

5.1 COMPUTER APPLICATIONS IN FOOD TECHNOLOGY

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RATIONALE

The main objective of introducing this subject in the diploma course of food technology is to expose the student with fundamental knowledge on hardware and software of computers. It will also impart knowledge related to the applications of computation in food industries

DETAILED CONTENTS

1. Introduction (8 Hrs.)
 - 1.1. Introduction to computer and related hardware used in food industry (Touch Screens, Hand Held Devices, Palm Tops, Barcode Printers and Scanners, RFID Tags, etc.)
 - 1.2. Introduction to various softwares for their application in food technology (like SAP, justFoodERP, FoodWorks, SERVE, etc.) with relevant case studies.
2. Application of MS Excel (latest version) to solve the problems of Food Technology (10 Hrs.)
 - 2.1. MS Excel Basics
 - 2.1.1. Introduction to different menus and commands commonly used in solving problems
 - 2.1.2. Use of Add-In Tools like MegaStat, etc. for statistical data analysis.
3. Application of MS Excel to solve the problems of Food Technology (10 Hrs.)
 - 3.1 Chemical kinetics in food processing
 - 3.1.1. Determining rate constant of zero order reaction
 - 3.1.2. First order rate constant and half-life of reactions
 - 3.2 Microbial destruction in thermal processing of foods
 - 3.2.1 Determining decimal reduction time from microbial survival data
 - 3.3 Statistical quality control in food processing
 - 3.3.1 Control Charts
 - 3.4 Sensory evaluation of foods
 - 3.4.1 Statistical descriptors of a population estimated from sensory data obtained for a sample

- 3.5 Mechanical transport of liquid foods
 - 3.5.1 Measuring viscosity of liquid foods using a capillary tube viscometer
- 3.6 Steady state heat transfer in food processing
 - 3.6.1 Reducing heat transfer through a wall using insulation
- 3.7 Transient heat transfer in food processing
 - 3.7.1 Predicting temperature in a liquid food heated in a steam-jacketed kettle
- 3.8 Refrigeration, freezing and cold chain
 - 3.8.1 Pressure-temperature relations for ammonia used as a refrigerant in a vapor compression refrigeration system
 - 3.8.2 Loss of quality in the cold chain
- 4 Familiarization with the application of computer in some common food industries, (like milk plant, bakery, fruit and vegetable processing, etc.) starting from the receiving of raw material up to the storage and dispatch of finished product with relevant case studies. (10 Hrs.)
- 5 Basic Introduction to CAD (Computer Aided Designing), CAM (Computer Aided Manufacturing), CIM (Computer Integrated Manufacturing) and CAE (Computer Aided/ Assisted Engineering) and application of different softwares (like AutoCAD, Pro-E, Google Sketchup, etc.) in the same. (5 Hrs.)
- 6 Basic Introduction to Application of computers in instrumentation and process control of food industry (PLC, SCADA, etc.), Inventory control and management in food industry using computers. (5 Hrs)

LIST OF PRACTICALS

1. Introduction to computer hardware and softwares used in food industry.
2. Sensory analysis using sensory analysis softwares (like Compusense 5, SIMS 2000, etc.).
3. Problem solving using spread sheet (like MS Excel, etc.).
4. Use of statistical packages (MS Excel, MegaStat Excel Add-In (Free Add-In), Graphpad InStat, Graphpad StatMate, Statistica, SPSS, Matlab, etc.) for analysis of data.
5. Use of search engines and online research databases for research on food related topics.
6. Use of word processing software (like MS Word) for creating reports and technical papers with the help of reference managers (like EndNote, Reference Manager, RefWorks, etc.)

7. Working with chemical and biological structures drawing softwares (like ChemBioOffice, ChemDraw, etc.)
8. Familiarization with software related to food industry (like SAP, justFoodERP, LIMS (Laboratory Management Information System), etc.
9. Use of simulation softwares for food industry related problems (like FlexSim, MATLAB Simulink, etc.)
10. Visit to the industries & knowledge of computer application in the same.

INSTRUCTIONAL STRATEGY

This is a practical oriented subject. Teacher should lay emphasis on giving hands on practice on computers to the students. Latest software in food technology may be procured and students should be given demonstration and practice on the same. The relevant theory may be given along with practical exercises. Some of the experts from industries may be invited to deliver lectures and demonstration.

