



Course Name: **Bachelor of Vocational**  
 Discipline: **Food Safety and Quality Management**  
**(FOR THOSE WHO JOIN IN 2023 AND AFTER)**  
 Duration of the Course: Three Years  
**COURSE SCHEME:**

Sem	Part	Subject	Hours/Week	Credits			Int+Ext =Total	Subject Code	Focus on Employability/ Entrepreneurship/ Skill Development	Revised / New / No Change / Interchanged & Percentage of revision
				Theory	Skill	Total				
I	Part-I	Communicative English - Paper I	6	2	2	4	25+75=100	EV22E11/ EV15E1	Skill Development	No change
	Core-1	Basics of Food, Food Safety and Quality Management	6	3	3	6	25+75=100	B22FSC11	Skill Development	Revised – 70%
	Core 2 Apprenticeship	Apprenticeship at any Food Industry for BFFSQM	6	0	4	4	100 (Internal)	B22FSC12/ B19FSC12	Skill Development	No change
	Allied 1	Food Microbiology - I	5	2	2	4	25+75=100	B22FSA11	Skill Development	Revised – 60%
	Allied 2	Food Microbiology Practical - I	5	0	4	4	40+60=100	B22FSAP11	Skill Development	Revised – 80%
	SBE 1	Food Packaging	2	1	1	2	25+75=100	B22FSS11/ B19FSS11	Skill Development	No change
	Part-IV SLC	Value Education	-	3	0	3	25+75=100	U22VE11		
		Industrial Visit & Report	0	0	3	3	50 (Internal)	B22FSIV11/ B19FSIV1	Skill Development	No change
	<b>Total</b>		<b>30</b>	<b>11</b>	<b>19</b>	<b>30</b>	<b>750</b>			

Sem	Part	Subject	Hours/Week	Credits			Int+Ext =Total	Subject Code	Focus on Employability/ Entrepreneurship/ Skill Development	Revised / New / No Change / Interchanged & Percentage of revision
				Theory	Skill	Total				
II	Part-I	Communicative English -II	6	2	2	4	25+75=100	EV22E21/ EV15E2	Skill Development	No change
	Core-3	Food Laws and Standards (FLS)	6	3	3	6	25+75=100	B22FSC21	Skill Development	Revised- 40%
	Core 4 Apprenticeship	Apprenticeship at any Food Industry for FLS	6	0	4	4	100 (Internal)	B22FSC22/ B19FSC22	Skill Development	No change
	Allied 3	Food Microbiology - II	5	3	2	5	25+75=100	B22FSA21	Skill Development	Revised – 20%
	Allied 4	Food Microbiology Practical - II	5	0	4	4	40+60=100	B22FSAP21	Skill Development	Revised – 70%
	SBE 2	Basics of Computers for Reports Maintenance	2	1	1	2	25+75=100	B22FSS21	Skill Development	Revised – 20%



Part-IV SLC	Environmental Studies	-	2	-	2	25+75=100	U22ES21		No change
	Industrial Visit & Report	0	0	2	2	50 (Internal)	B22FSIV21/ B19FSIV2	Skill Development	No change
	<b>Total</b>	<b>30</b>	<b>12</b>	<b>18</b>	<b>29</b>	<b>750</b>			

