Choice Based Credit System

Scheme & Syllabus of

Bachelor of Science (Hons) in Food Technology

B.Sc. (Hons)Food Technology

Batch 2024 onwards

By

Board of Study Food Science and Engineering

Department of Academics

I.K. Gujral Punjab Technical University

Vision:

To create competent professionals those, contribute towards the economic development of the nation by going in line with the policy of Government of India in the field of food processing food safety and security.

Mission:

- Development of human resources in the field of food science and technology to serve the cause of the nation
- Providing a strong theoretical and practical background across the food science discipline with an emphasis on developing sustainable resources to cater to food and nutrition-related challenges
- Development of human resources in the area of clinical nutrition and research to contribute effectively to making India healthy
- Create a favorable environment for innovation to translate theoretical knowledge into practical applications
- Inculcating professional ethical values, innovative research capabilities, and leadership abilities
- Holistic development of the youth through the process of self-evaluation and continuous improvement

Program Name:	Bachelor of Science (Hons) in Food Technology **Or** B.Sc. (Hons) in Food Technology
Program Level	Undergraduate (UG) Programme
Duration	4 years (8 Semesters)
Eligibility for Admission	Passing of 10+2 examination (Science) or 10+2 arts with Food Preservation / Food Science and Technology Vocational subject of the recognized board (Punjab School Education Board / C.B.S.E. / I.C.S.E) with 40% marks or any other equivalent examination.
Year of Implementation	New Syllabus will be implemented from 2024 onwards.
Medium of Instruction	English

Program Education Objectives:

1. To make the students competent in developing future foods by utilizing technologies such as dehydration, freezing, irradiation, fermentations, applications of enzymes in food processing, food product development, nutraceuticals, and nutritional and functional foods.

2. To keep students abreast with the rapid developments reported within technology and biological science that are creating completely new ways of developing various processed foods.

3. To impart an understanding of modern food processing and profound knowledge of technology associated with the development of healthy and safe foods.

4. To motivate and enable students of B.Sc. Food Technology to opt for higher levels of learning viz. post-graduate program, and doctoral programs by research in this interdisciplinary field with the view of developing highly skilled professionals to work in Industry and academia.

Program Outcomes:

PO1	To impart knowledge of various areas related to Food Science and Technology
PO2	To enable the students to understand food composition and its physicochemical, nutritional, microbiological, and sensory aspects
PO3	To familiarize the students with the processing and preservation techniques of pulses, oilseeds, spices, fruits and vegetables, meat, fish, poultry, milk & milk products
PO4	To emphasize the importance of food safety, food quality, food plant sanitation, food laws and regulations, food engineering, and packaging in the food industry.
PO5	To impart an understanding of modern food processing and profound knowledge of technology associated with the development of healthy and safe foods**.**

Mapping of Program Outcomes with Program Education Objectives: -

POE / PO	POE1	POE2	POE3	POE4
PO1	**1**	**1**	**1**	**3**
PO2	**1**	**1**	**1**	**2**
PO3	**1**	**1**	**1**	**2**
PO4	**1**	**2**	**1**	**1**
PO5	**1**	**1**	**1**	**1**

Course Type Coding:

DSC	Discipline Core
DSE	Discipline Elective
QP-NOS	Qualification Pack - National Occupational Standards.
SEC-SB	Skill Enhancement Course- Skill Based
SEC-VB	Skill Enhancement Course- Value Based
AECC	Ability Enhancement Course
OE	Open Elective

Important Notes:

1. Theory courses will be of 04 hours and practical will be of 04 hours duration per week. For all lecture courses, one credit per lecture/week/semester will generally be adopted. One laboratory hour per week per semester will be assigned half credit.
2. No elective course will be run unless the number of students registered for the elective course is five or more.

Program Scheme & Syllabus

Semester I

Course Code	Course Title	Course Type	Load			Marks Distribution		Total	Credits
			L	T	P	Internal	External		
BSFT111-24	Foundations of Food Science	DSC	4	0	0	40	60	100	4
BSFT112-24	Technology of Food Preservation	DSC	4	0	0	40	60	100	4
BSFT113-24	Food Analysis and Preservation (Lab) Science	DSC	0	0	4	30	20	50	2
FIC/Q9005	Industrial Production Worker – Food Processing[#]	QP-NOS	4	0	0	40	60	100	4
SEC111-24	Digital Fluency	SEC-SB	4	0	0	40	60	100	4
SEC112-24	Digital Fluency (Lab)	SEC-SB	0	0	4	30	20	50	2
HVPE101-18	Human Values, De-addiction, and Traffic Rules	AECC	3	0	0	40	60	100	3
HVPE102-18	Human Values, De-addiction and Traffic Rules (Lab/Seminar)	AECC	0	0	1	25[##]	--	25	1
BTHU103-18	English	AECC	1	0	0	40	60	100	1
BTHU104-18	English (Lab)	AECC	0	0	2	30	20	50	1
BSFT114-24	Industrial Visit with FoSTaC Course	AECC	0	0	3	40	--	40	3
B MPD102-18	Mentoring and Professional Development	SEC-VB	0	0	1	25[##]	--	25	1
	Total		**20**	**0**	**15**	420	420	840	30

[#] Students will learn the practical application of Industrial Production Worker – Food Processing skills in the food industry through summer training after their first year.

[##]The Human Values, De-addiction and Traffic Rules (Lab/ Seminar), and Mentoring and Professional Development course will have internal evaluation only.

SEMESTER- I

BFT111-24: Foundations of Food Science

Total marks: 100	**L**	**T**	**P**
	4	**0**	**0**

Course objective:

Introduce students to the fundamentals of food science, including its historical development and composition, structure, and nutritional value of foods derived from plants and animals.

Course outcome: At the end of the course, the students will be able to

CO1	Explain the basics of food science and technology, and the status of the food industry in India and globally.
CO2	Analyze the functions and changes of nutrients during food processing and storage.
CO3	Describe the properties of water and its impact on food quality and spoilage.
CO4	Evaluate the composition, nutritional value, and processing techniques of plant-based foods.
CO5	Assess the composition, nutritional value, and processing effects on animal-based foods and understand the concept of healthy foods.

Mapping of Course Outcomes with Program Outcomes: Formulation of Course Outcomes-Program Outcomes matrix with correlation values as 1 (Low), 2 (Medium), 3 (High)

PO / CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	3	2	1	1	3
CO2	1	3	3	1	2
CO3	1	3	1	3	1
CO4	1	3	3	1	2
CO5	3	3	3	3	3

Details of the Course Content - Foundations of Food Science (BFT111-24)

Unit	Contents	Contact Hours
I	**Introduction to Food Science and Fundamentals** **1. Introduction to Food Science, Food Technology, and Food Engineering:** Overview of food science, its importance, and interdisciplinary nature; Distinctions and interrelationships between food science, food technology, and food engineering **2. Status of the Food Industry in India and Abroad:** Current trends and statistics of the food industry in India; Comparison with global food industry trends; Key challenges and opportunities in the food industry **3. Nutrients and Functions of Food:** Carbohydrates, Proteins, Lipids, Vitamins, Minerals**:** Types, functions, dietary sources, importance in the diet, and Changes in nutrient composition during food processing and storage **4. Physical Properties of Water and Ice:** Chemical nature and structure of the water molecule; Physical properties of water and ice; Absorption phenomena and types of water solutions; Colligative properties of water; Distinction between free and bound water; Water activity and its role in food spoilage; Freezing and ice structure: Impact on food preservation and quality	12
II	**Food Dispersions and Plant-Based Foods** **1. Food Dispersions:** Introduction to food dispersions; Structure and classification of different types of food dispersions (e.g., solutions, suspensions, emulsions, gels); Stability factors and mechanisms affecting food dispersions **2. Cereals and Millets:** Definition, types, composition, nutritional value, structure (Wheat and rice), factors affecting and changes in major cereals and millets during processing (cooking and germination) **3. Pulses:** Definition, types, composition, nutritional value, factors affecting and changes in major pulses during processing (Soaking, Germination, Decortication, Cooking, Fermentation); Identification and implications of antinutritional factors in pulses	11
III	**Composition and Nutritive Value of Plant-Based Foods** 1. **Nuts & Oilseeds:** Definition, types, composition, and nutritional value of nuts and oilseeds; Processing techniques for oilseeds such as soybeans and coconut; Production and applications of protein isolates and texturized vegetable protein (TVP) 2. **Fruits & Vegetables:** Definition, classification, composition, and nutritional value of fruits and vegetables; Vegetable cookery: Techniques and nutritional implications; Changes in fruits and vegetables during maturation, ripening, storage, and cooking;	11