RECOMMENDED BOOKS

1. Computer Applications in Food Technology: Use of Spreadsheets in Graphical, Statistical and Process Analysis by R. Paul Singh, AP.
2. Computer Applications in Food Technology by Vedpal Yadav, i-proclaim.com.
3. Statistical Quality Control for the Food Industry by Merton R. Hubbard (Kluwer Academic)
4. MS Excel Video Tutorials on <http://www.youtube.com> (Recommended channel is ExcellIsFun).
5. MS Excel for Dummies.
6. Manuals of MS office

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	08	16
2	10	20
3	10	20
4	10	20
5	5	12
6	5	12
Total	48	100

5.2 TECHNOLOGY OF BEVERAGES

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RATIONALE

Food beverage industries are one of the fast growing industries in India. Therefore, this subject is introduced with the basic objective to impart knowledge and skills of process techniques and equipment used for the production of these beverages, to the students.

DETAILED CONTENTS

1. Introduction (03 Hrs)
Status and scope of beverage industry in India, Classification of beverages and their nutritional significance,
2. Bottled Water (04 Hrs)
Water treatment before its utilization in beverages, Mineral water, bottled water, Quality standards of water.
3. Technology of Carbonated and Non-Alcoholic Beverages (07 Hrs)
Definition of soft drinks, different ingredients for soft drinks and their functions, methods of preparation, related equipments and machinery
4. Tea and Coffee Processing (04 Hrs)
Types, nutritional significance, methods and processing of tea and coffee, related equipment and machinery
5. Alcoholic Beverages (08 Hrs)
Ingredients and their role in beer and wine preparation, methods of manufacturing of Wine, Beer, Scotch, Whiskey, Brandy, Rum, Vodka and Gin; related equipment
6. Fruit Juices and Heath Drinks (06 Hrs)
Preparation of various juices, slush, RTS (ready to serve) such as coconut water, soya drink

LIST OF PRACTICALS

1. Determination of Important Potable Water Quality Parameters
2. Preparation of carbonated beverages and their evaluation
3. Preparation of Tea and coffee decoction
4. Determination of quality of Tea based on chemical indices (TF/TR ratio)
5. Preparation of Ready To Serve beverages (RTS beverages) including cold coffee and iced tea
6. Determination of CO₂ level in carbonated beverages
7. Preparation of different Wines
8. Preparation of flavoured milk, lassi, butter-milk, soya milk and kanji etc.
9. Visit to carbonated and non-carbonated beverage/brewery/winery/distillery industry

INSTRUCTIONAL STRATEGY

This being one of the most important subject, teacher should lay emphasis on developing basic understanding of various concepts and principles and procedures involved herein. Suitable tutorial exercises may be designed by the teachers, which require students visit to various industries. Students may also be exposed to various National and international standards. Visits to the relevant industry for demonstrating various operations involved in the food beverage, is a must. Experts from the industry may be invited to deliver lectures on the latest technology. Knowledge about pollution control and devices for the same may be provided to the students. Wherever relevant, students may be made aware about safety aspects.

RECOMMENDED BOOKS:

1. Potter and Hotchkiss Food Science CBI publication
2. Ashurst Chemistry and Technology of Sheffield Academic Press
3. Soft Drinks and Fruit Juices
4. Varnam and Sutherland Beverages- Technology, Chemistry ASPEN
5. and Microbiology

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	03	06
2	04	14
3	07	24
4	04	14
5	08	24
6	06	18
Total	32	100

5.3 SPICES, HERBS, CONDIMENTS AND FOOD FLAVOURS

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RATIONALE

Some of the diploma holders in food technology may find employment in the industries dealing with processing of spices, herbs and plantation products. The basic understanding about processes of spices, herbs and plantation products is essential for these diploma holders. Hence this subject is included in the curriculum.