**TENTATIVE TABLE FOR NEXT III year BOS MEETING**

Semester	Part	Subject	Hour	Credit	Int+Ext= Total	Subject Code	Focus on Employability/ Entrepreneurship/ Skill Development	Revised/ New/ No Change/ Interchange d If Revised % of Change
V	Core- 9	Food Safety and Quality Management Systems	6	6	25+75=100	B19FSC51	Skill Development	New
	Core 10	Food Toxicology	6	6	25+75=100	B21FSC52	Skill Development	New
	Core 11	International Food Legislations & Standards	6	5	25+75=100	B21FSC53	Skill Development	New
	Core 12 Lab	Food safety and quality management systems -Practical	5	4	40+60=100	B21FSP51	Focus on Employability	New
	Core 13 Training	Apprenticeship at any food industry for Food Safety And Quality Management systems	5	4	100 (Internal)	B21FSC54	Entrepreneurship	New
	Core 14	Food Preservation Fruits and Vegetables	2	2	25+75=100	B21FSC55	Skill Development	New
		Industrial Visit & Report (Minimum 2 trips)	0	3	100 (Internal)	B21FSIV4	Focus on Employability	New
	<b>Total</b>		<b>30</b>	<b>30</b>				
VI	Core 15	Medicinal Plants compounds Separation and Quality control	6	6	25+75=100	B21FSC61	Skill Development	New
	Core 16	Hygienic designs of food process equipment.	6	6	25+75=100	B21FSC62	Skill Development	New
	Core 17	Food Analysis and Adulteration Testing (FAAT)	5	5	25+75=100	B21FSC63	Skill Development	New
	Core 18 Lab	LAB :Food Adulteration Testing	5	3	40+60=100	B21FSP61	Focus on Employability	New
	Core19 Training	Apprenticeship at any food industry for Food Analysis And Adulteration testing.	5	3	100 (Internal)	B21FSC64	Entrepreneurship	New
	Core 20	Processed food packaging in milk products	3	3	25+75=100	B21FSC65	Skill Development	New



	Industrials Visit Report	0	3	100 (Internal)	B21FSIV5	Focus on Employability	New
	<b>Total</b>	<b>30</b>	<b>29</b>	<b>650</b>			

### SEMESTER - I

#### COMMUNICATIVE ENGLISH - PAPER I

Contact Hours per week : 6

Subject Code: EV22E11/ EV15E1

Contact Hours per semester: 90 (Theory 60 + Skill 30) Credits: 4 (2 Theory + 2 Skill)

#### Section- A: Theory (2 credits)

#### COURSE OUTCOMES (CO):

On successful completion of the course, the learners will be able to

CO1: provide the vital information required to understand the concepts underlying various communication skills.

CO2: cover the several aspects of communication in oral and written modes.

CO3: facilitate acquisition of necessary language skills.

CO4: learn the basic grammar of English language

CO5: apply knowledge of word power and grammar rules in Formal and Informal letter writings

#### Unit I – Grammar

12 hours

- i. Parts of Speech
- ii. Tenses – Present, Past, Future

#### Unit II – Reading Skill

12 hours

- i. Comprehension of a Passage / Story / News

#### Unit III – Writing Skill

12 hours

- i. Narration of story
- ii. Translation of sentences, short passages
- iii. Letter writing (Informal Letters)

#### Unit IV – Phonetics

12 hours

- i. Vowels, Consonants, Diphthongs
- ii. Transcription of words

#### Unit V – Speaking Skill

12 hours

- i. Introducing oneself and others
- ii. Situational Communication – Greeting, Complimenting, Requesting etc.

**Note:** 2, 4 units are considered as a Language laboratory  
(Allocation: 12 hours Laboratory, 18 Hours theory)

#### TEXTBOOK:

1. V.JeyaSanthi and R. Selvam, 2015. *Advanced Skills for Communication in English: Book I*, New Century Book House

#### REFERENCE BOOKS:

1. G.Radhakrishna Pillai - *Emerald English Grammar & Composition*, Emerald Publishers
2. Board of Editors - *Synergy – Communication in English and Study Skills*,



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- |    |                                       |   |
|----|---------------------------------------|---|
| 3. | Dr.S.Vincent                          | Orient Blackswan<br>- <i>Let's Speak English (A Course in Spoken English)</i> Soundra Publications      |
| 4. | K.R.Lakshminarayanan,<br>T.Murugavel  | - <i>Communication Skills in English</i> , SciTech Publications, Chennai.                               |
| 5. | G.Radhakrishna Pillai,<br>K.Rajeevan  | - <i>Spoken English for You: Level One</i> Emerald Publishers   |
| 6. | Bikram K.Das                          | - <i>Functional Grammar and Spoken and Written Communication in English</i> , Orient Longman Pvt., Ltd. |
| 7. | A.R.Thorat, B.S.Valke,<br>S.B.Gokhale | - <i>Enriching Your Competence in English</i> Orient Longman Pvt. Ltd.                                  |
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### Section –B Skill Components

**Contact Hours per semester: 30**

**Credits: 2**

1. To impart and enhance communicative competency for professional mobility
  2. To equip the student with necessary skills for employment
  3. To prepare students for career in media
  4. To develop ability of all students to read, write, listen, speak and think critically
  5. To produce students with advanced skills in writing, reading and reasoning.
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### Core 1 - BASICS OF FOOD, FOOD SAFETY AND QUALITY MANAGEMENT