	Concept and mechanisms of enzymatic browning in fruits and vegetables 3. **Spices & Herbs:** Definition, classification, composition, and nutritional value of spices and herbs; Culinary and preservative uses of spices and herbs; Overview of essential oils and oleoresins: Extraction, properties, and applications.	
IV	**Composition and Nutritive Value of Animal-Based Foods and Health Foods** 1. **Eggs:** Structure, composition and nutritional value of eggs; Grading and quality assessment of egg; Changes in eggs during cooking and storage 2. **Meat & Fish:** Structure, types, composition and nutritional value of meat and fish; Different processing methods and their effects on meat and fish quality and nutritional value 3. **Dairy Products:** Definition, types, composition, nutritional value of milk; Overview of different types of market milk and milk products; Changes during milk processing such as pasteurization and homogenization; Storage and its effects on milk and milk products 4. **Health Foods:** Functional foods and nutraceuticals; definition, classification and their role in health; Organic foods: Definition and advantages; Genetically modified (GM) foods: Concept and Implications.	14

Recommended Books and Resources

1. Potter, N. N., & Hotchkiss, J. H. (1998). *Food science* (5th ed.). Springer.
2. DeMan, J. M. (2014). *Principles of food chemistry* (4th ed.). Springer.
3. Manay, N. S., & Shadaksharaswamy, M. (2009). *Food facts and principles*. New Age International.
4. Srilakshmi, B. (2016). *Food science* (4th ed.). New Age International.
5. Frazier, W. C., & Westhoff, D. C. (2008). *Food microbiology* (5th ed.). Tata McGraw-Hill Education.
6. Fellows, P. J. (2017). *Food processing technology: Principles and practice* (4th ed.). Woodhead Publishing.
7. De, S. (2015). *Outlines of dairy technology* (3rd ed.). Oxford University Press.
8. Vaclavik, V. A., & Christian, E. W. (2014). *Essentials of food science* (4th ed.). Springer.
9. Mudambi, S. R., & Rao, S. M. (2007). *Food science*. Oxford University Press
10. Singh, R. P., & Heldman, D. R. (2014). *Food engineering: Fundamentals and applications* (2nd ed.).
11. Sharma, D. (2018). *The food industry in India: Challenges and opportunities*.
12. Whitney, E. N., & Rolfes, S. R. (2018). *Understanding nutrition* (15th ed.).
13. McCain, V. B. (2010). *Water in foods*.
14. Walstra, P. (2003). *Physical chemistry of foods*.
15. Fennema, O. R. (Ed.). (1996). *Food chemistry* (3rd ed.).
16. deMan, J. M. (1999). *Principles of food chemistry* (3rd ed.). Springer.
17. Grumezescu, A. M., & Holban, A. M. (Eds.). (2019). *Handbook of plant-based food and beverage technology*.
18. Li, T. S. C. (2006). *Vegetables and fruits: Nutritional and therapeutic values*.
19. Walstra, P., Wouters, J. T. M., & Geurts, T. J. (2006). *Dairy science and technology* (2nd ed.).
20. Warriss, P. D. (2010). *Meat science: An introductory text* (2nd ed.).

21. Garg, M. L., & Berry Ottaway, P. (Eds.). (2011). *Functional foods: Principles and technology*.
22. Hui, Y. H. (Ed.). (2006). *Handbook of food science, technology, and engineering* (Vols. 1-4).
23. Brennan, J. G. (Ed.). (2006). *Food processing handbook*.
24. Hui, Y. H., Meunier-Goddik, L., Josephsen, J., Nip, W.-K., Stanfield, P. S., & Lam, A. S. T. (Eds.). (2004). *Handbook of food and beverage fermentation technology*.
25. Shortt, C., & O'Brien, J. (Eds.). (2004). *Handbook of functional dairy products*.
26. Shetty, K., Paliyath, G., Pometto, A., & Levin, R. E. (2008). *Food biotechnology* (2nd ed.). CRC Press.
27. Bagchi, D., Misra, L. K., Bagchi, M., & Kothari, S. C. (Eds.). (2014). *Nutraceutical and functional food processing technology* (2nd ed.). CRC Press.

BFT112-24: Technology of Food Preservation

Total marks: 100	**L**	**T**	**P**
	4	**0**	**0**

Course objective:

Equip students with comprehensive knowledge of historical and modern food preservation techniques, including thermal and non-thermal methods, microbial control, and emerging technologies, to enhance food safety, quality, and shelf life.

Course outcome: At the end of the course, the students will be able to

CO1	Understand the historical evolution and principles of food preservation, recognizing its importance in extending shelf life and ensuring food safety.
CO2	Classify various types of foods based on perishability and comprehend the factors influencing their shelf life.
CO3	Identify and explain different types of food spoilage and contaminants, and understand the role of microorganisms in food preservation.
CO4	Analyze and apply thermal and non-thermal preservation methods to maintain food quality and safety.
CO5	Evaluate emerging preservation technologies and their impact on food quality and microbial control.

Mapping of Course Outcomes with Program Outcomes: Formulation of Course Outcomes-Program Outcomes matrix with correlation values as 1 (Low), 2 (Medium), 3 (High)

PO / CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	3	1	1	2	3
CO2	2	3	2	2	2
CO3	**3**	3	2	3	2
CO4	3	2	3	3	3
CO5	2	1	2	2	3

Details of the Course Content - Technology of Food Preservation (BFT112-24)

Unit	Contents	Contact Hours
I	**Introduction to Food Preservation** **1. Food Preservation:** Historical Perspectives**:** Early methods of food preservation; Evolution of food preservation technologies; Principles of Food Preservation: Importance and objectives of food preservation. **2. Types of Foods and Shelf Life:** Classification of foods: Perishable foods, Semi-perishable foods, Shelf-stable foods; Definition of shelf life **3. Food Spoilage and Contaminants:** Concept and types of spoilage (biological, chemical, physical); Concept, sources and types of contaminants. **4. Food Microbiology:** Microorganisms associated with foods: bacteria, yeast, mold and their importance in the food industry; Classification and growth curve of microorganisms; Food infection and food intoxication.	11
II	**Thermal Preservation Methods** **1. Heat Processing:** Thermal Processing: Principles of thermal processing, Thermal resistance of microorganisms, Thermal Death Time and Lethality concept, Characterization of heat penetration data, Thermal process calculations; Commercial Heat Preservation Methods: Sterilization and commercial sterilization, Pasteurization and Blanching. Effect of thermal processing on food. Process of canning, Equipment and materials used, Safety and quality control in canning. **2. Microwave and Ohmic Heating:** Mechanisms and applications, Advantages and limitations. Effects of microwave and ohmic heating on food. **3. Drying and Dehydration:** Definition, Principles of drying, heat and mass transfer, factors affecting rate of drying, normal drying curve, Types of dryers; Impact on food quality. Psychrometric Charts: Introduction, Data Interpretation and Application. **4. Evaporation:** Definition and factors affecting evaporation, Types of evaporators used in the food industry	13
III	**Non-Thermal Preservation Methods** **1. Food Preservation by Low Temperature:** Introduction to refrigeration, cool storage, and freezing; Refrigeration: Mechanism and effects on microbial growth, Types of refrigeration systems; Freezing: Principles and equipment, Types of freezing (slow, fast, cryogenic), Freezing curve and quality changes during freezing and storage, Introduction to thawing and its effects on food. **2. Chemical Preservation:** Types of preservatives, GRAS (Generally Recognized As Safe) substances, Use of chemical preservatives, Safety and regulatory aspects. **3. Biological Preservation:** Fermentation definition, Principles and benefits, Types of fermented foods.	12