DETAILED CONTENTS

1. Importance and role of spices, herbs and plantation products in food processing and food products (6 hrs)
2. Classification and properties of spices, herbs and plantation products – their products, including health benefits and medicinal properties (8 hrs)
3. Cleaning, grading, milling, blending, formulating and packaging of spices and spice mixes (12 hrs)
4. Uses of spices and herbs (10 hrs)
 - Processing of major spices: ginger, pepper, turmeric, galangal
 - Minor spices: clove, nutmeg cardamom
 - Leafy spices: bay oregano, basil (tulsi), mint, thyme and curry leaves
 - Seed spices: fenugreek, mustard, sesame (til), garlic, dill
 - Common aromatic herbs and their uses: basil (tulsi), mint, turmeric, curry leaves, lemon grass, stevia etc.
5. Preparation of pastes, extraction of oleoresins and essential oils (6 hrs)
6. Food Flavours: Natural, Nature identical and Synthetic flavours; Browning reactions (6 hrs)

LIST OF PRACTICALS

1. Demonstration of process of essential oil extraction and oleoresin of different spices
2. Study of detection of adulteration in spices
3. Study of constituents and sensory characteristics of essential oils and oleoresins
4. Demonstration of actual processing of different spices, herbs and plantation products

5. Practicals related to: cleaning, grading, milling, blending, formulating and preparing of spices and spice mixes.
6. Visit to relevant industries

INSTRUCTIONAL STRATEGY

Experts from industry may be invited to give lectures on various themes. Students may be taken to industry to demonstration processing of spices, herbs and plantation products.

RECOMMENDED BOOKS

1. Medicinal Plants by NS Chauhan
2. Spices and Condiments by JS Pruthy
3. Food and Beverage Service by Dennis & Lilly Crap
4. Other relevant sources of information on Internet

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	06	12
2	08	16
3	12	26
4	10	22
5	06	12
6	06	12
Total	48	100

5.4 INSTRUMENTATION AND PROCESS CONTROL

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RATIONALE

After studying the course the students will be able to identify different types of sensors and transducers and their applications in the field of instrumentation and process control used in food industry. The students will be able to select appropriate transducers relating to a process and will also get the relevant technical know how about the conditioning of a signal from a transducer for the purpose of control. This course will also enable the students to study in detail different types of control systems used in instrumentation and will provide understanding of basic control loops

The objective of this course is to give the knowledge of various instruments and skill in handling them, which control the process parameters and various operations in any food industry

DETAILED CONTENTS

1. Introduction (6 hrs)
Importance of instruments in process industries. Classification of instruments, static and dynamic characteristics of instrument.
2. Instruments for Temperature Measurement (4 hrs)
Thermometer , thermocouple, thermister and pyrometer, application and working.
3. Instruments for pressure Measurement (4 hrs)
Use of Manometers, Bourdon gauge, measurement of vacuum and pressure. Liquid level measurement-Direct and differential method.
4. Flow Measurements (6 hrs)
Flow measurement and calibration with orifice, venturi meter, rotameter, pitot tube
5. Instruments for Miscellaneous Measurements (6 hrs)
Measurement of viscosity, conductivity, humidity and pH value, TSS, industrial weighing systems.
6. Controls (6 hrs)
Concept of automatic process control and its classifications. Types of controllers and their applications.

LIST OF PRACTICALS

1. Measurement of temperature using mercury in glass thermometer
2. Calibration and measurement of temperature using different kinds of Thermocouple
3. Measurement of viscosity of a fluid using viscometer
4. Measurement of the vacuum using pressure gauge
5. Measurement of the pressure using manometer
6. Measurement of static & dynamic characteristics of Bourdon gauge.
7. Measurement of the liquid level using the direct and differential method.
8. Measurement of TSS
9. Measurement of physical parameters of food
10. Visit to industrial unit

INSTRUCTIONAL STRATEGY

As far as possible the teachers should demonstrate various instruments used in food processing during the lectures. Expert's lectures and field visits may also be allowed to supplement the classroom instruction.

RECOMMENDED BOOKS

1. Process Control by Harriott and Peter Process system Analysis and Control of Coughanour; McGraw Hill
2. Industrial Instrumentation by Eckman; Wiley Eastern

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	6	20
2	4	12
3	4	12
4	6	18
5	6	18
6	6	20
Total	32	100

5.5 TECHNOLOGY OF OILS & FATS

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RATIONALE

This subject is aimed at imparting thorough knowledge and skill related to the extraction and processing techniques of oils & fats and their nutritional and qualitative effects on food

1. Introduction (6 hrs)
Oils and Fats, sources, composition, physico-chemical properties and their functions (Tenderness, Texture, Flavor and Emulsion)
2. Nutritional importance of oils and fats (2 hrs)
3. Extraction and refining of oils and fats (10 hrs)
Pretreatment, rendering, extraction methods, refining, bleaching, hydrogenation, fractionation, deodorizing, plasticizing, packaging
4. Production and processing of animal fats (12 hrs)
 - Butter and ghee
 - Margarine
 - Lard
 - Fish oil
5. Production and processing of vegetable oils (14 hrs)
 - Soya bean oil
 - Mustard oil
 - Groundnut oil
 - Sunflower oil
 - Olive Balm and coconut oil
6. Blending and fortification of oils. (4 hrs)

