

**SWAMI RAMANAND TEERTH MARATHWADA
UNIVERSITY, NANDED**



UGC Sanctioned Vocational Course

Syllabus for,

Certificate, Diploma, Advanced Diploma and B. Voc. Degree in Food

Processing/ Food Processing Technology/ Food Processing and Technology

(CBCS Pattern)

First Year Semester I & II

Faculty: Science and Technology

(w.e.f. 2020-21)



Swami Ramanand Teerth Marathwada University, Nanded

Syllabus structure for,

Certificate, Diploma, Advanced Diploma and B.Voc Degree (Food Processing)

	Paper No.	Course Number	Course Title	Hr/Week	Type of Course	Credits	Marks		Total
							ESA	CIA	
Sem. I	General Education Component								
	Paper-I	BAAGE -111	Communication Skills	4	GE	4	75	25	100
	Paper-II	BAAGE -112	Basics of Computer	4	GE	4	75	25	100
	Paper-III	BAAGE -113	*Activity based on Paper-I & II	1	GE	1	-	25	25
	Skill Courses								
	Paper-IV			4	CC	4	75	25	100
	Paper-V			4	CC	4	75	25	100
	Paper-VI			4	CC	4	75	25	100
	Practical Skill Courses								
	Paper-VII			3	PR	3	50	25	75
	Paper-VIII			3	PR	3	50	25	75
Paper-IX			3	PR	3	50	25	75	
Sem. II	Paper No.	Course Number	Course Title	Hr/Week	Type of Course	Credits	Marks		Total
	General Education Component								
	Paper-X	BAAGE -124	Personality Development	4	GE	4	75	25	100
	Paper-XI	BAAGE -125	Environmental Study	4	GE	4	75	25	100
	Paper-XII	BAAGE -126	*Activity based on Paper-X & XI	1	GE	1	-	25	25
	Skill Courses								
	Paper-XIII			4	CC	4	75	25	100
	Paper-XIV			4	CC	4	75	25	100
	Paper-XV			4	CC	4	75	25	100
	Practical Skill Courses								
	Paper-XVI			3	PR	3	50	25	75
Paper-XVII			3	PR	3	50	25	75	
Paper-XVIII			3	PR	3	50	25	75	
Summer	Compulsory Activity: 2 Months Industrial Training during Summer Vacation								

	Paper No.	Course Number	Course Title	Hr/W eek	Type of Course	Credits	Marks		Total
							ESA	CIA	
Sem. III	General Education Component								
	Paper-XIX	BAAGE -237	ICT-Skill	4	GE	4	75	25	100
	Paper-XX	BAAGE -238	Entrepreneurship Development	4	GE	4	75	25	100
	Paper-XXI	BAAGE -239	*Activity based on Paper-XIX & XX	1	GE	1	-	25	25
	Skill Courses								
	Paper-XXII			4	CC	4	75	25	100
	Paper-XXIII			4	CC	4	75	25	100
	Paper-XXIV			4	CC	4	75	25	100
	Practical Skill Courses								
	Paper-XXV			2	PR	2	50	-	50
	Paper-XXVI			2	PR	2	50	-	50
	Paper-XXVII			2	PR	2	50	-	50
	Paper-XXVIII		Report on Summer Activity	-	PR	3	75	-	75
Sem. IV	Paper No.	Course Number	Course Title	Hr/W eek	Type of Course	Credits	Marks		Total
	General Education Component								
	Paper-XXIX	BAAGE -2410	Agriculture Extension	4	GE	4	75	25	100
	Paper-XXX	BAAGE -2411	Agriculture Business Management	4	GE	4	75	25	100
	Paper-XXXI	BAAGE -2412	*Activity based on Paper-XXIX & XXX	1	GE	1	-	25	25
	Skill Courses								
	Paper-XXXII			4	CC	4	75	25	100
	Paper-XXXIII			4	CC	4	75	25	100
	Paper-XXXIV			4	CC	4	75	25	100
	Practical Skill Courses								
	Paper-XXXV			3	PR	3	50	25	75
	Paper-XXXVI			3	PR	3	50	25	75
Paper-XXXVII			3	PR	3	50	25	75	
Summer	Compulsory Activity: 2 Months Industrial Training during Summer Vacation								

	Paper No.	Course Number	Course Title	Hr/Week	Type of Course	Credits	Marks		Total
							ESA	CIA	
Sem. V	General Education Component								
	Paper-XXXVIII	BAAGE -3513	Marketing Skill management.	4	GE	4	75	25	100
	Paper-XXXIX	BAAGE -3514	Climate Change and Agriculture	4	GE	4	75	25	100
	Paper-XXXX	BAAGE -3515	*Activity based on Paper-XXXVIII & XXXIX	1	GE	1	-	25	25
	Skill Courses								
	Paper-XXXXI			4	CC	4	75	25	100
	Paper-XXXXII			4	CC	4	75	25	100
	Paper-XXXXIII			4	CC	4	75	25	100
	Practical Skill Courses								
	Paper-XXXXIV			2	PR	2	50	-	50
	Paper-XXXXV			2	PR	2	50	-	50
	Paper-XXXXVI			2	PR	2	50	-	50
	Paper-XXXXVII		Report on Summer Activity	-	PR	3	75	-	75
Sem. VI Elective-I	Paper No.	Course Number	Course Title	Hr/Week	Type of Course	Credits	Marks		Total
							ESA	CIA	
	General Education Component								
	Paper-XXXXVIII	BAAGE -3616	Production and Quality control	4	GE	4	75	25	100
	Paper-XXXXIX	BAAGE -3617	Human Resource Management	4	GE	4	75	25	100
	Paper-XXXXX	BAAGE -3618	*Activity based on Paper-XXXXVIII & XXXIX	1	GE	1	-	25	25
	Skill Courses								
	Paper-XXXXXI		1 Month Industrial Training at Agri./Food based Industries	-	CC	21	300	100	400
		Report Writing	-	25			25	50	
		Seminar and Viva-Voce	-	75			-	75	

