



॥ सा विद्या या विमुक्तये ॥

स्वामी रामानंद तीर्थ मराठवाडा विद्यापीठ, नांदेड

'ज्ञानतीर्थ', विष्णुपुरी, नांदेड - ४३१ ६०६ (महाराष्ट्र राज्य) भारत

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED

'Dnyanteerth', Vishnupuri, Nanded - 431 606 (Maharashtra State) INDIA

स्वामी रामानंद तीर्थ
मराठवाडा विद्यापीठ, नांदेड

Established on 17th September, 1994, Recognized By the UGC U/s 2(f) and 12(B), NAAC Re-accredited with 'B++' grade

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विद्यापीठ अनुदान आयोगाने शैक्षणिक वर्ष २०२०-२१ पासून मान्यता दिलेल्या बी.व्होक कोर्सेसच्या II year चे अभ्यासक्रम शैक्षणिक वर्ष २०२१-२२ पासून लागू करणे बाबत.

प रि प त्र क

या परिपत्रकान्वये सर्व संबंधितांना कळविण्यात येते की, विद्यापीठ अनुदान आयोगाने मान्यता दिलेल्या बी. व्होक. पदवी अभ्यासक्रमास अभ्यासमंडळानी केलेल्या शिफारशीनुसार द्वितीय वर्षाचे अभ्यासक्रम शैक्षणिक वर्ष २०२१-२२ पासून लागू करण्याबाबत मा. कुलगुरू महोदयानी मा. विद्यापरिषदेच्या मान्यतेच्या अधीन राहून मान्यता दिली आहे. त्यानुसार खालील अभ्यासक्रम लागू करण्यात येत आहेत.

1. B. Voc. Horticulture and Post-Harvest Technology. II year
5. B. Voc. Herbal Medicine II year
6. B. Voc. Agriculture/Commercial Aquaculture. II year
7. B. Voc. Food Processing/Food Processing Technology./Food Processing and Technology II year

सदरील परिपत्रक व अभ्यासक्रम प्रस्तुत विद्यापीठाच्या www.srtmun.ac.in या संकेतस्थळावर उपलब्ध आहेत. तरी सदरील बाब ही सर्व संबंधितांच्या निदर्शनास आणून द्यावी. ही विनंती.

जा.क्र.:शैक्षणिक-१/परिपत्रक/व्होकेशनल अभ्यासक्रम/N-
२०२१-२२/३६२

दिनांक : १९.०४.२०२२

प्रत माहिती व पुढील कार्यवाहीस्तव :

- १) मा. अधिष्ठाता, विज्ञान व तंत्रज्ञान विद्याशाखा, प्रस्तुत विद्यापीठ.
- २) मा. संचालक, परीक्षा व मूल्यमापन मंडळ यांचे कार्यालय, प्रस्तुत विद्यापीठ.
- ३) प्राचार्य, सर्व संबंधित संलग्नित महाविद्यालये, प्रस्तुत विद्यापीठ.
- ४) अधीक्षक, परीक्षा विभाग विज्ञान विद्याशाखा, प्रस्तुत विद्यापीठ.
- ६) सिस्टम एक्सपर्ट, शैक्षणिक विभाग, प्रस्तुत विद्यापीठ. यांना देवून कळविण्यात येते की, सदरील परिपत्रक विद्यापीठ संकेतस्थळावर प्रसिध्द करण्यात यावे.

स्वाक्षरित
सहा.कुलसचिव
शैक्षणिक (१-अभ्यासमंडळ) विभाग

**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)

Second Year Semester III & IV

Faculty: Science and Technology

(w.e.f. 2021-22)

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/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	FPT-236	Fruits and Vegetables Processing	4	CC	4	75	25	100	
	Paper-XXIII	FPT-237	Wheat Milling and Baking Technology	4	CC	4	75	25	100	
	Paper-XXIV	FMS-232	Food Safety and Microbial Standards	4	CC	4	75	25	100	
	Practical Skill Courses									
	Paper-XXV	Practical based on FPT-236			2	PR	2	50	-	50
	Paper-XXVI	Practical based on FPT-237			2	PR	2	50	-	50
	Paper-XXVII	Practical based on FMS-232			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	FPT-248	Legumes and Oilseeds Technology	4	CC	4	75	25	100	
	Paper-XXXIII	FCN-241	Food Additives and Preservatives	4	CC	4	75	25	100	
	Paper-XXXIV	FE-241	Food Refrigeration and Cold Storage	4	CC	4	75	25	100	
	Practical Skill Courses									
	Paper-XXXV	Practical based on FPT-248			3	PR	3	50	25	75
	Paper-XXXVI	Practical based on FCN-241			3	PR	3	50	25	75
Paper-XXXVII	Practical based on FE-241			3	PR	3	50	25	75	
Summer	Compulsory Activity: 2 Months Industrial Training during Summer Vacation									

- 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 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.