LIST OF PRACTICALS

1. To determine the smoke point, flash point and fire point of given sample
2. To determine the acid value of given sample
3. To determine the iodine value of given sample

4. To determine the saponification value of given sample
5. Determination of rancidity of given sample
6. To determine the melting point of given sample
7. To determine the fat content of a given sample
8. Detection of adulteration in fats/oils
9. Visit to oil processing industry

RECOMMENDED BOOKS

1. Food Science: Norman. N. Potter CBS Publication, *CBS Publishers and distributors Pvt. Ltd*, New Delhi
2. Food Oils & Fats: Lawson Harry-CBS Publication, *CBS Publishers and distributors Pvt. Ltd*, New Delhi
3. Food Oils & Fats: Bailey Publication, Oxford & IBH *Publishing Co.*, New Delhi
4. Bailey's Industrial Oil and Fat Products by Daniel Swern, *Interscience Publishers*, New York
5. The Chemical Analysis of Food and Food Products by Jacobs, Morris B *Jacobs Publisher*: New York,
6. A First Course in Food Analysis by A.K. Sathe, New Age Publications, New Delhi
7. Standards for Fats & Oils by Lawson, *AVI Publishing Company*, Westport.

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	06	12
2	02	04
3	10	20
4	12	26
5	14	30
6	04	08
Total	48	100

5.6 GENERIC SKILLS AND ENTREPRENEURSHIP DEVELOPMENT

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RATIONALE

Generic Skills and Entrepreneurship Development is one of the courses from “Human Science” subject area. Generic skills have emerged as an important component of employability skills, which enable an individual to become and remain employable over lifetime and to lead happy and prosperous life. Entrepreneurship development aim at developing conceptual understanding for setting-up one’s own business venture/enterprise. This aspect of Human Resource Development has become equally important in the era, when wage employment prospects have become meager.

Both the subject areas are supplementary to each other and soft skills are required to be developed in diploma passouts for enhancing their employability and self confidence.

DETAILED CONTENTS

1. Introduction to Generic Skills (4 hrs)
 - 1.1 Importance of Generic Skill Development (GSD)
 - 1.2 Global and Local Scenario of GSD
 - 1.3 Life Long Learning (LLL) and associated importance of GSD.
2. Managing Self (8 hrs)
 - 2.1 Knowing Self for Self Development
 - Self-concept, personality, traits, multiple intelligence such as language intelligence, numerical intelligence, psychological intelligence etc.
 - 2.2 Managing Self - Physical
 - Personal grooming, Health, Hygiene, Time Management
 - 2.3 Managing Self – Intellectual development
 - Information Search: Sources of information
 - Listening: Effective Listening
 - Speaking: Effective Oral Communication
 - Reading: Purpose of reading, different styles of reading, techniques of systematic reading; Note Taking: Importance and techniques of note taking
 - Writing: Correspondence - personal and business

Note: Practical sessions should be coupled with teaching of effective listening, speaking, reading and writing.

2.4 Managing Self – Psychological

- Stress, Emotions, Anxiety-concepts and significance (Exercises related to stress management)
- Techniques to manage the above

3. Managing in Team (6 hrs)

- 3.1 Team - definition, hierarchy, team dynamics
- 3.2 Team related skills- sympathy, empathy, co-operation, concern, lead and negotiate, work well with people from culturally diverse background
- 3.3 Communication in group - conversation and listening skills

4 Task Management (3 hrs)

- 4.1 Task Initiation, Task Planning, Task execution, Task close out
- 4.2 Exercises/case studies on task planning towards development of skills for task management

5. Problem Solving (5 hrs)

- 5.1 Prerequisites of problem solving- meaningful learning, ability to apply knowledge in problem solving
- 5.2 Different approaches for problem solving.
- 5.3 Steps followed in problem solving.
- 5.4 Exercises/case studies on problem solving.