	4. Modified Atmosphere Packaging (MAP): Definition, Principles and techniques, Applications and advantages.	
IV	**Emerging Technologies** **1. Pulsed Electric Fields (PEF):** Principles and applications, Effects on microorganisms and food quality. **2. Irradiation:** Mechanisms and types (gamma rays, X-rays, electron beams), Safety and regulatory concerns. **3. High-Pressure Processing (HPP):** Principles and mechanisms, Impact on microorganisms and food quality, Applications and limitations **4. Cold plasma technology:** Principles and potential applications,	12

Recommended Books and Resources

1. Potter, N. N., & Hotchkiss, J. H. (1998). *Food Science* (5th ed.). Springer.
2. Desrosier, N. W., & Desrosier, J. N. (1987). *The Technology of Food Preservation* (4th ed.). AVI Publishing Company.
3. Fellows, P. (2009). *Food Processing Technology: Principles and Practice* (4th ed.). Woodhead Publishing.
4. Rahman, M. S. (2020). *Handbook of Food Preservation* (3rd ed.). CRC Press.
5. Hui, Y. H. (2006). *Handbook of Food Science, Technology, and Engineering* (Vol. 4). CRC Press.
6. Barbosa-Cánovas, G. V., & Juliano, P. (2008). *Food Engineering: Thermal Processing Systems*. Springer.
7. Singh, R. P., & Heldman, D. R. (2022). *Introduction to Food Engineering* (6th ed.). Academic Press.
8. Heldman, D. R., & Lund, D. B. (2006). *Handbook of Food Engineering* (2nd ed.). CRC Press.
9. Leistner, L., & Gorris, L. G. M. (1995). *Food Preservation by Combined Processes*. CRC Press.
10. Gould, G. W. (2000). *New Methods of Food Preservation*. Springer.
11. Zhang, H. Q., Barbosa-Cánovas, G. V., Balasubramaniam, V. M., Dunne, C. P., Farkas, D. F., & Yuan, J. T. C. (2011). *Nonthermal Processing Technologies for Food*. Wiley-Blackwell.
12. Hendrickx, M., & Knorr, D. (2001). *Ultra High Pressure Treatments of Foods*. Springer.
13. Barbosa-Cánovas, G. V., Tapia, M. S., & Cano, M. P. (2004). *Novel Food Processing Technologies*. CRC Press.
14. Rosenthal, I. (2010). *Pulsed Electric Fields Technology for the Food Industry*. Springer.
15. Heldman, D. R. (2023). *Food Preservation Process Design*. Springer.
16. Ghosh, D., & Kumar, A. (2024). *Emerging Technologies in Food Preservation*. Wiley-Blackwell.
17. Datta, A. K. (2023). *Food Processing and Preservation*. CRC Press.
18. Smith, J. P., & Hongshun, Y. (2022). *Food Processing: Principles and Applications* (3rd ed.). Wiley-Blackwell.

BFT113-24: Food Analysis and Preservation (Lab)

Total marks: 50	**L**	**T**	**P**
	0	**0**	**4**

Course objective:

To equip students with practical skills and comprehensive knowledge in the analysis and preservation of food products, ensuring proficiency in laboratory techniques, safety protocols, and quality evaluation methods essential for preserving the food products in the food technology field.

Course outcome: At the end of the course, the students will be able to

CO1	Demonstrate proficiency in using laboratory equipment and adhering to safety protocols in a food testing lab.
CO2	Apply fundamental techniques for food sampling, preparation, and proximate as well as physio-chemical analysis.
CO3	Perform microbial analysis, including total plate count, coliform, and E. coli detection, to ensure food safety and quality.
CO4	Evaluate the quality characteristics of various food products preserved by methods such as drying, freezing, blanching, pickling, and canning.
CO5	Compare and contrast conventional and modern food processing methods, and analyze their effects on the nutritional and microbial stability of food products.

Mapping of Course Outcomes with Program Outcomes: Formulation of Course Outcomes-Program Outcomes matrix with correlation values as 1 (Low), 2 (Medium), 3 (High)

PO / CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	2	1	1	3	1
CO2	3	3	2	2	2
CO3	2	3	1	3	2
CO4	2	2	3	2	2
CO5	2	2	2	2	3

Details of the Course Content - Food Analysis and Preservation (Lab) (BFT113-24)

Practical no.	Contents	Contact Hours
1*	Overview of the laboratory processes	1
2*	Introduction to the quality analysis process	1
3*	Attributes of an assistant lab technician -Food and Agricultural Commodities and laboratory ethics	1
4*	Prepare and Maintain Work Area and Equipment for Food Lab Testing (FIC/N7601)	1
5*	Prepare for Quality Analysis and Manage Housekeeping for Food Lab Activities (FIC/N7602)	1
6*	Food Safety, Hygiene and Sanitation for Food Lab Testing (FIC/N7605)	1
7*	Sampling and Quality Analysis for Food Lab Activities (FIC/N7603)	2
8*	Complete Documentation and Record Keeping Related to Performing Lab Activities (FIC/N7604)	2
9	Moisture and ash content determination in food samples (Gravimetric method).	2
10	Determination of pH in Various Foods Using pH Meter and Effect of pH on Microbial Stability of Foods.	2
11	Determination of protein content (Kjeldahl method).	2
12	Estimation of fat content (Soxhlet extraction method).	2
13	Determination of dietary fibre content in food samples.	2
14	Estimation of total carbohydrate content in food samples (Titrimetric or spectrophotometric method).	2
15	Identification and Classification of Cereals and Millets.	2
16	Quality Evaluation of Spices and Condiments.	2
17	Quality Characteristics of Foods Preserved by Drying/Dehydration.	2
18	Quality Characteristics of Frozen Foods.	2
19	Blanching of Vegetables and Its Effects.	2
20	Pickling Process and Quality Analysis.	2
21	Comparison of Conventional and Microwave Processing of Foods.	2
22	Preservation of Food by Canning and Cut-Out Analysis.	2

*Mandatory to teach from FIC/Q7601 manual

Recommended Books and Resources

1. FICSI. FIC/Q7601- Assistant Lab TechnicianFood and Agricultural Commodities.
2. Food Safety and Standards Authority of India (FSSAI). (n.d.). Manual of Methods of Analysis for Various Food Products. Retrieved from https://fssai.gov.in/cms/manuals-of-methods-of-analysis-for-various-food-products.php.
3. Food Analysis Laboratory Manual (In-house developed manual with specific methods).
4. American Public Health Association, American Water Works Association, & Water Environment Federation. (2017). Standard Methods for the Examination of Water and Wastewater (23rd ed.). Washington, DC: American Public Health Association.
5. Food Safety and Standards Authority of India (FSSAI). (2018). Manual on Food Safety Laboratory Practices. New Delhi, India: FSSAI.
6. International Organization for Standardization (ISO). (n.d.). ISO/IEC 17025:2017 General requirements for the competence of testing and calibration laboratories**.** Geneva, Switzerland: ISO.
7. AOAC International. (2019). Official Methods of Analysis of AOAC International (21st ed.). Gaithersburg, MD: AOAC International.

8. Prosky, L., Asp, N.-G., Schweizer, T. F., DeVries, J. W., & Furda, I. (1985). Determination of Insoluble, Soluble, and Total Dietary Fiber in Foods and Food Products: Interlaboratory Study. *Journal of the Association of Official Analytical Chemists, 68*(4), 677-679.
9. American Spice Trade Association. (2000). ASTA Method of Analysis. Washington, DC: American Spice Trade Association.
10. Nielsen, S. S. (Ed.). (2010). *Food analysis* (4th ed.). Springer.
11. Sarker, D. K., & Nahar, N. (Eds.). (2016). *Handbook of food analysis* (3rd ed.). CRC Press.
12. BeMiller, J. N., & Whistler, R. L. (Eds.). (2009). *Carbohydrate chemistry for food scientists* (3rd ed.). AACC International.
13. Yanniotis, S., & Taoukis, P. (Eds.). (2013). *Food process monitoring and control* (1st ed.). Woodhead Publishing.
14. Wrolstad, R. E., Acree, T. E., Decker, E. A., Penner, M. H., Reid, D. S., Schwartz, S. J., Shoemaker, C. F., & Smith, D. M. (Eds.). (2019). *Handbook of food analytical chemistry* (1st ed.). Wiley.
15. Valero, D., & Valverde, J. M. (Eds.). (2012). *Postharvest biology and technology of horticultural crops: Principles and practices for quality maintenance* (1st ed.). Woodhead Publishing.
16. Nollet, L. M. L., & Toldrá, F. (Eds.). (2012). *Handbook of analysis of active compounds in functional foods* (1st ed.). CRC Press.
17. Smith, J. L., & Charter, E. R. (Eds.). (2012). *Food chemical safety* (1st ed.). Springer.
18. Velasco, V., & Meléndez-Martínez, A. J. (Eds.). (2010). *Handbook of food science, technology, and engineering* (4th ed.). CRC Press.
19. Nielsen, S. S. (Ed.). (2016). *Food analysis laboratory manual* (2nd ed.). Springer.