**Contact hours per week : 6**

**Subject Code: B22FSC11**

**Contact hours per semester : 90 (60 Theory + 30 Skill) Credits: 6 (3 Theory + 3 Skill)**

### COURSE OUTCOMES (CO):

On successful completion of the course, the learners will be able to

- CO1: become familiar with the safe handling of foods.
- CO2: get acquainted with the principles and methods of food quality control.
- CO3: recognize the quality management system and recognize the importance of quality assurance system in food industry.
- CO4: understand the food regulation and standards at the national and international levels.
- CO5: identify general principles of food safety risk management

### Section - A: Theory

#### Objectives:

1. To explain biological, chemical and physical hazards.
2. To understand the need for food safety system.
3. To understand the different phases and framework of project management.
4. To identify general principles of food safety risk management.
5. To understand and be aware of food safety practices.

#### Unit I

**12 hours**

Food - definition - importance - basic 5 food groups - function of food - factors affecting while cooking the food – methods of cooking foods - cereals and grains - fruits and vegetables, milk and milk products, meats, poultry and its product, sea foods and canned food - food safety - definition - importance of safe foods - safe handling of foods.



**Unit II**

**12 hours**

Quality Control - definition, principles in food processing - protecting food from contamination - Total Quality Management (TQM) - definition, principles, concept of TQM, scope and need of TQM and benefits of TQM.

**Unit III**

**12 hours**

Food regulation and standards in India - National - BIS, AGMARK and PFA, Essential Commodities Act - FPO, MPO, Milk and Milk Products Order, Standard of Weights and Measures Act, Export Inspection Council and Consumer Protection Act - Food Safety and Standard Authority of India (FSSAI) - principles, functions and duties - Risk analysis- risk assessment, risk management and risk communication.

**Unit IV**

**12 hours**

Project Management - introduction - three phases - 7 S of project management - project: A conversion process - role and strategy in project management.

**Unit V**

**12 hours**

Other food safety practice - Good Practice in Agriculture, animal husbandry; Manufacturing; Retail Practices, Transport Practices and Nutritional Labelling - Traceability Studies.

**REFERENCE BOOKS:**

1. Srilakshmi,B. (2015). *Food Science*. New Delhi: New Age International Ltd.
2. Early, R. (1995). *Guide to Quality Management Systems for the Food Industry*. Blackie, Academic and Professional, London.
3. Gould, W.A. and Gould, R.W. (1998). *Total Quality Assurance for the Food Industries*. CTI publications Inc, Baltimore.
4. Askar, A. and Treptow, H. (1993). *Quality Assurance in Tropical Fruit Processing*. Springer - Verlag. Berlin
5. Parmar, M. (2014). *Food Safety and Preservation*. Black Prints, New Delhi.

**Section - B Skill Component**

**Contact hours per semester: 30**

**Credits: 3**

1. To purchase chemicals, standards and lab needs.
2. To identify the risk factors of the food.
3. To prepare the report of the quality of the food.
4. To study the FSSAI regulations followed in the manufacture of foods.
5. To study the good manufacturing practices by visiting an industry

**Core II: APPRENTICESHIP AT ANY FOOD INDUSTRY FOR BFFSQM**

**Section –B Skill component**

**Contact Hours per week : 6**

**Subject Code: B22FSC12/ B19FSC12**

**Contact Hours per semester: 90**

**Credits: 4**

**COURSE OUTCOMES:**

1. To study about the importance of Food Safety Display Board (FSDB) in an industry.
2. To study about the FSSAI regulations of a product in the nearby industry.
3. To analyze the FSSAI license number for a product.
4. To visit the food testing labs in the industry.
5. To study the color code followed by FSDB in various business sectors.



### ALLIED 1 FOOD MICROBIOLOGY – I

Contact Hours per week : 5

Subject Code: B22FSA11/ B19FSA11

Contact Hours per semester: 75 (45 Theory + 30 Skill) Credits: 4 (2 Theory + 2 Skill)

#### COURSE OUTCOMES (CO):

On successful completion of the course, the learners will be able to

CO1: identify the important pathogens and spoilage microorganisms in foods and the conditions under which they will grow.