6. Entrepreneurship

- 6.1 Introduction (22 hrs)
 - Concept/Meaning and its need
 - Competencies/qualities of an entrepreneur
 - Entrepreneurial Support System e.g., District Industry Centres (DICs), Commercial Banks, State Financial Corporations, Small Industries Service Institute (SISIs), Small Industries Development Bank of India (SIDBI), National Bank of Agriculture and Rural Development (NABARD), National Small Industries Corporation (NSIC) and other relevant institutions/organizations at State/National level.

- 6.2 Market Survey and Opportunity Identification (Business Planning)
 - How to start a small scale industry
 - Procedures for registration of small-scale industry
 - List of items reserved for exclusive manufacture in small-scale industry
 - Assessment of demand and supply in potential areas of growth.
 - Understanding business opportunity
 - Considerations in product selection
 - Data collection for setting up small ventures.
- 6.3 Project Report Preparation
 - Preliminary Project Report
 - Techno-Economic Feasibility Report
 - Exercises on Preparation of Project Report in a group of 3-4 students

INSTRUCTIONAL STRATEGY

This subject will require a blend of different teaching and learning methods beginning with lecture method. Some of the topics may be taught using question answer, assignment, case studies or seminar. In addition, expert lectures may be arranged from within the institution or from management organizations. Conceptual understanding of Entrepreneurship, inputs by teachers and outside experts will expose the students so as to facilitate in starting ones own business venture/enterprise. The teacher will discuss success stories and case studies with students, which in turn, will develop managerial qualities in the students. There may be guest lectures by successful diploma holding entrepreneurs and field visits also. The students may also be provided relevant text material and handouts.

RECOMMENDED BOOKS

1. Soft Skills for Interpersonal Communication by S.Balasubramaniam; Published by Orient BlackSwan, New Delhi
2. Generic skill Development Manual, MSBTE, Mumbai.
3. Lifelong learning, Policy Brief (www.oecd.org)
4. Lifelong learning in Global Knowledge Economy, Challenge for Developing Countries – World Bank Publication
5. Towards Knowledge Society, UNESCO Paris Publication
6. Your Personal Pinnacle of Success by DD Sharma, Sultan Chand and Sons, New Delhi
7. Human Learning, Ormrod
8. A Handbook of Entrepreneurship, Edited by BS Rathore and Dr JS Saini; Aapga Publications, Panchkula (Haryana)
9. Entrepreneurship Development by CB Gupta and P Srinivasan, Sultan Chand and Sons, New Delhi
10. Handbook of Small Scale Industry by PM Bhandari

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (hrs)	Marks Allotted (%)
1.	4	5
2.	8	15
3.	6	10
4.	3	10
5.	5	10
6.	22	50
Total	48	100

5.7 PROJECT ORIENTED PROFESSIONAL TRAINING

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Towards the end of second year, after completion of course work, the students should be sent to food processing and preservation industries for project oriented professional training. The purpose of this training is:

1. To develop understanding of various field activities in which students are going to play a role as food technologists after completing diploma programme
2. To Develop understanding of subject based knowledge given in the class room in the context of its application at work places
3. To gain first hand experience and confidence amongst the students to enable them to use and apply knowledge and skills to solve practical problems in the field
4. Development of special skills and abilities like interpersonal skills communication skills, attitudes and values

For the fulfillment of above objectives, polytechnic(s) offering diploma course in food technology may establish close linkages with 8 – 10 food processing and preservation industries/organizations. The industries/organizations may be contacted by the teachers and students for project oriented and professional training of students during third year. The practical industrial training has to be well planned, structured and supervised by polytechnic teachers clearly specifying complete schedule of the students on day to day basis for whole of their training period. Proforma may be prepared by polytechnics related to the concerned industries to access daily, weekly and monthly progress of the students and the students must be asked to fill these proformas regularly duly signed by them and countersigned by personnel from industry and concerned teacher attached to a particular student. Each teacher is suppose to supervise and guide 4 to 6 students. Following schedule, as a sample, is proposed for the training

Familiarization and Training about Various Food Processing Operations

Students should be familiarized with various materials, principles and operations involved in processing of different types of food used for different purposes

Specific Task

Students should be given specific task related to following:

- Complete flow chart and plant layout for food-processing unit

- Preparation and preservation of food products, including raw material identification, testing and processing
- Hygiene and sanitation for a food processing and preservation unit
- Fault diagnosis and rectification

Problem-Solving Work Site

After undergoing above two phases of vigorous practical project orientation professional training, students may be given practical problems, which are of interest to industry where he/she is taking practical training. The problem should be identified and guided by the personnel from industry in collaboration with teacher and the solutions suggested by the students may be tried