FIC/Q9005: Industrial Production Worker – Food Processing

Total marks: 100	**L**	**T**	**P**
	4	**0**	**0**

Course objective:

To equip students with comprehensive training aligned to the Qualification Pack for Industrial Production Worker - Food Processing (FIC/Q9005) and Food Product Handler (FIC/Q9010) at NSQF level 2, covering understanding of industry standards, proficiency in hygiene and safety, practical skills in machinery operation and maintenance, and knowledge of documentation and compliance practices.

Course outcome: At the end of the course, the students will be able to

CO1	Demonstrate comprehensive knowledge of the food processing industry, including its organizational standards, norms, and regulatory requirements.
CO2	Exhibit proficiency in maintaining high standards of personal hygiene and workplace ethics as per food safety guidelines.
CO3	Possess practical skills in cleaning, sanitizing, and maintaining work areas and processing machinery to ensure optimal production conditions.
CO4	Competently operate and troubleshoot various processing machinery used in bakery, fruits and vegetable processing, milk and milk products, and meat processing industries.
CO5	Understand the importance of documentation and record-keeping in maintaining quality standards and regulatory compliance within food processing operations.

Mapping of Course Outcomes with Program Outcomes: Formulation of Course Outcomes-Program Outcomes matrix with correlation values as 1 (Low), 2 (Medium), 3 (High)

PO / CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	3	2	2	3	2
CO2	2	1	1	3	2
CO3	2	2	2	3	3
CO4	2	2	3	3	3
CO5	2	2	1	3	3

Details of the Course Content -Industrial Production Worker – Food Processing (FIC/Q9005)

Unit	Contents	Contact Hours
I	**Introduction to the Training Program of Industrial Production Worker - Food Processing and (based on the Qualification Pack (QP) code FIC/Q9005) and Overview of Food Processing Industry (FIC/N9020):** Introduction to the training program; Food Processing and Technology: An overview, Classification of Food and Agro-Processing Industry **Organizational Standards and Norms (CSC/N1336):** Roles and Responsibilities Industrial Production Worker - Food Processing; Knowledge and understanding of the organization; Workplace ethics; Personal hygiene guidelines for food handlers; Food Safety and hygienic standards for workplace	12
II	**Prepare And Maintain Work Area And Processing Machineries For Production (FIC/N9020):** Cleaning and sanitation; Prepare and maintain the work area and processing machineries for the production process; Machine maintenance and troubleshooting; Waste management **The Production Process (FIC/N9020):** Operation of machineries and equipment's; Post Production cleaning and storage of tools	12
III	**The Production Process (FIC/N9020):** Manufacturing Process and Controls in Bakery industry, Fruits and Vegetable Processing industry, milk and milk products processing industry, meat processing industry **Documentation And Record Keeping (FIC/N9020):** Need of documentation and record keeping; Process of documenting records	12
IV	**Basic Health And Safety Practices At Food Processing Workplace FIC/N9002):** Workplace safety, Types of Safety and safety measures, Methods to build safety in daily operations, Emergency response and evacuation, Rescue techniques during emergency, Basic first aid methods , Methods of accident prevention, Managing the safety hazards in different industries	12

Recommended Books and Resources

1. F Food Industry Capacity & Skill Initiative (FICSI). (2023). *Industrial Production Worker – Food Processing*. https://www.ficsi.in/upload/participant_handbook/PH_English_Industrial%20Production%20Worker_FICQ9005_V3.0.pdf
2. F Food Industry Capacity & Skill Initiative (FICSI). (2023). Food Product Handler PH V.10: English. https://www.ficsi.in/upload/participant_handbook/Food%20Product%20Handler%20PH%20V.10-%20English.pdf

3. Food Safety and Standards Authority of India. (2022). *Food Safety and Standards (Licensing and Registration of Food Businesses) Regulations, 2011*. Retrieved from https://www.fssai.gov.in
4. Bureau of Indian Standards. (2018). *IS 14596: Food Hygiene - General Principles - Code of Practice*. Retrieved from https://www.bis.gov.in
5. AGMARK. (2021). *Agricultural Produce (Grading and Marking) Act, 1937*. Retrieved from https://agmarknet.gov.in
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7. International Organization for Standardization. (2018). ISO 19011:2018 - Guidelines for Auditing Management Systems. Retrieved from https://www.iso.org
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10. International Organization for Standardization. (2022). *ISO Standards*. Retrieved from https://www.iso.org/standards.html
11. *Food Processing Machinery Standards*. (2022). Retrieved from https://www.nsf.org/knowledge-library/food-equipment-standards
12. National Qualifications Register. (2022). *FIC/N9020: Monitor the food production on a mechanized production line for processed food items*. Retrieved from https://www.nqr.gov.in/qualification-title/nqr-title/fic/n9020
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14. National Qualifications Register. (2022). *CSC/N1336: Work effectively with others*. Retrieved from https://www.nqr.gov.in/qualification-title/nqr-title/csc/n1336
15. FICSI - Food SSC (2022). *Overview of Food Processing Industry*. Retrieved from https://youtu.be/wMu0EpUgCd4
16. FICSI - Food SSC. (2022). *Industrial Production Worker*. Retrieved from https://youtu.be/0tThA3DYX2c
17. FICSI - Food SSC. (2022). *Introduction to Bread & Bakery Industry*. Retrieved from https://youtu.be/mcpVs3CVNIw
18. FICSI - Food SSC. (2022). *Overview of fruits and vegetable processing*. Retrieved from https://youtu.be/hW10tq2fWfY
19. FICSI - Food SSC. (2022). *Overview of Dairy Industry*. Retrieved from https://youtu.be/4XuvGYvKGnE
20. FICSI - Food SSC. (2022). *Overview of Meat and Poultry Industry*. Retrieved from https://youtu.be/UZ7nMyVQWCU
21. FICSI - Food SSC. (2022). *Documentation and record keeping in food processing unit*. Retrieved from https://youtu.be/HesWbNFSQS4
22. FICSI - Food SSC. (2022). *Introduction to entrepreneurship*. Retrieved from https://youtu.be/BzeoC3mSDgg
23. FICSI - Food SSC. *Traits of Entrepreneur*. Retrieved from https://youtu.be/3uEqWH9oWls

SEC111-24: Digital Fluency

Total marks: 100	**L**	**T**	**P**
	4	**0**	**0**

Course objective:

Equip students with comprehensive digital fluency, encompassing fundamental computer skills, effective digital communication and collaboration, office productivity tools, e-learning, digital content creation, e-commerce, cybersecurity, emerging technologies, and ethical considerations to proficiently navigate and leverage the digital landscape.

Course outcome: At the end of the course, the students will be able to

CO1	Demonstrate a thorough understanding of digital fluency, including the use of essential digital tools and platforms.
CO2	Exhibit proficiency in basic computer skills, operating systems, and file management.
CO3	Apply effective digital communication techniques and utilize office productivity tools for various professional tasks.
CO4	Create and manage digital content, engage in e-commerce transactions securely, and understand cybersecurity measures.
CO5	Analyze and evaluate the impact of digital emerging technologies on the food industry and society, while adhering to ethical and legal standards in the digital world.