OR

	Paper No.	Course Number	Course Title	Hr/Week	Type of Course	Credits	Marks		Total
							ESA	CIA	
Sem. VI Elective-II	Paper-XXXXVIII		3 Months Industrial Training	-	CC	30	750	-	750
		Marks Distribution	Industrial Training Certificate			20	500	-	500
			Report Writing			05	125	-	125
			Seminar and Viva-Voce			05	125	-	125

- Note:** 1. The ESA part of practical and Industrial Project should be completely assessed and evaluated by external examiner.
2. The external examiner should be appointed for practical and industrial training ESA part.
3. * Sign denotes that internal assessment should be based on seminar/Interview skill/expected component of the course.
4. Student should submit the Report based on summer industrial training.
5. For VI semester students can opt Elective-I or Elective-II pattern.
6. Student opting for Elective-II pattern of VI semester should submit the certificate of three months industrial training from respective industries.

ESA: End Semester Assessment,

CIA: Continues Internal Assessment,

GE: General Education Component,

CC: Core Skill Courses,

PR: Practical Skill Courses,

CIA of 25 Marks (Theory): 15 Marks for college level internal test & 10 Marks for Assignment,

CIA of 25 Marks (Practical): 15 Marks for college level internal practical test & 10 Marks for Record Book and Field Note Book submission.

Table: Indicating Eligibility, Duration, Total Credits.

Exit Points /Awards	Eligibility	Normal Duration	Skill Component Credits	General Education Credits	Total Credits for Award	NSQF Level	Medium of instruction
B. Voc Degree	12th pass or Diploma in relevant field after 10 th	Six semester	108	72	180	7	English
Advanced Diploma		Four semester	72	48	120	6	
Diploma		Two semester	36	24	60	5	
Certificate		One semester	18	12	30	4	

About the Course:

Government of India, taking note of the requirement for skill development among students launched National Vocational Education Qualification Framework (NVEQF) which was later on assimilated into National Skills Qualifications Framework (NSQF). Various Sector Skill Councils (SSCs) are developing Qualification Packs (QPs), National Occupational Standards (NOSs) and assessment mechanisms in their respective domains, in alignment with the needs of the industry.

In view of this, the UGC implemented the scheme of Community Colleges from 2013-14 in pilot mode on the initiative of the MHRD. Thereafter, realizing the importance and the necessity for developing skills among students, and creating work ready manpower on large scale, the Commission decided to implement the scheme of Community Colleges as one of its independent schemes from the year 2014-15. The Commission also launched another scheme of B.Voc. Degree programme to expand the scope of vocational education and also to provide vertical mobility to the students admitted into Community Colleges for Diploma programmes to a degree programme in the Universities and Colleges. While these two schemes were being implemented, it was also realized that there is a need to give further push to vocational education on a even larger scale. Accordingly, 'Deen Dayal Upadhyay Centres for Knowledge Acquisition and Upgradation of Skilled Human Abilities and Livelihood (KAUSHAL)' was also incorporated. Since all these three provisions serve a common purpose, all these schemes are merged into a single scheme for providing skill based education under National Qualification Framework.

Type of Courses and Awards: There will be full time credit-based modular programmes, wherein banking of credits for skill and general education components shall be permitted so as to enable multiple exit and entry. The multiple entry and exit enables the learner to seek employment after any level of Award and join back as and when feasible to upgrade qualifications / skill competencies either to move higher in the job profile or in the higher educational system. This will also provide the learner an opportunity for vertical mobility to second year of B.Voc degree programme after one year diploma and to third year of B.Voc degree programme after a two year advanced diploma. The students may further move to Masters and Research degree programmes mapped at NSQF Level 8 – 10.

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Aims and Objectives:

The aims and objectives of the scheme of Vocational programme under NSQF are;

- (i) To provide judicious mix of skills relating to a profession and appropriate content of general education.
 - (ii) To ensure that the students have adequate knowledge and skills, so that they are work ready at each exit point of the programme.
 - (iii) To provide flexibility to students by means of pre-defined entry and multiple exit points.
 - (iv) To integrate NSQF within the undergraduate level of higher education in order to enhance employability of the graduates and meet industry requirements.
 - (v) Such diploma graduates apart from meeting the needs of local and national industry are also expected to be equipped to become part of the global workforce.
 - (vi) To provide vertical mobility to students coming out of 10+2 with vocational subjects and Community Colleges.
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The Objectives of the B.Voc. in Food Processing Technology:

- (i) To provide an updated education to the students at large in order to know the importance and scope of the discipline and to provide mobility to students from one university or state to other.
- (ii) To develop a scientific attitude to make students open minded, critical and curious.
- (iii) To develop an ability to work on their own and to make them fit for the society.
- (iv) To develop skill in field work, experiments, equipment and laboratory use along with collection and interpretation of materials and data.
- (v) To make aware of natural resources and environment and the importance of conserving the same.
- (vi) To develop ability for the application of the acquired knowledge in the relevant fields so as to make our country self-reliant and self-sufficient.