CO2: assess the conditions under which the important pathogens are commonly inactivated, killed or made harmless in foods.

CO3: utilize laboratory techniques to identify microorganisms in food.

CO4: aware the principles involving food preservation via fermentation processes.

CO5: describe beneficial roles of microorganisms

#### Section- A: Theory

##### Objectives:

1. To explain the applied aspects of microbiology.
2. To identify sources of food microorganisms.
3. To state emerging food borne pathogens and reasons for their emergence.
4. To describe beneficial roles of microorganisms.
5. To describe different screening and enumeration techniques of microorganisms.

##### Unit I

9 hours

Microbiology: Introduction and developments - Structure of Prokaryotic cells – Sterilization – Types of Media - Media Preparation- Growth of Bacteria – Gram's staining Technique.

##### Unit II

9 hours

Food Microbiology: origin and scope – Microorganism in Food - Common Bacterial and fungal groups in food – Importance in food - Food Borne Diseases - Beneficial roles of Microorganisms.

##### Unit III

9 hours

Food contamination – source of contamination - Food Spoilage – Types of spoilage – factors affecting the spoilage – role of microorganism in food preservation.

##### Unit IV

9 hours

Analytical techniques in Microbiology – Enumeration of Microorganism in food – Detection of pathogens in food: Dye reduction test & Methylene Blue reduction test.

##### Unit V

9 hours

Detection of *Bacillus* & *E.coli* – Rapid detection techniques for food microorganisms – immunological methods – Indicator organisms- Biosensor.

##### TEXT BOOKS:

1. Ananthanarayanan and J.Panicker, 2005. *Text book of Microbiology*. Orient blackswan Publication.
2. Ray, B., Bhunia, A. 2007. *Fundamental Food Microbiology*, 4th Edition. CRC Publication
3. Sharma, 2019. *Text Book of Food Science and Technology*. CBS Publication



**REFERENCE BOOKS:**

1. Adams, MR., 2018. *Food Microbiology*. New Age International Private Limited
2. Foster, WM, 2020. *Food Microbiology*. CBS Publication
3. Frazier W. 1995. *Food Microbiology*. 4<sup>th</sup> edition, Tata McGraw Hill, India.

**Section – B Skill components**

**Contact Hours per semester: 30**

**Credits: 2**

1. To demonstrate the observation of bacteria in microscope.
2. To ensure the quality of a food by microbiological analysis.
3. To study about the identification of various bacteria in food products.
4. To evaluate the nutritional value and mineral content of food.
5. To test the food sample for a particular type of mold and yeast.

**Allied 2 – FOOD MICROBIOLOGY PRACTICAL – I**

**Section –B Skill component**

**Contact hours per week : 5**

**Subject Code: B22FSAP11**

**Contact hours per semester: 60**

**Credits: 4**

**COURSE OUTCOMES (CO):**

On successful completion of the course, the learners will be able to

- CO1: aware the various Culture media and their applications and also understand various physical and chemical means of sterilization
- CO2: demonstrate theory and practical skills in microscopy and their handling techniques and staining procedures
- CO3: understand the basic microbial structure and function and study the comparative characteristics of prokaryotes and eukaryotes
- CO4: utilize the aseptic techniques and be able to perform routine culture handling tasks safely and effectively
- CO5: evaluate the various Physical and Chemical growth requirements of bacteria and get equipped with various methods of bacterial growth measurement.

1. Microbiology laboratory Rules and regulations of Safety measures
2. Basic microbiology laboratory practices
3. Cleaning and Methods of sterilization
4. Cultivation and sub-culture of microbes
5. Staining Techniques – Simple and Gram's staining
6. Serial dilution techniques for Spread and Streak plate method
7. Direct Microscopic examination of foods
8. Nutritional requirements of microorganisms
9. Effect of physicochemical factors on growth of microorganisms
10. Observation of microorganisms in curd
11. Observation and Identification of mould in bread.

**REFERENCE BOOKS:**

1. J. G. Cappucino and N. Sherman, 2014. *Microbiology: A laboratory manual*, 11<sup>th</sup> Edition, Pearson publications United States.
2. Prescott L.M., Harley J.Pand Klein D.A, 2005. *Microbiology*. Sixth edition, McGraw Hill, Boston.



