugar & chocolate based confectionary products.
CO7: Students will know about manufacturing of various techniques in bakery and confectionery industry.

PO7- Research Skills:- Understand how to design, collect, analyze, interpret and evaluate information/data that is relevant to food technology.
CO4: The students may learn about the quality test of flour and what will be the effect of the flour quality on food.
CO5: Students will know about the working of different bakery equipments in bakery industry.
CO6: Students may learn about the process of sugar & chocolate based confectionary products and they can easily classified the sugar & chocolate based confectionary products.

PO8- Application of Knowledge:- Develop a scientific outlook and apply the knowledge with respect to food technology.
CO3: The students will be able to understand bakery and confectionery technology**.**
CO7: Students will know about manufacturing of various techniques in bakery and confectionery industry.

PO9- Ethical Awareness- To train students in professional and ethical attitude, effective communication skills, team work skills and multidisciplinary approaches related to food technology and engineering.
CO1: Students will have a thorough understanding on effect of blending and baking on final product of bakery.
CO6: Students may learn about the process of sugar & chocolate based confectionary products and they can easily classified the sugar & chocolate based confectionary products.

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

CO1: Students will have a thorough understanding on effect of blending and baking on final product of bakery.
CO2: Students will able to prepare different bakery products with different equipments.

CO4: The students may learn about the quality test of flour and what will be the effect of the flour quality on food.
CO6: Students may learn about the process of sugar & chocolate based confectionary products and they can easily classified the sugar & chocolate based confectionary products.

PO11:- Environment and Sustainability:- Develop various communication skills such as reading, listening and speaking skills to express ideas and views clearly and effectively.
CO2: Students will able to prepare different bakery products with different equipments.
CO3: The students will be able to understand bakery and confectionery technology

PO12:- Lifelong Learning:- Propose novel ideas in explaining the scientific data, facts and figures related to Science and technology.
CO4: The students may learn about the quality test of flour and what will be the effect of the flour quality on food.

CBCS Syllabus as per NEP 2020 for F.Y B.Voc. Food Technology & Research (2023 Pattern)

Name of the Programme: B.Voc. Food Technology & Research

Programme Code **:** FTR

Class **:** F.Y B.Voc.

Semester *II*

Course Type **:** Vocational Skill Course (VSC)

Course Code **:** FTR-171-VSC

Course Title **:**Practicals of Fermentation Technology

No.ofCredits *:02*

No.ofTeachingHours 30

LearningObjectives:

1 To learn about the fermentation technology
2 To study the innovations in fermentation
3 To study about the types of fermentation.
4 To learn about important fermentation techniques.
5 To know about processing of different types of fermented alcoholic beverages.
6 To learn about working of different fermented equipments.
7 Tolearn about different oriented products.

CourseOutcomes:

CO1: Students will get knowledge about the different types of traditional fermented foods.
CO2: Students will have a thorough understanding of different fermentation techniques.
CO3: The students will know the classification of fermented foods and beverages.
CO4: Student will learn about the preservation by using fermentation.
CO5: Students will study about the types of food fermentation.
CO6: The students may learn about the innovations in fermentation.
CO7: Students will know about the working of different fermentation equipments.

TopicsandLearningPoints

Sr. No.	Practical Name	Periods
1.	To study the types of fermentation	**2P**
2.	Preparation of Kefir	**2P**
3.	Preparation of Saurkraut	**2P**
4.	Preparation of yogurt	**2P**
5.	Preparation of wine	**2P**
6.	Preparation of beer	**2P**
7.	Preparation of soysauce	**2P**
8.	Preparation of miso	**2P**
9.	Preparation of Cheese	**2P**
10.	Preparation of Kombucha	**2P**
11.	Preparation of bakers yeast	**2P**
12.	Preparation of Idli	**3P**
13.	Analysis of fermented food products	**2P**
14.	Visit to winery or any other fermented products based industry and report submission.	**3P**

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- 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
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- B. Srilakshmi (2007) Dietetics, Revised Fifth Edition, New Age International Publishers
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CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	**6**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2**	**2**	**-**	**-**
CO2	**-**	**-**	**2**	**6**	**5**	**6**	**6**	**-**	**-**	**-**	**-**	**6**
CO3	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2**
CO4	**-**	**2**	**-**	**-**	**2**	**-**	**-**	**4**	**-**	**-**	**6**	**-**
CO5	**-**	**-**	**2**	**-**	**2**	**2**	**-**	**2**	**-**	**2**	**-**	**-**
CO6	**4**	**-**	**-**	**-**	**2**	**-**	**-**	**-**	**-**	**2**	**-**	**-**
CO7	**2**	**-**	**1**	**4**	**2**	**6**	**-**	**-**	**-**	**-**	**-**	**-**

Justification for the mapping

PO1:- Disciplinary Knowledge - Understand the basic concepts, fundamental principles and experimental findings and the scientific the ories related to food technology, food science and Food technology & engineering and its other fields related to the program.
CO1: Students will get knowledge about the different types of traditional fermented foods and their notional value.
CO6: The students may learn about the history & innovations in fermentation.
CO7: Students will know about the working of different fermentation equipments.