Outcome of the course:

- (i) This program will train and orient the students in the field of food processing under the field of Agriculture.
 - (ii) This program will help the students for their career development.
 - (iii) This program shall train and orient the students for industrial food processing skills and serve as human resource for the industries and other organizations.
 - (iv) The programme also has a strong interdisciplinary component. Emphasis is given on the experimental learning through hands-on laboratory exercises, field trips and assignments.
 - (v) This skill oriented course will provide job opportunities and additional specific skills to the students for self-employability through the development of their own enterprises.
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	Paper No.	Course Number	Course Title	Hr/Week	Type of Course	Credit	Marks		Total	
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Sem.I	General Education Component									
	Paper-I	BAAGE -111	Communication Skills	4	GE	4	75	25	100	
	Paper-II	BAAGE -112	Basics of Computer	4	GE	4	75	25	100	
	Paper-III	BAAGE -113	*Activity based on Paper-I & II	1	GE	1	-	25	25	
	Skill Courses									
	Paper-IV	FPT-111	Principles of Food Processing	4	CC	4	75	25	100	
	Paper-V	FPT-112	Post-harvest Management of Fruits and Vegetables	4	CC	4	75	25	100	
	Paper-VI	FMS-111	Food Microbiology	4	CC	4	75	25	100	
	Practical Skill Courses									
	Paper-VII	Practical Based on FPT-111			3	PR	3	50	25	75
	Paper-VIII	Practical Based on FPT-112			3	PR	3	50	25	75
	Paper-IX	Practical Based on FMS-111			3	PR	3	50	25	75

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Sem.II	General Education Component									
	Paper-X	BAAGE -124	Personality Development	4	GE	4	75	25	100	
	Paper-XI	BAAGE -125	Environmental Study	4	GE	4	75	25	100	
	Paper-XII	BAAGE -126	*Activity based on Paper-X & XI	1	GE	1	-	25	25	
	Skill Courses									
	Paper-XIII	FPT-123	Cereal Processing	4	CC	4	75	25	100	
	Paper-XIV	FPT-124	Food Packaging Technology	4	CC	4	75	25	100	
	Paper-XV	FPT-125	Processing of Milk and Milk Products	4	CC	4	75	25	100	
	Practical Skill Courses									
	Paper-XVI	Practical Based on FPT-123			3	PR	3	50	25	75
	Paper-XVII	Practical Based on FPT-124			3	PR	3	50	25	75
	Paper-XVIII	Practical Based on FPT-125			3	PR	3	50	25	75
	Summer	Compulsory Activity: 2 Months Industrial Training during Summer Vacation								

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Swami Ramanand Teerth Marathwada University, Nanded
Certificate, Diploma, Advanced Diploma and B.Voc Degree (Agriculture and Allied
Faculties)

First Year (Semester I)

Paper-I: Communication Skills (BAAGE-111)

Maximum Marks: 100

Credits: 4

Periods: 45

Unit I: Basic Grammar: (13 Periods)

Introduction, Grammar Word Classes (Open & Closed), Sentence – Kinds – Transformation, Phrase, Clause and its kinds, Simple, Complex & Compound sentences, (Only definitions & Structure), Tenses - Use of verbs in the Sentences

Unit II: Vocabulary: (10 Periods)

Morphology, Synonyms & Antonyms, One Word Substitution, Homophones & Homonyms

Unit III: Communication Skills: (10 Periods)

Definition & Types, Communication Cycle & Barriers, Principles for Effective Communication, Varieties in English (Indian, British & American).

Unit IV: Writing Skills: (12 Periods)

Letters (Formal & Informal), Report Writing (Scientific and Formal), Memorandum, Curriculum Vitae, Personal Employment Interview, Group Discussion. Phonetics: 44 sounds, consonants, vowels & Diphthongs, Transcription of words, Accent, Syllable cluster and Intonation.

Reference Books:

1. Developing of Communication Skills -Krishna Mohan & Meera Banerji
 2. A Practical English Grammar A.J. Thomson –Oxford
 3. Mastering English Grammar – S.H.Burton
 4. Technical Communication- Raman Sharma- Oxford
 5. Written Communication in English – Sarah Freeman Orient Longman Pvt. Ltd.
 6. A Course in Phonetics & Spoken English -J.Sethi & P.V.Dhamija
 7. Radiance-Tense
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Swami Ramanand Teerth Marathwada University, Nanded
Certificate, Diploma, Advanced Diploma and B.Voc Degree (Agriculture and Allied
Faculties)

First Year (Semester I)

Paper-II Basics of Computer (BAAGE-112)

Maximum Marks: 100

Credits: 4

Periods-45

Unit I: Basics of Computer: (10 Periods)

Introduction to computer, Definition and Types. Basic Applications of Computer; Components of Computer System, Central Processing Unit (CPU), VDU, Keyboard and Mouse, Other input/output Devices, Computer Memory, Concepts of Hardware and Software; Connecting keyboard, mouse, monitor and printer to CPU and checking power supply.