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**SBE 1: FOOD PACKAGING**

**Contact hours per week : 2 Subject Code: B22FSS11/ B19FSS11**

**Contact hours per semester : 30 (20 Theory + 10 Skill) Credits: 2 (1 Theory + 1 Skill)**

**Section- A: Theory**

**COURSE OUTCOMES (CO):**

On successful completion of the course, the learners will be able to

CO1: explain the principles and current practices of processing techniques and the effects of processing parameters on product quality.

CO2: understand the properties and uses of various packaging materials.

CO3: describe the basic principles and practices of cleaning and sanitation in food processing operations.

CO4: evaluate the quality and safety of packaging.

CO5: utilize the Aseptic and shrink packaging methods

**Unit I**

**4 hours**

Food packaging: Introduction – Principles - Function - Methods of packaging for different foods, Interactions between packaging material and foods.

**Unit II**

**4 hours**

Packaging of various food commodities – fruits, vegetables, meat, fish, poultry and processed foods. Types of packaging- Modified atmospheric packaging (MAP).

**Unit III**

**4 hours**

Packaging materials: Qualities – types - paper, polythene, wood, metal and environmental friendly materials - Deteriorative changes in foodstuff, shelf life of packaged foodstuff, methods to extend Shelf-life.

**Unit IV**

**4 hours**

Methods of packaging of various food – Evaluation of quality and safety of packaging materials – Different testing procedures

**Unit V**

**4 hours**

Printing of packages – Barcodes and other marking, Sealing equipment – Labeling and its laws; Aseptic and shrink packaging, transport packaging, Cost consideration in selecting packaging materials.

**TEXTBOOKS:**

1. P. Jacob John. 2017. *A handbook on food packaging*. Daya Publishing House, New Delhi.
2. Cruz. 2019. *Food Packaging: Innovations and Shelf-Life*. CRC Press

**REFERENCE BOOKS:**

1. NIIR Board of Consultants Engineers, 2020. *Food Packaging Technology Handbook*. NIIR Project Consultancy Services
2. GL Robertson, 2012. *Food Packaging: Principles and Practice*. CRC Press

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**Section- B: Skill components**

**Contact hours per semester: 10 hours**

**Credits: 1**

1. To study about proper food handling during packaging.



2. To analyze the packaging method of various food commodities in industries.
3. To study the shelf life of packaged food stuff in an industry.
4. To evaluate the quality and safety of packaging materials.
5. To study about cost consideration in selecting packaging materials.

### INDUSTRIAL VISIT & REPORT

**Credits: 4**

**Subject Code: B22FSIV11/ B19FSIV1**

#### Course Outcomes:

On successful completion of the course, the learners will be able to

**CO1:** visits industries which offer a great source to gain practical knowledge.

**CO2:** observe and learn as to how theatrical concepts are put to into action, thereby aiding their practical learning.

**CO3:** exposed to real working environment and shown how things are done in an organization.

It helps to narrate and compile the information and data that is used to construct and assess about the company's safety and risk management programs.

Format: Introduction, review on instrumentation, labors, and processing. Prediction of future of the company

### SEMESTER - II

#### COMMUNICATIVE ENGLISH – PAPER II

**Contact Hours per week : 6**

**Subject Code: EV22E21/ EV15E2**

**Contact Hours per semester: 90 (Theory 60 + Skill 30) Credits: 4 (2 Theory + 2 Skill)**

#### Section- A: Theory (2 credits)

#### COURSE OUTCOMES (CO):

On successful completion of the course, the learners will be able to

CO1: understand basic mathematics, data interpretations.

CO2: learn about effective presentation of data.

CO3: acquire knowledge about applications of Differentiation

CO4: enrich the knowledge about methods of data collection

CO5: demonstrate the Computations

#### Unit I – Grammar

**12 hours**

- i. Concord, Voice, Speech, Article, Preposition
- ii. Error Spotting

#### Unit II – Conversational English

**12 hours**

- i. Dialogue building on various situations

#### Unit III – Business English

**12 hours**

- i. Letter writing (Formal Letters & Resume)
- ii. Memo / Notice / Agenda / Minutes Writing
- iii. Report writing