Mapping of Course Outcomes with Program Outcomes: Formulation of Course Outcomes-Program Outcomes matrix with correlation values as 1 (Low), 2 (Medium), 3 (High)

PO / CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	3	1	1	2	2
CO2	3	2	2	3	3
CO3	2	1	1	3	2
CO4	3	2	2	3	3
CO5	3	3	3	3	3

Details of the Course Content - Digital Fluency (SEC111-24)

Unit	Contents	Contact Hours
I	**Introduction to Digital Fluency and Basic Computer Skills** 1. **Introduction to Digital Fluency:** Importance of digital fluency, Overview of digital tools and platforms 2. **Basic Computer Skills:** An Overview of the Computer, Block Diagram of the Computer, Evolution and Generations of Computers, Software and its types, Operating systems: types of operating systems: Windows, macOS, Linux; major functions of the operating systems; File management and organization.	10
II	**Digital Communication and Collaboration** **1. Digital Communication:** Email etiquette and management; Online communication tools: messaging apps, and video conferencing; Netiquette and digital footprint **2. Office Productivity Tools**: Creating and Editing: Word processing (Microsoft Word, Google Docs), Spreadsheets (Microsoft Excel, Google Sheets), Presentations (Microsoft PowerPoint, Google Slides), Google form: Creating and analysis of response; Google Drive- uploading and sharing of files and folders.	12
III	**E-learning, Digital Content Creation, E-commerce and Security Aspects** **1. E-learning:** Introduction to e-learning platforms such as Swayam and MOOC. **2. Digital Content Creation**: Basics of graphic design (Canva); Video creation and editing **3. E-Commence:** Basic Web Commerce Concept, E- payment methods: E-cash Payment System, Credit Payment System, Types of Electronic Payment Systems: Credit Card • Debit Card • Smart Card • E-Money • Electronic Fund Transfer (EFT). **4. Cyber Security and Online Privacy:** Threats and Prevention, Viruses and its types, Antivirus, HTTP vs HTTPS, Firewall, Cookies, Hackers and Crackers, Safe browsing practices, Protecting personal information online	14
IV	**Emerging Technologies and Ethical Issues** **Emerging Technologies:** Introduction to emerging technologies and their applications in the food industry- Artificial Intelligence, IoT, Cloud Computing, Machine learning, Big Data, Blockchain, ChatGPT; Role of Phyton, Pandas, Numpy, matplotlib in machine learning. Impact of emerging technologies on society; Future trends in technology **Ethical and Legal Issues in the Digital World:** Understanding digital rights and responsibilities; Intellectual property and copyright issues; Ethical considerations in digital technology	12

Recommended Books and Resources

1. Fundamentals of computers - V. Rajaraman - Prentice- Hall of India.
2. Computer Fundamentals - P. K. Sinha Publisher: BPB Publications
3. Digital Promise. Digital literacy. Retrieved from https://digitalpromise.org/initiative/digital-literacy/
4. Norton, P. (2018). Introduction to Computers. McGraw-Hill Education.
5. Shelly, G. B., & Vermaat, M. E. (2012). Discovering Computers: Fundamentals. Cengage Learning.
6. Coursera. Email Etiquette: Tips and Tricks for Professionals. Retrieved from https://www.coursera.org/learn/email-etiquette
7. Poatsy, M. A., & Mulbery, K. (2019). Exploring Microsoft Office 2019 Introductory. Pearson.
8. Microsoft Office Support. Retrieved from https://support.microsoft.com/en-us/office
9. LinkedIn Learning. Office 365 Essential Training. Retrieved from https://www.linkedin.com/learning/office-365-essentials
10. Bates, A. W. (2019). Teaching in a Digital Age: Guidelines for Designing Teaching and Learning. Tony Bates Associates Ltd.
11. SWAYAM. Retrieved from https://swayam.gov.in/ & https://www.aicte-india.org/bureaus/swayam
12. edX.Introduction to MOOCs. Retrieved from https://www.edx.org/
13. Canva Design School. Retrieved from https://www.canva.com/learn/
14. Adobe Creative Cloud. Video Production and Editing. Retrieved from https://www.adobe.com/creativecloud/video/discover.html
15. Laudon, K. C., & Traver, C. G. (2020). E-Commerce 2020: Business, Technology, Society. Pearson.
16. Coursera. Introduction to E-Commerce. Retrieved from https://www.coursera.org/learn/e-commerce
17. Stallings, W. (2020). Network Security Essentials: Applications and Standards. Pearson.
18. Cybersecurity & Infrastructure Security Agency (CISA). (n.d.). Retrieved from https://www.cisa.gov/
19. Russell, S., & Norvig, P. (2020). Artificial Intelligence: A Modern Approach. Pearson.
20. Coursera. Introduction to AI. Retrieved from https://www.coursera.org/learn/ai
21. Spinello, R. A., & Tavani, H. T. (2016). Cyberethics: Morality and Law in Cyberspace. Jones & Bartlett Learning.
22. Quinn, M. J. (2016). Ethics for the Information Age. Pearson.
23. edX. Cybersecurity and Privacy. Retrieved from https://www.edx.org/course/cybersecurity-and-privacy-in-the-iot.
24. Digital 101 Course offered by Future Skill Prime Platform https://learn.futureskillsprime.in/
25. Gmail Creating links:
26. https://clubrunner.blob.core.windows.net/00000000961/en-ca/files/homepage/how-to- create-a-gmail-account/HowtoCreateaGmailAccount.pdf
27. Google Forms: https://pdst.ie/sites/default/files/Google%20Drive_1.pdf
28. Google Meet: https://edvance.hawaii.hawaii.edu/wp-content/uploads/Google-Meet- Tutorial-Getting-Started-and-Recording-a-Lecture.pdf
29. Security Aspects - https://ncert.nic.in/textbook/pdf/lecs112.pdf
30. E-Commence: http://www.aagasc.edu.in/cs/msccs/ECommerce%20Unit%201.pdf
31. E- payment methods: http://www.dspmuranchi.ac.in/pdf/Blog/e%20business%20UnitIII,%20%202020.pdf

SEC112-24: Digital Fluency (Lab)

Total marks: 50	**L**	**T**	**P**
	0	**0**	**4**

Course objective:

To equip students with practical skills and comprehensive knowledge in the analysis and preservation of food products, ensuring proficiency in laboratory techniques, safety protocols, and quality evaluation methods essential for preserving the food products in the food technology field.

Course outcome: At the end of the course, the students will be able to

CO1	Demonstrate proficiency in using laboratory equipment and adhering to safety protocols in a food testing lab.
CO2	Apply fundamental techniques for food sampling, preparation, and proximate as well as physio-chemical analysis.
CO3	Perform microbial analysis, including total plate count, coliform, and E. coli detection, to ensure food safety and quality.
CO4	Evaluate the quality characteristics of various food products preserved by methods such as drying, freezing, blanching, pickling, and canning.
CO5	Compare and contrast conventional and modern food processing methods, and analyze their effects on the nutritional and microbial stability of food products.

Mapping of Course Outcomes with Program Outcomes: Formulation of Course Outcomes-Program Outcomes matrix with correlation values as 1 (Low), 2 (Medium), 3 (High)

PO / CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	2	1	1	3	1
CO2	3	3	2	2	2
CO3	2	3	1	3	2
CO4	2	2	3	2	2
CO5	2	2	2	2	3

Details of the Course Content - Digital Fluency- Lab (SEC112-24)

Practical no.	Contents	Contact Hours
1	Identifying the configuration and version of a computer system (PC), laptop, and a mobile phone.	3
2	Finding the background and foreground processes on Task manager.	2
3	Translating Punjabi/Hindi words into English in Google embedded with AI.	2
4	Use Google assistant on any android smartphone to dictate commands and to launch apps	2
5	Downloading your e-aadhar, mask e-aadhar and locked e-aadhar.	2
6	Creating resume in Word processor.	2
7	Creating powerpoint presentation for your department introduction and apply transitions and animations.	2
8	Create your marksheet in Microsoft Excel.	2
9	Simple computation using spread sheet.	2
10	Create an email-ID and sending and forwarding.	2
11	Attaching files and downloading files in email.	2
12	Creating a Google form and send it to Ten users.	2
13	Scheduling a virtual meet and invite peoples to join the Google meet/Zoom/skype.	2
14	Creating a hotspot from a mobile phone, and allowing others to use the hotspot.	2
15	Sign in and create account e-learning platforms such as Swayam and MOOC.	2
16	Creating an account on the railway reservation website, IRCTC, and finding trains and running status.	2
17	Demo of online order placing for books using Flipkart/Amazon, etc.	2
18	Install any antivirus app on your mobile and scan.	2
19	Demonstrate unsecured (HTTP) and secured (HTTPS) websites	2
20	Demonstrate setup of printer, scanner and projector with laptop or PC	2