Unit II: Computer Operation: (13 Periods)

Operating Computer using GUI Based Operating System: What is an Operating System; Basics of Popular Operating Systems; The User Interface, Using Mouse; Using right Button of the Mouse and Moving Icons on the screen, Use of Common Icons, Status Bar, Using Menu and Menu-selection, Running an Application, Viewing of File, Folders and Directories, Creating and Renaming of files and folders, Opening and closing of different Windows;

Unit III: MS-Office: (10 Periods)

Introduction to MS-Word: Word Processing Basics; Opening and Closing of documents; Text creation and Manipulation; Formatting of text; Table handling; Spell check, language setting and thesaurus; Printing of word document. MS- Excel, Power Point. Internet concept & definition, WWW, URL, http, Browsers, Search engines etc.

Unit IV: Computer Networking: (12 Periods)

Basic of Computer networks; LAN, MAN, WAN; Concept of Internet; Applications of Internet. Communications and collaboration: Basics of electronic mail; Getting an email account; Sending and receiving emails; Accessing sent emails; Using Emails; Document collaboration; Instant Messaging; Netiquettes.

Reference Books:

1. Introduction of Computer Science- P. Pushman & R. Mata Toledo, McGraw Hill
 2. Computer fundamentals – P.K. Sinha – BPB New Delhi.
 3. Microsoft Office – 2000 Complete – BPB Practicals
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Swami Ramanand Teerth Marathwada University, Nanded

B. Voc. Food Processing Technology

First Year (Semester I)

Paper-IV: Principles of Food Processing (FPT-111)

Marks: 100

Credits: 4

Periods: 45

Unit-I: Food processing principles: (10 Periods)

Defining food; Classification of food; Constituents of foods; Food processing; Food preservation; Food Spoilage – Introduction, Causes of food spoilage, Food poisoning, Food-borne intoxication, Food-borne infection,

Unit-II: Food Preservation and Processing: (11 Periods)

Introduction; necessary; Methodology; Principles and Methods of food preservation, High Temperature Preservation: Introduction; Blanching; Pasteurization; Sterilization; Canning, Drying, Dehydration and Concentration: Introduction; Purpose; Water activity and relative humidity; Factors affecting rate of drying and dehydration; Drying methods; Changes during drying and dehydration; different Driers;

Unit-III: Food Irradiation: (13 Periods)

Introduction; Radiation sources; Measurement of radiation dose; Mechanism of Action; Type of irradiation; Factors affecting food irradiation; Effect of irradiation, Preservation using Sugar, Salt and Acids: Factors affecting osmotic pressure of sugar solution, Foods preserved using sugar; Salt: Introduction, Antimicrobial activity of salt, Food products preserved using salt; Acid – Introduction, Mechanism, Common foods preserved using acids, Preservation by Use of Chemical preservatives: Introduction, Factors affecting antimicrobial activity of preservatives;

Unit-IV: Food Fermentation: (11 Periods)

Introduction, methods, common fermented foods. Effect of processing on nutritional value of food: Introduction; Consuming raw foods; Changes during meat grilling; Effect of processing on vitamins; Effect of processing on minerals; Effect of processing on carbohydrates; Effect of processing on lipids. Fermentation of food.

Recommended Readings:

1. Bawa. A.S, O.P Chauhan etal. Food Science. New India Publishing agency, 2013
 2. Roday,S. Food Science, Oxford publication, 2011.
 3. B. Srilakshmi, Food science, New Age Publishers,2002
 4. Meyer, Food Chemistry, New Age,2004
 5. De Sukumar., Outlines of Dairy Technology, Oxford University Press, 2007
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Swami Ramanand Teerth Marathwada University, Nanded

B. Voc. Food Processing Technology

First Year (Semester I)

Paper-V: Post-harvest Management of Fruits and Vegetables (FPT-112)

Marks: 100

Credits: 4

Periods: 45

Unit-I: Introduction to Post Harvest Management: (10 Periods)

Definition of PHM, PHT, Scope, Responsibilities, Post-harvest losses, Possible measures, Morphology of Fruits and Vegetables: Parts of fruit; Botanical classification of fruit; Consumer classification of fruit; Classification of fruits on the basis of origin; Vegetables; Fruits vs. vegetables Nutritional value: Introduction; Water; Carbohydrates; Protein; Lipid; Organic acids; Vitamin and minerals, Volatiles;

Unit-II: Physiology and Biochemistry: (11 Periods)

Physiological development stages; Respiration; Respiration drift; Climacteric fruit; Non-climacteric fruit. Factors affecting rate of respiration. Transpiration; Maturity of Fruits and Vegetables. Methods of identification of maturity, Fruit Ripening: Changes during Ripening. Deterioration of Fruits & Vegetables: Primary and Secondary causes of losses;

Unit-III: Pre-harvest Factors affecting Quality: (13 Periods)

Pre-harvest factors related to plant. Harvesting of Fruits & Vegetables: Definition, methods of harvesting, factors during harvest affecting harvesting of fruits & vegetables. Post-harvest handling; Post-harvest Commodity Treatments: Precooling; Waxing; Sprout inhibition; Disinfestation; Fungicide application; Hot water treatment; Vapor heat treatment; Irradiation; Ripening and Degreening; Delaying ripening; Curing of roots and tubers; Dryings of root crops; Commodity treatments for apple Pre-cooling: Introduction; Effect of precooling on product quality; Factors affecting precooling; Cooling methods; Packinghouse operations: Introduction; Dumping (loading and unloading); Washing; Drying.