Note: Students are supposed to prepare detailed notes of each of above phases of training and write complete report of the whole of practical industrial training which shall be used for the learning and evaluation purposes

***Assessment Criteria**

Students may be assessed by the external (personnel from industry) and internal (teacher) examiners based on the criteria given in Table 1 below:

Sr. No.	Performance Criteria Items	** Max. Marks	Rating Scale				
			Excellent	Very Good	Good	Fair	Poor
1.	Punctuality and Regularity	10	10	8	6	4	2
2.	Initiative in Learning/ Working at site	10	10	8	6	4	2
3.	Level/proficiency of practical problems	20	20	16	12	8	4
4.	Ability to solve live practical problems	20	20	16	12	8	4
5.	Sense of Responsibility	10	10	8	6	4	2
6.	Self Expression/ Communication Skills	5	5	4	3	2	1
7.	Interpersonal skills/human Relations	5	5	4	3	2	1
8.	Report Writing Skills	10	10	8	6	4	2
9.	Viva Voce/Presentation	10	10	8	6	4	2
Total		100	100	80	64	40	20

The overall grading of the practical training shall be made as per following:

Range of maximum Marks	Overall Grade
More than 80	Excellent
79 < > 60	Very Good
59 < > 40	Good
39 < > 20	Fair
Less than 20	Poor

In order to qualify for the diploma students must get “overall good” grade failing which the students may be given just one more chance of undergoing project oriented professional training in the same industry before being disqualified from the diploma and declared “not eligible to receive diploma in food technology”. It is also important to note that the students must get more than six “goods or above good” grades, in different performance criteria items, in order to get “Overall Good” grade

- * The criteria must be followed by the internal and external examiner and they should see the daily, weekly and monthly reports while awarding marks and following the criteria
- ** The criteria for evaluation of the students have been worked out for 100 maximum marks. The internal and external examiners shall use multiple (1 and 2) of marks original to internal (100 marks) and external (200 marks) respectively to evaluate the students and shall further overall grade them excellent, very good, good, fair or poor

RECOMMENDED BOOKS

1. Food Preservation by SK Kulshrestta, Vikas Publishing House, New Delhi
2. Fundamentals of Food and Nutrition by Sumati R. Mudambi & MV Rajagolap, New Age International Pvt. Ltd. New Delhi

3. Food Processing and Preservation by Bibliography Sivasankar, Prentice Hall of India Pvt. Ltd., New Delhi
4. Managing Food Processing Industries in India by U.K. Srivastva
5. Hand Book of Entrepreneurship by B.S. Rathore, Oxford & IBH *Publishing Co.*, New Delhi
6. Microbiological Safety of Processed Foods by Crowther, Vikas *Publishing House*, New Delhi.
7. Food Poisoning & Food Hygiene by Hobbs
8. Drying & Storage of Grains & Oilseeds by Brodoker
9. Fundamentals of Food Process Engg. By Toledo, AVI *Publishing Co.*, Westport
10. Chocolate, Cocoa & Confectionery by Minifie, AVI *Publishing Co.*, Westport
11. Safe Food Handling by M. Jacob, Hemisphere *Publishing Corporation*, New York
12. Food & Beverage Service by Andrews, Heinemann Educational *Books Ltd.*, London.
13. The Science of Cookie & Cracker Production by Faridi, CBS *Publishers & Distributors*, New Delhi
14. Snack Foodby Booth, *Publishers* ISBN, New Delhi
15. Food Additives by Mahindru, . A.P.H. *Publishers, New Delhi*
16. Dough Rheology & Baked Product Texture by Faridi, CBS *Publishers & Distributor*, New Delhi

PERSONALITY DEVELOPMENT CAMP

This is to be organized at a stretch for two to three days during fifth or sixth semester. Extension Lectures by experts or teachers from the polytechnic will be delivered on the following broad topics. There will be no examination for this subject.

1. Communication Skills
2. Correspondence and job finding/applying/thanks and follow-up
3. Resume Writing
4. Interview Techniques: In-Person Interviews; Telephonic Interview' Panel interviews; Group interviews and Video Conferencing etc.
5. Presentation Techniques
6. Group Discussions Techniques
7. Aspects of Personality Development
8. Motivation
9. Leadership
10. Stress Management
11. Time Management
12. Interpersonal Relationship
13. Health and Hygiene