Recommended Books and Resources

1. Fundamentals of computers - V. Rajaraman - Prentice- Hall of India.
2. Computer Fundamentals - P. K. Sinha Publisher: BPB Publications
3. Digital Promise. Digital literacy. Retrieved from https://digitalpromise.org/initiative/digital-literacy/
4. Norton, P. (2018). Introduction to Computers. McGraw-Hill Education.
5. Shelly, G. B., & Vermaat, M. E. (2012). Discovering Computers: Fundamentals. Cengage Learning.
6. Coursera. Email Etiquette: Tips and Tricks for Professionals. Retrieved from https://www.coursera.org/learn/email-etiquette
7. Poatsy, M. A., & Mulbery, K. (2019). Exploring Microsoft Office 2019 Introductory. Pearson.
8. Microsoft Office Support. Retrieved from https://support.microsoft.com/en-us/office
9. LinkedIn Learning. Office 365 Essential Training. Retrieved from https://www.linkedin.com/learning/office-365-essentials
10. Bates, A. W. (2019). Teaching in a Digital Age: Guidelines for Designing Teaching and Learning. Tony Bates Associates Ltd.

11. SWAYAM. Retrieved from https://swayam.gov.in/ & https://www.aicte-india.org/bureaus/swayam
12. edX.Introduction to MOOCs. Retrieved from https://www.edx.org/
13. Canva Design School. Retrieved from https://www.canva.com/learn/
14. Adobe Creative Cloud. Video Production and Editing. Retrieved from https://www.adobe.com/creativecloud/video/discover.html
15. Laudon, K. C., & Traver, C. G. (2020). E-Commerce 2020: Business, Technology, Society. Pearson.
16. Coursera. Introduction to E-Commerce. Retrieved from https://www.coursera.org/learn/e-commerce
17. Stallings, W. (2020). Network Security Essentials: Applications and Standards. Pearson.
18. Cybersecurity & Infrastructure Security Agency (CISA). (n.d.). Retrieved from https://www.cisa.gov/
19. Russell, S., & Norvig, P. (2020). Artificial Intelligence: A Modern Approach. Pearson.
20. Coursera. Introduction to AI. Retrieved from https://www.coursera.org/learn/ai
21. Spinello, R. A., & Tavani, H. T. (2016). Cyberethics: Morality and Law in Cyberspace. Jones & Bartlett Learning.
22. Quinn, M. J. (2016). Ethics for the Information Age. Pearson.
23. edX. Cybersecurity and Privacy. Retrieved from https://www.edx.org/course/cybersecurity-and-privacy-in-the-iot.
24. Digital 101 Course offered by Future Skill Prime Platform https://learn.futureskillsprime.in/
25. Gmail Creating links:
26. https://clubrunner.blob.core.windows.net/00000000961/en-ca/files/homepage/how-to- create-a-gmail-account/HowtoCreateaGmailAccount.pdf
27. Google Forms: https://pdst.ie/sites/default/files/Google%20Drive_1.pdf
28. Google Meet: https://edvance.hawaii.hawaii.edu/wp-content/uploads/Google-Meet- Tutorial-Getting-Started-and-Recording-a-Lecture.pdf
29. Security Aspects - https://ncert.nic.in/textbook/pdf/lecs112.pdf
30. E-Commence: http://www.aagasc.edu.in/cs/msccs/ECommerce%20Unit%201.pdf
31. E- payment methods: http://www.dspmuranchi.ac.in/pdf/Blog/e%20business%20UnitIII,%20%202020.pdf

HVPE101-18: HUMAN VALUES, DE-ADDICTION AND TRAFFIC RULES

Total marks: 100

L	T	P
3	0	0

Course objective:

To equip students with comprehensive communication skills, including theory, types, and modes of communication, proficiency in verbal and non-verbal language, enhanced reading and interpretation abilities, and effective writing techniques, preparing them for diverse personal, social, and professional contexts.

Course outcome: At the end of the course, the students will be able to

CO1	Students will develop a comprehensive understanding of the theory, types, and modes of communication, enabling effective verbal and non-verbal interactions across various contexts.
CO2	Students will gain proficiency in spoken and written communication, encompassing personal, social, and business scenarios, and learn strategies to overcome communication barriers.
CO3	Students will master close reading, comprehension, summary paraphrasing, and analysis, fostering critical thinking and interpretive abilities through diverse texts, including translations between Hindi/Punjabi and English.
CO4	Students will acquire essential writing skills for documenting, report writing, note-making, and letter writing, enhancing their ability to produce clear and structured written communication.
CO5	Students will develop effective intra-personal, inter-personal, and group communication skills, preparing them for collaborative and professional environments.

Mapping of Course Outcomes with Program Outcomes: Formulation of Course Outcomes-Program Outcomes matrix with correlation values as 1 (Low), 2 (Medium), 3 (High)

PO / CO	PO1	PO2	PO3	PO4	PO5
CO1	1	1	1	1	2
CO2	1	2	1	2	3
CO3	2	2	1	2	3
CO4	2	1	2	3	3
CO5	2	1	1	2	3

Details of the Course Content - Human Values, De-Addiction And Traffic Rules (HVPE101-18)

Unit	Contents	Contact Hours
I	**Course Introduction - Need, Basic Guidelines, Content and Process for Value Education** 1. Understanding the need, basic guidelines, content and process for Value Education 2. Self Exploration–what is it? - its content and process; 'Natural Acceptance' and Experiential Validation- as the mechanism for self exploration 3. Continuous Happiness and Prosperity- A look at basic Human Aspirations 4. Right understanding, Relationship and Physical Facilities- the basic requirements for fulfillment of aspirations of every human being with their correct priority 5. Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario 6. Method to fulfill the above human aspirations: understanding and living in harmony at various levels	6
II	**Understanding Harmony in the Human Being - Harmony in Myself!** 1. Understanding human being as a co-existence of the sentient 'I' and the material 'Body' 2. Understanding the needs of Self ('I') and 'Body' - Sukh and Suvidha 3. Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer) 4. Understanding the characteristics and activities of 'I' and harmony in 'I' 5. Understanding the harmony of I with the Body: Sanyam and Swasthya; correct appraisal of Physical needs, meaning of Prosperity in detail 6. Programs to ensure Sanyam and Swasthya- Practice Exercises and Case Studies will be taken up in Practice Sessions.	6
III	**Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship** 1. Understanding harmony in the Family- the basic unit of human interaction 2. Understanding values in human-human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti; Trust (Vishwas) and Respect (Samman) as the foundational values of relationship 3. Understanding the meaning of Vishwas; Difference between intention and competence 4. Understanding the meaning of Samman, Difference between respect and differentiation; the other salient values in relationship 5. Understanding the harmony in the society (society being an extension of family): Samadhan, Samridhi, Abhay, Sah-astitva as comprehensive Human Goals	6

	6. Visualizing a universal harmonious order in society- Undivided Society (Akhand Samaj), Universal Order (Sarvabhaum Vyawastha)- from family to world family!- Practice Exercises and Case Studies will be taken up in Practice Sessions.	
IV	**Understanding Harmony in the Nature and Existence - Whole existence as Co-existence** 1. Understanding the harmony in the Nature 2. Interconnectedness and mutual fulfillment among the four orders of nature- recyclability and self-regulation in nature 3. Understanding Existence as Co-existence (Sah-astitva) of mutually interacting units in all- pervasive space 4. Holistic perception of harmony at all levels of existence - Practice Exercises and Case Studies will be taken up in Practice Sessions.	4
V	**Implications of the above Holistic Understanding of Harmony on Professional Ethics** 1. Natural acceptance of human values 2. Definitiveness of Ethical Human Conduct 3. Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order 4. Competence in professional ethics: a) Ability to utilize the professional competence for augmenting universal human order, b) Ability to identify the scope and characteristics of people-friendly and eco- friendly production systems, c) Ability to identify and develop appropriate technologies and management patterns for above production systems. 5. Case studies of typical holistic technologies, management models and production systems 6. Strategy for transition from the present state to Universal Human Order: a) At the level of individual: as socially and ecologically responsible engineers, technologists and managers b) At the level of society: as mutually enriching institutions and organizations	6