Unit-IV: Sorting & Grading, Packaging, Transportation Storage Structures:(11 Periods)

Introduction; Goal of Storage systems; Storage considerations; Storage Systems; Low cost and High Cost Technology, MA, CA and Hypobaric storage Chemical Preservation of Fruits and Vegetables: General rules for chemical preservation; Factors affecting action of chemical preservatives, Hurdle technologies for preservation.

TEXT BOOKS:

1. A Handbook on Post harvest Management of Fruits and Vegetables by P. Jacob John Daya Publishing House, Delhi ISBN: 9788170355328
2. Postharvest: An introduction to the physiology and handling of fruit and vegetables, 6th edition by Wills R. and Golding J. UNSW Press ISBN: 9781742247854
3. Post-harvest Technology of Fruits and Vegetables – Vol. 1 by Verma L. R. and Joshi V. K. Indus Publishing Company, Delhi ISBN: 8173871086
4. Handbook of Analysis and Quality Control for Fruits and Vegetable Products by Ranganna S. 2nd Edition, Tata-McGraw Hill, 2001

REFERENCE BOOKS:

1. Handbook of Postharvest Technology by Chakraverty A. Mujumdar A. S. Ramaswamy H. Marcel Dekker Inc. , New York ISBN: 0824705149
 2. Handbook of Vegetable Science and Technology: Salunke D. K. Kadam S. S. Marcel Dekker Inc. , New York ISBN: 0824705149
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Swami Ramanand Teerth Marathwada University, Nanded

B. Voc. Food Processing Technology

First Year (Semester I)

Paper-VI: Food Microbiology (FMS-111)

Marks: 100

Credits: 4

Periods: 45

UNIT-I: Microbes in food science: (11 Periods)

Importance and significance of microbes in food science. Microbial spoilage of foods Factors affecting kinds, numbers, growth and survival of microorganisms in foods, Intrinsic factors; pH, water activity, nutrients etc. and Extrinsic factors: Relative humidity, temperature and gaseous atmosphere

UNIT-II: Chemical changes caused by microorganisms: (12 Periods)

Changes in nitrogenous organic compounds, non-nitrogenous organic compounds, organic acids, other compounds, lipids, pectic substances, Contamination of foods; Sources of contamination, Genera of bacteria, Maintenance of anaerobic conditions; Asepsis, removal of microorganisms; Intermediate moisture foods;

UNIT-III: Microbiology of cereal products, milk products, Meat Products: (11 Periods)

Microbiology of cereal and cereal products Microbiology of milk and milk products, meat and meat products, poultry and eggs, fish and other sea foods Microbiology of fruits and vegetables and canned foods Microbiology of sugar and sugar products and salts and spices Shelf life: Calculation of shelf life, Shelf life requirements, deteriorative reactions,

UNIT-IV: Accelerated testing Simulations of product: (11 Periods)

Package environment interaction, shelf life simulation for moisture, oxygen, and light sensitive products Food borne intoxications and infections, types of food involved, toxicity and symptoms, chemical properties, environmental conditions Food borne viruses: Polio, hepatitis A and E, noroviruses, rota viruses, prion diseases, types of food involved, toxicity and symptoms

TEXT BOOK:

1. Food Microbiology Frazier and Dennis 4th Ed. Tata McGraw-Hill Education, New Delhi. 1987.
2. Modern Food Microbiology James M. Jay 6th Ed. Aspen Publishers, Inc., Gaithersburg, Maryland, USA. 2002.
3. Basic Food Microbiology Banawart GJ 2nd Ed. AVI Publ. 1989

4. Essentials of Food Microbiology Garbutt J Arnold Heinemann, 1997
5. Fundamentals of Food Microbiology Ray B 3rd Edition, CRC Press, 2004

REFERENCE BOOKS:

6. Martin R. Adams and Maurice O. Moss Food Microbiology 3rd Ed., The Royal Society of Chemistry, Cambridge, UK. 2008.
 7. Basic Food Microbiology George J. Banwart 2nd Ed. Chapman & Hall, New York, USA. 1989
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Swami Ramanand Teerth Marathwada University, Nanded

B. Voc. Food Processing Technology

First Year (Semester I)

Paper-VII: Practical Based on Principles of Food Processing (FPT-111)

Marks: 75

Credits: 3

Pr. No.	Practical Title
1	Demonstration of various machineries used in processing.
2	Demonstration of effect of blanching on quality of foods.
3	Preservation using heat; Preservation by low temperature.
4	Preservation by high concentration of sugar.
5	Preservation by using salt.
6	Preservation by using chemicals.
7	Drying and dehydration of fruits.
8	Drying and dehydration of vegetables.
9	Fermentation of food.

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B. Voc. Food Processing Technology

First Year (Semester I)

Paper-VIII: Practical Based on

Post-harvest Management of Fruits and Vegetables (FPT-112)

Marks: 75

Credits: 3

Pr. No.	Practical Title
1	Morphological features of some selected fruits and vegetables
2	Studies on maturity indices; Wax coating of selected fruits
3	Use of chemicals for ripening of fruits; Effect of maturity on acidity of lemon;
4	Effect of storage of respiration and transpiration of fruit; Packaging of fruits and vegetables with scavengers
5	Determination of firmness of fruits and vegetables
6	Degreening of fruits

Swami Ramanand Teerth Marathwada University, Nanded

B. Voc. Food Processing Technology

First Year (Semester I)

Paper-IX: Practical Based on Food Microbiology (FMS-111)