#### Unit IV – Situational Speech

**12 hours**

- i. Welcome address / Vote of thanks
- ii. Group Discussion



**Unit V – Writing Skill**

**12 hours**

- i. Describing a thing / place / person
- ii. Writing Stories from outline

**Note:** (Allocation: 24 hours Laboratory, 36 hours theory)

**TEXTBOOK**

1. V.JeyaSanthi and A. Sankar- *Advanced Skills for Communication in English: Book II:*

**REFERENCE BOOKS:**

1. G.Radhakrishna Pillai - *Emerald English Grammar & Composition*, Emerald Publishers
2. Board of Editors - *Synergy – Communication in English and Study Skills*, Orient Blackswan
3. Dr.S.Vincent - *Let's Speak English (A Course in Spoken English)* Soundra Publications
4. K.R.Lakshminarayanan, T.Murugavel - *Communication Skills in English*, SciTech Publications, Chennai.
5. G.Radhakrishna Pillai, K.Rajeevan - *Spoken English for You: Level One* Emerald Publishers
6. Bikram K.Das - *Functional Grammar and Spoken and Written Communication in English*, Orient Longman Pvt., Ltd.
7. A.R.Thorat, B.S.Valke, S.B.Gokhale - *Enriching Your Competence in English* Orient Longman Pvt. Ltd.

**Section –B Skill Components**

**Contact Hours per semester: 30**

**Credits: 2**

1. To enrich the students knowledge in the English language.
2. To equip the student with necessary skills for employment
3. To prepare students for career in media
4. To develop ability of all students to read, write, listen, speak and think critically
5. To produce students with advanced skills in writing, reading and reasoning.

**Core 3 - FOOD LAWS AND STANDARDS (FLS)**

**Contact hours per week : 6**

**Subject Code: B22FSC21**

**Contact hours per semester : 90 (60 Theory + 30 Skill)**

**Credits: 6 (3 Theory + 3 Skill)**

**COURSE OUTCOMES (CO):**

On successful completion of the course, the learners will be able to

- CO1: explore the history and basic ideas underlying quality management and have a detailed knowledge of the role of food laws and standards in modern management.
- CO2: demonstrate knowledge of food laws and standards systems, their implementation and the practical steps needed for implementation.
- CO3: aware of how to control and maintain a quality management system.
- CO4: select and apply appropriate regulations and standards and evaluate data generated.
- CO5: utilize the licensing and registration of food business

**Section - A: Theory**

**Unit I**

**12 hours**

Food Safety and Standard Authority of India (FSSAI) - establishment - composition -



selection committee - Chief Executive Officer - function - qualification - duties - Central Advisory Committee - Food Authority - function - duties - proceeding.

**Unit II**

**12 hours**

Food Safety and Standards Regulations, 2011 - licensing and registration of food business - packaging and labeling - food products and additives - prohibition and restriction on sales - contaminants, toxins and residues.

**Unit III**

**12 hours**

Food Safety and Standards Regulations, 2017 - food recall procedure - import foods - approval for non-specified food and food ingredients - organic foods.

**Unit IV**

**12 hours**

Food Safety and Standards Regulations, 2018 - alcoholic beverages - fortification of foods - recognition and notification of laboratories - advertising and claims - packaging

**Unit V**

**12 hours**

Other Laws and Standards Related to Food and food Products - National Agencies for Implementation of International Food Laws and Standards - Accreditation System for Conformity Assessment Bodies.

**REFERENCE BOOKS:**

1. LexisNexis 2019. *The Food Safety and Standards Act, 2006* - Universal's, New Delhi, India.
  2. Sree Lakshmi. *Food Science*, New age international publishers, Chennai.
  3. Dziezak, J.D. 1987. *Rapid methods for analysis of foods*. Food Technol. 41(7): 56-73.
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**Section - B: Skill components**

**Contact hours per semester: 30**

**Credits: 3**

1. To study the international food laws and standards in determining the quality of a food.
  2. To analyze the safety and quality of a food.
  3. To study about laws governing food products.
  4. To study about export related laws and regulations for a food.
  5. To study the violation of laws in various food products.
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**Core – 4: APPRENTICESHIP AT ANY FOOD INDUSTRY FOR FLS**