CO3: The students will know the classification of fermented foods and beverages.
CO6: The students may learn about the history & innovations in fermentation.

PO2:- Communication Skills:- Develop various communication skills such as reading, listening and speaking skills to express ideas and views clearly and effectively.
CO4: Student will learn about the preservation by using fermentation and their health benefits.

PO3- Critical Thinking :- Propose novel ideas in explaining the scientific data, facts and figures related to Science and technology.
CO2: Students will have a thorough understanding of different fermentation techniques
CO5: Students will study about the scope of food fermentation.
CO7: Students will know about the working of different fermentation equipments.
PO4- Analytical Reasoning and Problem Solving- To enable the students with good scientific and engineering knowledge so as to comprehend, design, and create food products and devices for the food industry and provide solutions for the challenges in the food industry as well as in agriculture.
CO2: Students will have a thorough understanding of different fermentation techniques and provide solutions for the challenges in the food industry.
CO7: Students will know about the working of different fermentation equipments.

PO5- Sense of Inquiry:- Curiously ask relevant questions for better understanding of fundamental concepts and principles, scientific theories and applications related to the study.
CO2: Students will have a thorough understanding of different fermentation techniques
CO4: Student will learn about the preservation by using fermentation and their health benefits.
CO5: Students will study about the scope of food fermentation
CO7: Students will know about the working of different fermentation equipments and their handling .
CO6: The students may learn about the history & innovations in fermentation.

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

CO2: Students will have a thorough understanding of different fermentation techniques

CO5: Students will study about the scope of food fermentation

CO7: Students will know about the working of different fermentation equipments and their handling

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

CO2: Students will have a thorough understanding of different fermentation techniques and Understand designs of various equipments.

PO8- Application of Knowledge:- Develop a scientific out look and apply the knowledge with respect to food technology.
CO4: Student will learn about the preservation by using fermentation and their health benefits.
CO5: Students will study about the scope of food fermentation apply the knowledge with respect to food technology.
PO9- Ethical Awareness- To train students in professional and ethical attitude, effective communication skills, team work skills and multidisciplinary approaches related to food technology and engineering.

CO2: Students will have a thorough understanding of different fermentation techniques and Understand designs of various equipments also develop the team work skills and multidisciplinary approaches related to food technology and engineering.

PO10:- Team Work - Understand the basic concepts, fundamental principles and experimental findings and the scientific the ories related to food technology, food science and Food technology & engineering and its other fields related to the program.
CO1: Students will get knowledge about the different types of traditional fermented foods and their notional value.
CO6: The students may learn about the history & innovations in fermentation.
CO7: Students will know about the working of different fermentation equipments.
CO3: The students will know the classification of fermented foods and beverages.
CO6: The students may learn about the history & innovations in fermentation.

PO11:- Environment and Sustainability:- Develop various communication skills such as reading, listening and speaking skills to express ideas and views clearly and effectively.
CO4: Student will learn about the preservation by using fermentation and their health benefits.

Po12:- Lifelong Learning:- Propose novel ideas in explaining the scientific data, facts and figures related to Science and technology.
CO2: Students will have a thorough understanding of different fermentation techniques
CO5: Students will study about the scope of food fermentation.
CO7: Students will know about the working of different fermentation equipments.

CBCS Syllabus as per NEP 2020 for F.Y B.Voc. Food Technology & Research (2023 Pattern)

Name of the Programme: B.Voc. Food Technology & Research

Programme Code **:** FTR

Class **:** F.Y B.Voc.

Semester *II*

Course Type **:** Skill Enhancement Course (SEC)

Course Code **:** FTR-176-SEC

Course Title **:** Practicals of Bakery Technology

No.ofCredits *:02*

No.ofTeachingHours 30

LearningObjectives:

1. To study the role of different types of major and minor ingredients
2. To provide the knowledge about different bakery equipments
3. To learn process for manufacturing bakery products.
4. To learn about different types of bakery products.
5. To learn about the quality test of flour.
6. To develop knowledge and skills in the preparation and storage of Bakery items

CourseOutcomes:

CO1: Students will have a thorough understanding on effect of blending and baking on final product of bakery.
CO2: Students will able to prepare different bakery products.
CO3: The students will be able to understand bakery technology
CO4: The students may learn about the quality test of flour.
CO5: Students will know about the working of different bakery equipments in bakery industry.
CO6: Students may learn about the types of icing & their uses in bakery products.
CO7: Students will know about manufacturing of various techniques in bakery industry.