Marks: 75

Credits: 3

Pr. No.	Practical Title
1	Isolation of bacteria and molds from foods; Microbial examination of cereal and cereal products;
2	Identification, isolation and confirmation; Microbial examination of vegetable and fruits: Identification, isolation and confirmation;
3	Microbial examination of meat and meat products: Identification, isolation and confirmation;
4	Microbial examination of fish and other sea foods: Identification, isolation and confirmation;
5	Microbial examination of eggs and poultry: Identification, isolation and confirmation
6	Microbial examination of milk and milk products: Identification, isolation and confirmation;
7	Microbial examination of sugar, salts and spices;
8	Microbial examination of canned products: Identification, isolation and confirmation;
9	Determination and enumeration of pathogenic and indicator organisms in foods (Coliform/Enterococcus); Thermal death time determination;
10	Detection of Salmonella from food sample
11	Detection of coliforms from water by MPN method;
12	Detection of Staphylococcus aureus from food sample

Swami Ramanand Teerth Marathwada University, Nanded
Certificate, Diploma, Advanced Diploma and B.Voc Degree (Agriculture and Allied
Faculties)

First Year (Semester II)

Paper-X: Personality Development (BAAGE-124)

Maximum Marks: 100

Credits: 4

Periods: 45

UNIT-I: Personality Development: (Periods: 11)

Introduction to personality development: The concept personality- Dimensions of theories of Freud & Erickson- personality – significant of personality development. The concept of success and failure: What is success? - Hurdles in achieving success - Overcoming hurdles - Factors responsible for success, What is failure - Causes of failure. SWOT analyses.

UNIT-II: Attitude & motivation: (Periods:11)

Attitude - Concept - Significance - Factors affecting attitudes - Positive attitude - Advantages –Negative attitude - Disadvantages - Ways to develop positive attitude - Difference between personalities having positive and negative attitude. Concept of motivation - Significance - Internal and external motives - Importance of self-motivation- Factors leading to de-motivation

UNIT-III: Interpersonal Relationship: (Periods: 11)

Term self-esteem - Symptoms - Advantages - Do's and Don'ts to develop positive self-esteem – Low self-esteem - Symptoms - Personality having low self-esteem - Positive and negative self-esteem. Interpersonal Relationships – Defining the difference between aggressive, submissive and assertive behaviors - Lateral thinking.

UNIT-IV: Overall personality development: (Periods: 12)

Other aspects of personality development: Body language, Problem-solving, Conflict and Stress Management, Decision making skills, Leadership and qualities of a successful leader. Character building, Team-work, Time management, Work ethics, Good manners and etiquette. Employability quotient: Resume building, The art of participating in Group Discussion. Facing the Personal (HR & Technical) Interview.

Reference Books:

1. “Personality Development and Soft Skills” by Barun Mitra
 2. The Only Skill That Matters by Jonathan A. Levi
 3. “Personality Development” by Swami Vivekananda
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Swami Ramanand Teerth Marathwada University, Nanded
Certificate, Diploma, Advanced Diploma and B. Voc. Degree (Agriculture and Allied
Faculties)

First Year (Semester II)

Paper-XI: Environmental Study (BAAGE-125)

Maximum Marks: 100

Credits: 4

Periods: 45

Unit-I: Ecosystems: (Periods: 11)

Introduction, Concept of an ecosystem. Structure and function of an ecosystem. Energy flow in the ecosystem. Food chains, food webs. Ecological pyramids: Introduction, types, characteristic features, structure and function of the following ecosystem: a. Forest ecosystem b. Aquatic ecosystems (ponds)

Unit-II: Biodiversity: (Periods: 11)

Introduction, Definition: genetic, species and ecosystem diversity. Biogeographical classification of India. Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values. India as a mega diversity nation. biodiversity Hot-spots of India. Threats to biodiversity: habitat loss, poaching of wildlife, man wildlife conflicts. Endangered and endemic species of India. Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

Unit-III: Environmental Biology: (Periods: 12)

Environmental Pollution; Introduction, Definition, Causes, effects and control measures of: a. Air pollution b. Water pollution c. Soil pollution d. Noise pollution f. Thermal pollution g. nuclear hazards. Disaster Management; Natural disaster- Earthquake, Tsunami, Cyclone, Tornado, Chemical Disaster- Bhopal Gas Tragedy, Nuclear Disaster- Chernobil.

Unit-IV: Natural Resources: (Periods: 11)

Renewable and Nonrenewable Resources; Solar Energy, Wind Energy. Forest Resources, Metal Mines, Crude Oil Mines. Sustainable development, Urban problems related to energy, Water conservation, rain water harvesting, watershed management. Resettlement and rehabilitation of people. Environmental ethics. Population growth, Population explosion.