**Contact hours per week : 6**

**Subject Code : B22FSC22/B19FSC22**

**Contact hours per semester : 90**

**Credits : 4 (Skill)**

**Section- B: Skill components**

1. To analyze the food laws and standards followed in an industry.
  2. To prepare a report on the quality of a product in the nearby industry.
  3. To analyze the laws during the export of a food product in an industry.
  4. To visit the food testing labs in the industry.
  5. To study various acts followed in the preparation of food in industry.
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**ALLIED -3: FOOD MICROBIOLOGY – II**

Contact hours per week : 5

Subject Code: B22FSA21

Contact hours per semester : 75 (45 Theory + 30 Skill) Credits: 5 (3 Theory + 2 Skill)

**COURSE OUTCOMES (CO):**

On successful completion of the course, the learners will be able to

CO1: aware the role and significance of microbial inactivation, adaptation and environmental factors (i.e., aW, pH, temperature)

CO2: analyze the growth and response of microorganisms in various environments.

CO3: identify the conditions, under which the important pathogens and spoilage microorganisms are commonly inactivated, killed or made harmless in foods.

CO4: demonstrate the Quality testing of Milk

CO5: acquire knowledge of food preservation techniques

**Section- A: Theory**

**Unit I**

**9 hours**

Food as a substrate for microorganisms- Role of microbes (mould, yeast, bacteria) in food- Contamination of food: Definition, Sources of contamination - plants, animals, sewage, soil and water - General food spoilage and spoilage of heated canned foods

**Unit II**

**9 hours**

Food preservation: Principles of preservation, methods of food preservation - Asepsis, Removal of microorganisms, High temperature, Low temperature, Salting, Smoking, freezing, dehydration, active packaging, Drying and Radiation: cyclotron, UV, IR.

**Unit III**

**9 hours**

Types of preservatives: Natural and artificial; Contamination, Preservation and Spoilage of Cereals, Vegetables, Meat, Poultry and Fish. Food sanitation and control.

**Unit IV**

**9 hours**

Contamination, Preservation and Spoilage of Milk and Milk products- Quality testing of Milk: Dye reduction test and Phosphatase test - Preparation of fermented food products: Yogurt, Sauerkraut and Vinegar.

**Unit V**

**9 hours**

Food borne diseases: Bacterial food intoxication (*Botulism, Staphylococcus*), Bacterial food infection (*Salmonella, Clostridium, Vibrio*) - Fungal food intoxication (Mycotoxin, Aflatoxin and Patulin)

**TEXT BOOKS:**

1. Ananthanarayanan and J.Panicker, 2005. *Text book of Microbiology*. Orient Long Publ.
2. Ray, B., Bhunia, A. 2007. *Fundamental Food Microbiology*, 4th Edition. CRC Publication
3. Sharma, 2019. *Text Book of Food Science and Technology*. CBS Publication

**REFERENCE BOOKS:**

1. Adams, MR., 2018. *Food Microbiology*. New Age International Private Limited
  2. Foster, WM, 2020. *Food Microbiology*. CBS Publication
  3. Frazier W. 1995. *Food Microbiology*. 4<sup>th</sup> edition, Tata McGraw Hill, India.
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**Section –B Skill component**

**Contact hours per semester: 30**

**Credits: 2**

1. To ensure the quality of a food by microbiological analysis.
  2. To demonstrate the microscopic observation of bacteria in microscope.
  3. To study about the identification of various bacteria in food products.
  4. Visual and sensory evaluation of a food product.
  5. To collect the sample and ensure the quality by triplicates.
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**Allied 4 –FOOD MICROBIOLOGY PRACTICAL – II**

**Contact Hours per week : 5**

**Subject Code: B22FSAP21**

**Contact Hours per semester: 60**

**Credits: 4 (Skill)**

**COURSE OUTCOMES (CO):**

On successful completion of the course, the learners will be able to

- CO1: understand the beneficial role of microorganisms in fermented foods and in food processing and the microbiology of different types of fermented food products – dairy, pickles, Legume and cereal based food products
- CO2: acquire knowledge of microbial techniques for isolation of pure cultures of bacteria, fungi and algae
- CO3: aware the spoilage mechanisms in foods and thus identify methods to control deterioration and spoilage
- CO4: recognize and describe the characteristics of important pathogens and spoilage microorganisms in foods.
- CO5: identify ways to control microorganisms in foods and thus know the principles involving various methods of food preservation