Recommended Books and Resources

1. R R Gaur, R Sangal, G P Bagaria, 2009, A Foundation Course in Value Education.
2. Ivan Illich, 1974, *Energy & Equity,* The Trinity Press, Worcester, and HarperCollins, USA
3. E.F. Schumacher, 1973, *Small is Beautiful: a study of economics as if people mattered*, Blond & Briggs, Britain.
4. A Nagraj, 1998, *Jeevan Vidya ek Parichay,* Divya Path Sansthan, Amarkantak.
5. Sussan George, 1976, *How the Other Half Dies,* Penguin Press. Reprinted 1986, 1991
6. PL Dhar, RR Gaur, 1990, *Science and Humanism*, Commonwealth Purblishers.
7. A.N. Tripathy, 2003, *Human Values*, New Age International Publishers.
8. Subhas Palekar, 2000, *How to practice Natural Farming,* Pracheen(Vaidik) Krishi Tantra Shodh, Amravati.
9. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, *Limitsto*

Growth – Club of Rome's report, Universe Books.
10. E G Seebauer & Robert L. Berry, 2000, *Fundamentals of Ethics for Scientists & Engineers ,* Oxford University Press
11. M Govindrajran, S Natrajan & V.S. Senthil Kumar, *Engineering Ethics (including HumanValues)*, Eastern Economy Edition, Prentice Hall of India Ltd.
12. B P Banerjee, 2005, *Foundations of Ethics and Management,* Excel Books.
13. B L Bajpai, 2004, *Indian Ethos and Modern Management*, New Royal Book Co., Lucknow. Reprinted 2008.
14. R R Gaur, R Sangal, G P Bagaria, 2009, *A Foundation Course in Value Education*.

Relevant CDs, Movies, Documentaries & Other Literature:

1. Value Education website, *http://uhv.ac.in*
2. Story of Stuff, *http://www.storyofstuff.com*
3. Al Gore, *An Inconvenient Truth*, Paramount Classics, USA
4. Charlie Chaplin, *Modern Times*, United Artists, USA
5. IIT Delhi, *Modern Technology – the Untold Story*

HVPE102-18: HUMAN VALUES, DE-ADDICTION AND TRAFFIC RULES (LAB/ SEMINAR)

Total marks: 25	**L**	**T**	**P**
	0	**0**	**1**

Course objective:

This course aims to facilitate students in self-exploration and understanding of human values to recognize the interconnection between personal well-being and societal harmony, ultimately empowering them to develop sustainable solutions for societal problems.

Course outcome: At the end of the course, the students will be able to

CO1	Students will develop a profound understanding of human values and their relevance in addressing global and societal issues.
CO2	They will gain skills in self-exploration and reflection, enabling them to set and achieve personal and professional goals aligned with ethical principles.
CO3	The course will equip students with the ability to distinguish between the needs of the self and the body, fostering holistic well-being.
CO4	Students will learn to apply their knowledge to improve interpersonal relationships and contribute positively to society.
CO5	They will be empowered to devise and implement sustainable solutions for societal challenges, promoting a harmonious and prosperous community.

Mapping of Course Outcomes with Program Outcomes: Formulation of Course Outcomes-Program Outcomes matrix with correlation values as 1 (Low), 2 (Medium), 3 (High)

PO / CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	1	1	1	2	2
CO2	2	1	1	2	3
CO3	1	2	1	2	3
CO4	1	1	2	3	2
CO5	1	2	2	3	3

Details of the Course Content -Human Values, De-Addiction And Traffic Rules (Lab/ Seminar) (HVPE102-18)

Practical no.	Contents	Contact Hours
1	Course Introduction - Need, Basic Guidelines, Content and Process for Value Education	14
2	Understanding Harmony in the Human Being - Harmony in Myself!	
3	Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship	
4	Understanding Harmony in the Nature and Existence - Whole existence as Co-existence	
5	Implications of the above Holistic Understanding of Harmony at all Levels of Existence	
6	One each seminar will be orgnizied on Drug De-addiction and Traffic Rules. Eminent scholar and experts of the subject will be called for the Seminar atleast once during the semester. It will be binding for all the students to attend the seminar.	

Recommended Books and Resources

1. R R Gaur, R Sangal, G P Bagaria, 2009, A Foundation Course in Value Education.
2. Ivan Illich, 1974, *Energy & Equity,* The Trinity Press, Worcester, and HarperCollins, USA
3. E.F. Schumacher, 1973, *Small is Beautiful: a study of economics as if people mattered*, Blond & Briggs, Britain.
4. A Nagraj, 1998, *Jeevan Vidya ek Parichay,* Divya Path Sansthan, Amarkantak.
5. Sussan George, 1976, *How the Other Half Dies,* Penguin Press. Reprinted 1986, 1991
6. PL Dhar, RR Gaur, 1990, *Science and Humanism*, Commonwealth Purblishers.
7. A.N. Tripathy, 2003, *Human Values*, New Age International Publishers.
8. Subhas Palekar, 2000, *How to practice Natural Farming,* Pracheen(Vaidik) Krishi Tantra Shodh, Amravati.
9. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, *Limitsto Growth – Club of Rome's report*, Universe Books.
10. E G Seebauer & Robert L. Berry, 2000, *Fundamentals of Ethics for Scientists & Engineers ,* Oxford University Press
11. M Govindrajran, S Natrajan & V.S. Senthil Kumar, *Engineering Ethics (including HumanValues)*, Eastern Economy Edition, Prentice Hall of India Ltd.
12. B P Banerjee, 2005, *Foundations of Ethics and Management,* Excel Books.
13. B L Bajpai, 2004, *Indian Ethos and Modern Management*, New Royal Book Co., Lucknow. Reprinted 2008.
14. R R Gaur, R Sangal, G P Bagaria, 2009, *A Foundation Course in Value Education*.

Relevant CDs, Movies, Documentaries & Other Literature:

1. Value Education website, *http://uhv.ac.in*
2. Story of Stuff, *http://www.storyofstuff.com*
3. Al Gore, *An Inconvenient Truth*, Paramount Classics, USA
4. Charlie Chaplin, *Modern Times*, United Artists, USA
5. IIT Delhi, *Modern Technology – the Untold Story*

BTHU103-18: ENGLISH

Total marks: 100	**L**	**T**	**P**
	1	**0**	**0**

Course objective:

To equip students with comprehensive communication skills, including theory, types, and modes of communication, proficiency in verbal and non-verbal language, enhanced reading and interpretation abilities, and effective writing techniques, preparing them for diverse personal, social, and professional contexts.

Course outcome: At the end of the course, the students will be able to

CO1	Students will develop a comprehensive understanding of the theory, types, and modes of communication, enabling effective verbal and non-verbal interactions across various contexts.
CO2	Students will gain proficiency in spoken and written communication, encompassing personal, social, and business scenarios, and learn strategies to overcome communication barriers.
CO3	Students will master close reading, comprehension, summary paraphrasing, and analysis, fostering critical thinking and interpretive abilities through diverse texts, including translations between Hindi/Punjabi and English.
CO4	Students will acquire essential writing skills for documenting, report writing, note-making, and letter writing, enhancing their ability to produce clear and structured written communication.
CO5	Students will develop effective intra-personal, inter-personal, and group communication skills, preparing them for collaborative and professional environments.