REFERENCES:

1. Agarwal, K.C.2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.
2. Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd. Ahmedabad —

380 013, India, Email: mapin@icenet.net (R)

3. Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc.480p
 4. Clark R.S., Marine Pollution, Clanderson Press Oxford (TB)
 5. Cunningham, W. P. Cooper, T. H. Gorhani, E & Hepworth, M.T.2001. Environmental Encyclopedia, Jaico Publ. House. Mumbai, 1196p
 6. Dc A.K., Environmental Chemistry, Wiley Eastern Ltd.
 7. Down to Earth, Centre for Science and Environment(R)
 8. Gleick, 11.P. 1993. Water in crisis, Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute. Oxford Univ. Press. 473p
 9. Hawkins R.E, Encyclopedia of Indian Natural History, Bombay Natural History Society , Bombay (R)
 10. Heywood, VII & Watson, R.I. 1995 . Global Biodiversity Assessment. Cambridge Univ. Press 1140p. .
 11. Jadhav & Bhosale, V.M. 1995. Environmental Protection and Laws. Himalaya Pub. House, Delhi 284 p.
 12. Mckinney, M.L. & Schoch. R.M. 1996. Environmental Science systems & Solutions. Web enhanced edition. 639p.
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Swami Ramanand Teerth Marathwada University, Nanded

B. Voc. Food Processing Technology

First Year (Semester II)

Paper-XIII: Cereal Processing (FPT-123)

Marks: 100

Credits: 4

Periods: 45

Unit-I: Introduction to Cereal: (13 Period)

Present status and future prospects of cereals and millets; Morphology: physico-chemical properties; chemical composition and nutritive value Rice: Paddy processing and rice milling: conventional milling, modern milling, milling operations, milling machines, milling efficiency, byproducts of rice milling. Quality characteristics influencing final milled products. Parboiling: rice bran stabilization and its methods; Aging of rice; Enrichment – need, methods; processed foods from rice – breakfast cereals, flakes, puffing, canning and instant rice.

Unit-II: Wheat Processing: (10 Period)

Wheat: break system, purification system and reduction system; extraction rate and its effect on flour composition; Quality characteristics of flour and their suitability for baking.

Unit-III: Corn, Barley, Sorghum Processing: (12 Period)

Corn milling – dry and wet milling, starch and gluten separation, milling fractions and modified starches. Barley: Malting and milling Sorghum: milling, Malting, Pearling and industrial utilization

Unit-IV: Millets Processing: (10 Period)

Importance of Millet, composition, processing of millets for food uses, major and minor millets Products and Byproduct of cereal and millets: infant foods from cereals and millets, breakfast cereal foods – flaked, puffed, expanded, extruded and shredded products, etc.

Text Books:

1. Technology of Cereals Kent NL Woodhead Publishing 1983 ISBN: 9780080408347

2. Post-Harvest Technology of Cereals, Pulses and Oil seeds A. Chakravarthy Oxford and IBH Publishing Company, 2014
3. Modern Cereal Science & Technology Y. Pomeranz VCH Publishing, 1987 ISBN: 9780895733269

REFERENCE BOOKS:

1. Post-Harvest Biotechnology of Cereals Salunkhe D.K. CRC Press, 1985 ISBN: 9780849362880
 2. Handbook of Post-Harvest and Technology; Cereals, Fruit and Vegetables tea and spices. Chakraverty A., Mujumdar A.S. Hosahalli S.R. CRC Press 1990 ISBN: 9780203911310
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Swami Ramanand Teerth Marathwada University, Nanded

B. Voc. Food Processing Technology

First Year (Semester II)

Paper-XIV: Food Packaging Technology (FPT-124)

Marks: 100

Credits: 4

Periods: 45

Unit-I: Basics of Food Packaging Technology: (10 Period)

Introduction to Food Packaging Technology, Packaging situations in World and India Need of packaging, plastic consumption/use in World, India etc. Package requirements, package functions Hazards acting on package during transportation, Storage and atmospheric package, labeling laws.

Unit-II: Package Materials: (12 Period)

Introduction, Classification packages, paper as package material its manufacture, types, advantages corrugated and paper board boxes etc. Glass as package material, Manufacture, Advantages, disadvantages. Metal as package material-manufacture, Advantages, disadvantages Aluminum as package material, its advantages and disadvantages, plastic as package material classification of polymers, Properties of each plastics, uses of each plastics, chemistry of each plastic such as polyethylene, Polypropylene, polystyrene, polycarbonate, PVC, PVDC, Cellulose acetate, Nylon etc.

Unit-III: Packaging Aspects: (12 Period)

Lamination, Coating and Aseptic packaging, Lamination, need of lamination, types, properties, advantages & disadvantages of each type. Coating on paper & films, types of coatings. Need of coating, methods of coatings. Biodegradable and edible packaging, Aseptic packaging-Need, Advantages, process, comparison of conventional & aseptic packaging. System of aseptic packaging and materials used in aseptic packaging, Machineries used in Packing foods.

Unit-IV: Packaging of food: (11 Period)

Permeability – theoretical consideration, permeability of gases and vapours. Permeability of multilayer packages, permeability in relation to products. Packaging of Specific Foods with its properties like bread, biscuits coffee, milk powder, egg powder, carbonated beverages Snack foods etc, Mechanical and functional tests on package, Various mechanical functional testes perform in laboratories on package boxes and package materials.

Text Books:

1. Food Packaging: Principles and Practice, Third Edition Robertson G.L. CRC Press, 2012 ISBN: 9781439862414

2. Food Packaging Sacharow and Griffin AVI Publishing Company, 1980 ISBN:
9780870553479
3. Principles of Food Packaging R. Heiss Keppler, 1970

Reference Books:

1. Fundamentals of Packaging F.A. Paine Institute of Packaging, 1981 ISBN:
9780950756707
 2. Plastic Packaging: Properties, Processing and Applications Culter JD and Hernandez
RJ Hanser, 2004 ISBN: 9783446229082
 3. Food Packaging Technology Richard C, Derek M, Mark J.K. CRC Press, 2003 ISBN:
9780849397882
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Swami Ramanand Teerth Marathwada University, Nanded

B. Voc. Food Processing Technology

First Year (Semester II)

Paper-XV: Processing of Milk and Milk Products (FPT-125)

Marks: 100

Credits: 4

Periods: 45

Unit-I: Milk and milk products in India: (11 Period)

Introduction to milk products, Importance of milk processing plant in the country Handling and maintenance of dairy plant equipment. Dairy plant operations viz. receiving, separation, clarification, pasteurization, standardization, homogenization, sterilization, storage, transport and distribution of milk.