**Section –B Skill component**

1. Isolation of Microbes from Food Samples
2. Characterization of microbes based on morphological and physiological characteristics
3. Evaluation of microbial quality of food and water sample
4. Standard Plate count method
5. Enumeration of fungi (Yeast and moulds) in food sample – Haemocytometer.
6. Assessment of Air using surface impingement method
7. Most Probable Number (MPN) method- Detection of *Coli* forms, *Pseudomonas* and Indicator organisms.
8. Bacteriological testing of milk with kits
9. Interpretations of Microbiological Data and its inferences

**References:**

1. J. G. Cappucino and N. Sherman, 2014. *Microbiology: A Laboratory Manual*, 11<sup>th</sup> Edition, Pearson publications United States.
  2. P. Gunasekaran, 1996, *Microbiology: A laboratory manual*, New Age International Publishers, New Delhi.
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**VIRUDHUNAGAR HINDU NADARS' SENTHIKUMARA NADAR COLLEGE**

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**[Re-accredited with 'A' Grade by NAAC]**

**Virudhunagar – 626 001.**

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**SBE 2: BASICS OF COMPUTERS FOR REPORTS MAINTENANCE**

**Contact hours per week: 2**

**Subject Code: B22FSS21**

**Contact hours per semester: 30 (20 Theory + 10 Skill)**

**Credits: 2 (1 Theory + 1 Skill)**

**COURSE OUTCOMES (CO):**

On successful completion of the course, the learners will be able to

CO1: enrich the knowledge to produce a quality manual.

CO2: understand the regulation of certification and accreditation.

CO3: acquire knowledge and insight of different quality management systems i.e. product quality management, safety and environmental management.

CO4: demonstrate the auditing and auditing systems.

CO5: critique the current state of the art in Quality Management

**Section- A: Theory**

**Unit I**

**4 hours**

Introduction to Computers: History of Computers – generation of Computers – Characteristics of Computers – Classification of Computers – Components of Computers – Block Diagram – Hardware Vs Software – System Software Vs Application Software – Programming Language.

**Unit II**

**4 hours**

Input Devices: Key board - Mouse – Touch Pad / Touch Screen Magnetic Ink Character Recognition (MICR) – Optical Character Recognition (OCR) – Optical Mark Recognition (OMR) – Output Devices: Monitor – Printers – Plotter Storage Devices: Magnetic tape – Hard Disk – Floppy Disk – Pen drive - CD-ROM, DVD Blue Ray Disc etc., - System Memory – RAM – ROM – PROM – EPROM.

**Unit III**

**4 hours**

Open office – MS office – Word Processing – Spread sheet – Power point presentation – Introduction to internet – Browsers – Search engines – Email – Google educational applications.

**Unit IV**

**4 hours**

Interpretation – Meaning of interpretation – Technique of interpretation – Precaution in interpretation – Interpretation of tables and figures.

**Unit V**

**4 hours**

Reporting – Significance of report writing – Different steps in writing report – Types of reports – Mechanics of writing reports – Precautions of writing research reports.

**References:**

1. Barbara Kasser, 1998. “Using the internet” Fourth edition, EE Edition, New Delhi.
  2. Dinesh Maidasani, 2008. “Learning Computer fundamentals, MS Office and Internet and Web Technology”, Firewall media.
  3. Alexis Leon Mathews Leon, 2012. “INTERNET for EVERYONE”, Leon Vikas Press, Chennai.
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**Section- B: Skill components**

**Contact hours per semester: 10**

**Credits: 1**

1. To learn the basic anatomy of a computer.
  2. To connect the hardware components in a computer.
  3. To type a report on the word document.
  4. To store the data in Microsoft excel.
  5. To learn the management of E-mail in a computer.
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**INDUSTRIAL VISIT & REPORT**

**Credits: 2**

**Subject Code: B22FSIV21/B19FSIV2**

**Course Outcomes:**

On successful completion of the course, the learners will be able to

**CO1:** visits industries which offer a great source to gain practical knowledge.

**CO2:** observe and learn as to how theatrical concepts are put to into action, thereby aiding their practical learning.

**CO3:** exposed to real working environment and shown how things are done in an organization.

It helps to narrate and compile the information and data that is used to construct and assess about the company's safety and risk management programs.

**Report Format:** Introduction, review on instrumentation, labors, and processing. Prediction of future of the company

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