Mapping of Course Outcomes with Program Outcomes: Formulation of Course Outcomes-Program Outcomes matrix with correlation values as 1 (Low), 2 (Medium), 3 (High)

PO / CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	1	1	1	1	2
CO2	1	2	1	2	3
CO3	2	2	1	2	3
CO4	2	1	2	3	3
CO5	2	1	1	2	3

Details of the Course Content - English (BTHU103-18)

Unit	Contents	Contact Hours
I	**Introduction:** Theory of Communication, Types and Modes of Communication	3
II	**Language of Communication:** Verbal and Non-verbal, Spoken and Written, Personal, Social and Business, Barriers and Strategies, Intra-personal, Inter-personal and Group communication	4
III	**Reading and Understanding**: Close Reading, Comprehension, Summary Paraphrasing, Analysis and Interpretation, Translation(from Hindi/Punjabi to English and vice-versa), Literary/Knowledge Texts	4
IV	**Writing Skills:** Documenting, Report Writing, Making notes, Letter writing	4

Recommended Books and Resources

1. Oxford University Press. (2020). *Fluency in English - Part II*.
2. Pearson. (2022). *Business English*.
3. Orient Blackswan. (2023). *Language, Literature and Creativity*.
4. Mishra, G., Kaul, R., & Biswas, B. (Eds.). (forthcoming). *Language through Literature*.
5. Zinsser, W. (2021). *On Writing Well*. Harper Resource Book.
6. Hamp-Lyons, L., & Heasly, B. (2021). *Study Writing*. Cambridge University Press.
7. Crystal, D. (2003). English as a Global Language (2nd ed.). Cambridge University Press.
8. Halliday, M. A. K., & Matthiessen, C. (2014). Halliday's Introduction to Functional Grammar (4th ed.). Routledge.
9. Hyland, K. (2019). Second Language Writing (2nd ed.). Cambridge University Press.
10. McCarthy, M. (1991). Discourse Analysis for Language Teachers. Cambridge University Press.
11. Swales, J. M., & Feak, C. B. (2012). Academic Writing for Graduate Students (3rd ed.). University of Michigan Press.
12. Brown, G., & Yule, G. (1983). *Discourse Analysis*. Cambridge University Press.

BTHU104-18: ENGLISH (LAB)

Total marks: 50	**L**	**T**	**P**
	0	**0**	**2**

Course objective:

The objective of this course is to enhance students' proficiency in oral communication through interactive practice sessions, covering listening comprehension, self-introduction, group discussions, role plays, everyday conversations, workplace communication, interviews, formal presentations, monologues, effective communication strategies, and public speaking.

Course outcome: At the end of the course, the students will be able to

CO1	Demonstrate improved listening comprehension and engage effectively in self-introductions, group discussions, and role plays.
CO2	Navigate common everyday situations with confidence through effective conversations and dialogues.
CO3	Communicate proficiently in workplace settings, including conducting and participating in interviews.
CO4	Deliver formal presentations and monologues with clarity and professionalism.
CO5	Identify and rectify miscommunication, ensuring effective public speaking and overall communication skills.

Mapping of Course Outcomes with Program Outcomes: Formulation of Course Outcomes-Program Outcomes matrix with correlation values as 1 (Low), 2 (Medium), 3 (High)

PO / CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	1	1	1	2	1
CO2	1	1	1	2	1
CO3	1	1	1	2	2
CO4	1	1	1	2	2
CO5	1	1	1	2	2

Details of the Course Content - English (Lab) (BTHU104-18)

Practical no.	Contents	Contact Hours
	Interactive practice sessions in Language Lab on Oral Communication	
1	Listening Comprehension	2
2	Self Introduction, Group Discussion and Role Play	4
3	Common Everyday Situations: Conversations and Dialogues	4
4	Communication at Workplace	2
5	Interviews	2
6	Formal Presentations	4
7	Monologue	2
8	Effective Communication/ Mis- Communication	2
9	Public Speaking	4

Recommended Books and Resources

1. Oxford University Press. (2020). *Fluency in English - Part II*.
2. Pearson. (2022). *Business English*.
3. Swan, M. (2021). *Practical English Usage* (4th ed.). Oxford University Press.
4. Kumar, S., & Lata, P. (2018). *Communication Skills* (2nd ed.). Oxford University Press.
5. CIEFL, Hyderabad. (2019). *Exercises in Spoken English* (Parts I-III). Oxford University Press.

BMPD101-18: MENTORING AND PROFESSIONAL DEVELOPMENT

Total marks: 25

L	T	P
0	0	1

Course objective:

The objective of mentoring is to develop overall personality, technical and general aptitude, general awareness, communication skills, and presentation skills.

Course outcome: At the end of the course, the students will be able to

CO1	Demonstrate enhanced technical and general aptitude through expert lectures and aptitude tests.
CO2	Exhibit improved communication and presentation skills via group discussions, quizzes, and student presentations.
CO3	Develop effective teamwork and leadership abilities through team-building exercises and outdoor activities.
CO4	Gain a broader understanding of current affairs and general knowledge, facilitated by diverse classroom interactions and society activities.
CO5	Show increased engagement in extracurricular and community service activities, contributing to holistic personal and professional growth.

Mapping of Course Outcomes with Program Outcomes: Formulation of Course Outcomes-Program Outcomes matrix with correlation values as 1 (Low), 2 (Medium), 3 (High)

PO / CO	PO1	PO2	PO3	PO4	PO5
CO1	3	2	2	2	3
CO2	2	1	1	2	2
CO3	2	1	1	2	2
CO4	2	1	1	2	2
CO5	2	1	1	2	2

Details of the Course Content - Mentoring and Professional Development (BMPD101-18): The course shall be split in two sections i.e. outdoor activities and class activities. For achieving the above, suggestive list of activities to be conducted are:

Practical no.	Contents	Contact Hours
	Part – A (Class Activities)	14
1	Expert and video lectures	
2	Aptitude Test	
3	Group Discussion	
4	Quiz (General/Technical)	
5	Presentations by the students	
6	Team building Exercises	
	Part – B (Outdoor Activities)	
1	Sports/NSS/NCC	
2	Society Activities of various students chapter i.e. ISTE, SCIE, SAE, CSI, Cultural Club, etc	

The evaluation shall be based on rubrics for Part – A & B Mentors/Faculty incharges shall maintain proper record student wise of each activity conducted and the same shall be submitted to the department.

BVFT114-24: Industrial Visit and FoSTaC Course

Total marks: 40	**L**	**T**	**P**
	0	**0**	**3**

Course objective:

To equip students with practical industry exposure and essential food safety knowledge through industrial visits, expert lectures, and completion of the FoSTaC - Basic Manufacturing course, fostering their competence in food manufacturing, processing, and packaging practices.

Course outcome: At the end of the course, the students will be able to

CO1	Students will gain practical knowledge of food industry operations and standards through firsthand industrial exposure and expert insights.
CO2	Students will develop a comprehensive understanding of fundamental food safety principles, including personal hygiene and food handling practices.
CO3	Students will be proficient in managing food operations and controls, ensuring adherence to safety and quality protocols.
CO4	Students will acquire skills in proper packaging and distribution methods to maintain food integrity and safety during the supply chain.
CO5	Students will be able to compile and present detailed reports on their industrial visit/expert lecturer and FoSTaC course experiences, demonstrating their applied knowledge and analytical skills.

Mapping of Course Outcomes with Program Outcomes: Formulation of Course Outcomes-Program Outcomes matrix with correlation values as 1 (Low), 2 (Medium), 3 (High)

PO / CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	3	2	2	3	3
CO2	3	3	2	3	2
CO3	2	2	3	3	3
CO4	2	2	2	3	3
CO5	3	3	2	2	2

Details of the Course Content - Industrial Visit and FoSTaC Course (BFT114-24)

Unit	Contents	Contact Hours
I	Students are required to visit a food industry or attend a guest lecture by a food industry expert. Subsequently, they must submit a report to the Head of the Department and Course Coordinator.	10
II	Students must complete the FoSTaC - Basic Manufacturing course. This course should be completed through https://www.skillindiadigital.gov.in/courses/detail/43c98220-675c-4284-b998-7bd3d413d724 or https://fostac.fssai.gov.in/index or any FSSAI-recognized training center.	

Recommended Books and Resources

1. https://www.skillindiadigital.gov.in/courses/detail/43c98220-675c-4284-b998-7bd3d413d724
2. https://fostac.fssai.gov.in/index