Unit-II: Milk Fermentation: (12 Periods)

Problems of milk supply in India, UHT, toned, humanized, fortified, reconstituted and flavoured milks. Technology of fermented milks (starter culture, dahi, yoghurt, shrikhand). Milk products processing viz. cream, butter, *ghee*, cheese, condensed milk, evaporated milk, whole and skimmed milk powder ice-cream, butter oil, *khoa*, *channa*, *paneer* and similar products.

Unit-III: Enzymes in milk processing: (11 Period)

Judging and grading of milk products Cheese spreads by spray and roller drying techniques, EMC (Enzyme modified cheese), Enzymes in dairy processing Insanitization viz. selection and use of dairy cleaner and sanitizer. Inplant cleaning system

Unit-IV: Milk processing industry: (10 Period)

Scope and functioning of milk supply schemes and various national and international organizations, Specifications and standards in milk processing industry, Dairy plant sanitation and waste disposal.

TEXT BOOKS:

1. Outline of Dairy Technology Sukumar De Oxford University Press, 2008
2. Indian Dairy Industry K.S.Rangappa and K L Acharya Asia publishing house, Mumbai
3. Technology of Milk Processing Khan QA and Padmanabhan ICAR, New Delhi

REFERENCE BOOK:

1. Principles of Dairy Processing J.N.Warner, Wiley Eastern Ltd, New Delhi
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Swami Ramanand Teerth Marathwada University, Nanded

B. Voc. Food Processing Technology

First Year (Semester II)

Paper-XVI: Practical Based on Cereal Processing (FPT-123)

Marks: 75

Credits: 3

Pr. No.	Practical Title
1	Determination of physical properties of cereal grains.
2	Determination of chemical properties of cereal grains Studies on cooking quality of cereals.
3	Preparation of malt, value added products from cereals and millets.
4	Production of modified starch;
5	Visit to milling industry

Swami Ramanand Teerth Marathwada University, Nanded

B. Voc. Food Processing Technology

First Year (Semester II)

Paper-XVII: Practical Based on Food Packaging Technology (FPT-124)

Marks: 75

Credits: 3

Pr. No.	Practical Title
1	Identification of Packaging Materials, measurement of Thickness of Packaging Films, papers and boards.
2	Measurement of water absorption of paper, paper boards; Measurement of bursting strength of paper and paperboard.
3	Measurement Tear resistance of papers; Measurement of puncture resistance of paper and paperboard; Measurement of tensile strength of paper of paper boards.
4	Determination of gas transmission rate of package films, Determination of WVTR of films Determination of coating on package materials.
5	Identification of plastic films.
6	Prepackaging practices followed for packing fruits and vegetables.

Swami Ramanand Teerth Marathwada University, Nanded

B. Voc. Food Processing Technology

First Year (Semester II)

Paper-XVIII: Practical Based on Processing of Milk and Milk Products

(FPT-125)

Marks: 75

Credits: 3

Pr. No.	Practical Title
1	Sampling and analysis of milk –Sp. gravity physico chemical properties and composition, DMC and DYC reduction tests, presence of adulterants and preservatives in milk.
2	Standardization of milk for markets, Clarification and separation of milk.
3	Heat processing of milk – Pasteurization.
4	Preparation of butter and Ghee, Preparation of dahi, shrikhand, Ice-cream preparation lassi.
5	Visit to Dairy plant.

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED

Choice Based Credit System (CBCS) (Semester Pattern)

Theory Examination

Question Paper Pattern (B.Voc.)

Maximum Marks: 75

Time: 3.00 Hrs

Q1. Long Answer Type Question(15 Marks).

OR

(a) Short Answer Type Question(8 Marks)

(b) Short Answer Type Question(7 Marks).

Q2. Long Answer Type Question(15 Marks).

OR

(a) Short Answer Type Question(8 Marks)

(b) Short Answer Type Question(7 Marks).

Q3. Long Answer Type Question(15 Marks).

OR

(a) Short Answer Type Question(8 Marks)

(b) Short Answer Type Question(7 Marks).

Q4. Long Answer Type Question(15 Marks).

OR

(a) Short Answer Type Question(8 Marks)

(b) Short Answer Type Question(7 Marks).

Q5. Write a short note on (**Any three** of following); (15 Marks)

(a)(5 Marks)

(b)(5 Marks)

(c)(5 Marks)

(d)(5 Marks)

(e)(5 Marks).

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED
Choice Based Credit System (CBCS) (Semester Pattern)
Practical Examination
Question Paper Pattern (B.Voc.)

Maximum Marks: 50

Time: 4.00 Hrs

- Q1.** Perform the Major Experiment(20 Marks).
- Q2.** (a) Perform the Minor Experiment(10 Marks).
(b) Describe procedure and working of the Minor Experiment(10 Marks).
- Q3.** (a) Viva -voce(5 Marks).
(b) Submission of Field Collection and Samplings during Field Visits
and Excursions.(5 Marks).