Topics and Learning Points

Sr. No.	Practical Name	Periods
1.	Quality testing of flour and yeast	**2P**
2.	Preparation of simple cake	**2P**
3.	Preparation of lava cake	**2P**
4.	Preparation of black forest pastries	**2P**
5.	Preparation of chocolate muffins	**2P**
6.	Preparation of Shrewsbury Biscuits	**2P**
7.	Preparation of Wheat Biscuits	**2P**
8.	Preparation of Ragi Biscuits	**2P**
9.	Preparation of coconut cookies	**2P**
10.	Preparation of simple bread	**2P**
11.	Preparation of khari	**2P**
12.	Preparation of cream roll	**2P**
13.	Preparation of doughnut	**2P**
14.	Preparation of Icing (Royal and Butter icing)	**3P**
15.	Visit to Bakery Industry	**1P**

References:

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2. Practical Baking Cooking, 1st edition, Queen street house, U.K.
3. Kamel B. S. and Stauffer C. E. (1993): Advances in baking technology, 1st edition, Blackie academic and professional.
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7. Manay S.N. and Shadaksharaswamy M. (2001); Food facts and principles, 2nd edn, New Age International (P) limited publishers.
8. Minife B.W. (1997): Chocolate, cocoa and confectionery science and technology, 3rd edition, CBS Publishers and Distributors, New Delhi.

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

Justification for the mapping

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

CO1: Students will have a thorough understanding on effect of blending and baking on final product of bakery.
CO2: Students will able to prepare different bakery products with different equipments.
CO4: The students may learn about the quality test of flour and what will be the effect of the flour quality on food.
CO6: Students may learn about the process of sugar & chocolate based confectionary products and they can easily classified the sugar & chocolate based confectionary products.

PO2:- Communication Skills:- Develop various communication skills such as reading, listening and speaking skills to express ideas and views clearly and effectively.
CO2: Students will able to prepare different bakery products with different equipments.
CO3: The students will be able to understand bakery and confectionery technology

PO3- Critical Thinking :- Propose novel ideas in explaining the scientific data, facts and figures related to Science and technology.
CO4: The students may learn about the quality test of flour and what will be the effect of the flour quality on food.

PO4- Analytical Reasoning and Problem Solving- To enable the students with good scientific and engineering knowledge so as to comprehend, design, and create food products and devices for the food industry and provide solutions for the challenges in the food industry as well as in agriculture.
CO3: The students will be able to understand bakery and confectionery technology**.**
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CO6: Students may learn about the process of sugar & chocolate based confectionary products and they can easily classified the sugar & chocolate based confectionary products.
CO7: Students will know about manufacturing of various techniques in bakery and confectionery industry.

PO5- Sense of Inquiry:- Curiously ask relevant questions for better understanding of fundamental concepts and principles, scientific theories and applications related to the study.
CO3: The students will be able to understand bakery and confectionery technology**.**
CO7: Students will know about manufacturing of various techniques in bakery and confectionery industry.

PO6- Use of Modern Tools:-
Operatemoderntools,equipment,instrumentsandlaboratorytechniquesto perform the experiments and write the programs in different languages.
CO2: Students will able to prepare different bakery products with different equipments.
CO5: Students will know about the working of different bakery equipments in bakery industry.
CO6: Students may learn about the process of sugar & chocolate based confectionary products and they can easily classified the sugar & chocolate based confectionary products.
CO7: Students will know about manufacturing of various techniques in bakery and confectionery industry.

PO7- Research Skills:- Understand how to design, collect, analyze, interpret and evaluate information/data that is relevant to food technology.
CO4: The students may learn about the quality test of flour and what will be the effect of the flour quality on food.
CO5: Students will know about the working of different bakery equipments in bakery industry.
CO6: Students may learn about the process of sugar & chocolate based confectionary products and they can easily classified the sugar & chocolate based confectionary products.

PO8- Application of Knowledge:- Develop a scientific outlook and apply the knowledge with respect to food technology.
CO3: The students will be able to understand bakery and confectionery technology**.**
CO7: Students will know about manufacturing of various techniques in bakery and confectionery industry.

PO9- Ethical Awareness- To train students in professional and ethical attitude, effective communication skills, team work skills and multidisciplinary approaches related to food technology and engineering.
CO1: Students will have a thorough understanding on effect of blending and baking on final product of bakery.
CO6: Students may learn about the process of sugar & chocolate based confectionary products and they can easily classified the sugar & chocolate based confectionary products.

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

CO1: Students will have a thorough understanding on effect of blending and baking on final product of bakery.
CO2: Students will able to prepare different bakery products with different equipments.

CO4: The students may learn about the quality test of flour and what will be the effect of the flour quality on food.
CO6: Students may learn about the process of sugar & chocolate based confectionary products and they can easily classified the sugar & chocolate based confectionary products.

PO11:- Environment and Sustainability:- Develop various communication skills such as reading, listening and speaking skills to express ideas and views clearly and effectively.
CO2: Students will able to prepare different bakery products with different equipments.
CO3: The students will be able to understand bakery and confectionery technology

PO12:- Lifelong Learning:- Propose novel ideas in explaining the scientific data, facts and figures related to Science and technology.
CO4: The students may learn about the quality test of flour and what will be the effect of the flour quality on food.

Theory Paper No- ENG-181-AEC-Functional English

Maximum Marks: 30 **Credits: 2**
Teaching Period: 2 /week **Teaching Load: 30 Theory Period/Semester**

Theory Paper No- FTR-185-VEC-Digital & Technology Solutions

Maximum Marks: 30 **Credits: 2**
Teaching Period: 2/week **Teaching Load: 30 Theory Period/Semester**

Theory Paper No- 139-Co-curricular Course (CC)