Swami Ramanand Teerth Marathwada University, Nanded
Certificate, Diploma, Advanced Diploma and B.Voc Degree (Agriculture and Allied
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Second Year (Semester III)

Paper-XIX: ICT-Skill (BAAGE-237)

Maximum Marks: 100

Credits: 4

Periods: 45

Unit I: IT and its importance. IT tools, IT-enabled services and their impact on society; computer fundamentals; hardware and software; input and output devices; Types of Memory, Units used for measurement of memory. Features of machine language, assembly language, high-level language and their advantages and disadvantages;

Unit II: Principles of programming- algorithms and flowcharts; ER diagram. Operating Systems, definition and types; introduction to WINDOWS and LINUX Operating Systems;

Unit III: Audio visual aids - definition, advantages, classification and choice of A.V aids; cone of experience and criteria for selection and evaluation of A.V aids; video conferencing. Communication process, feedback and barriers to communication.

Unit IV: Database, concepts and types, uses of DBMS/RDBMS in Agriculture Database design. Smartphone Apps in Agriculture for farm advises, market price, postharvest management etc; Geospatial technology for generating valuable agri information Decision support systems, concepts, components and applications in Agriculture, Agriculture Expert System, Soil Information Systems etc. for supporting Farm decisions Communication process, feedback and barriers to communication.

Reference books:

1. Gurvinder Singh, Rachhpal Singh & Saluja KK. 2003. Fundamentals of Computer Programming and Information Technology. Kalyani Publishers.
 2. Harshawardhan P. Bal. 2003. Perl Programming for Bioinformatics. Tata McGraw-Hill Education.
 3. Kumar A 2015. Computer Basics with Office Automation. IK International Publishing House Pvt Ltd.
 4. Rajaraman V & Adabala N. 2015. Fundamentals of Computers. PHI.
 5. *e-reading:* <http://ecourses.iasri.res.in/>
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Swami Ramanand Teerth Marathwada University, Nanded
Certificate, Diploma, Advanced Diploma and B.Voc Degree (Agriculture and Allied
Faculties)

Second Year (Semester III)

Paper-XX: Entrepreneurship Development (BAAGE-238)

Maximum Marks: 100

Credits: 4

Periods-45

Unit-I: Concept of entrepreneurship:

Entrepreneurship, functions of entrepreneur. Entrepreneurial characteristics, Distinction between an entrepreneur and a manager, Agri-entrepreneurship- concept, need and scope. Assessing overall business environment in Indian economy. globalization, and implications of social, political and economic systems on entrepreneurship. Entrepreneurship development programmes (EDPs) - objectives, phases, problems of EDPs, Criteria for assessment or evaluation of EDPs.

Unit-II: Role of entrepreneurship:

Generation, incubation and commercialization of business ideas. Role of entrepreneurship in economic development, Motivation and entrepreneurship development, Managing an enterprise. Importance of planning, budgeting, monitoring, evaluation and follow up in running an enterprise. Researching / managing competition- ways to define possible competitors, competitive information, SWOT analysis-concept, meaning and advantages

Unit-III: Forms of Ventures:

Venture capital- concept, aims, features, financing steps sources, criteria to provide venture capital finance, Export & Import policies relevant to agriculture sector. Forms of business- contract farming, joint venture and public private partnership. An overview of agricultural input industry in India; fertilizer, pesticide, seed and farm machinery industry. Over view of Indian agricultural processing industry.

Unit-IV: Social responsibility and business ethics:

Project- meaning, importance, components & preparation. Government schemes and incentives for promotion of entrepreneurship and government policy on small and medium enterprises. Supply chain management- meaning, advantages, stages, process, drivers and scope of agri-supply chain management, Women entrepreneurship-concept, problems and development of women entrepreneurs.

Swami Ramanand Teerth Marathwada University, Nanded

B. Voc. Food Processing Technology

Second Year (Semester III)

Paper-XXII: Fruits and Vegetables Processing (FPT-236)

Marks: 100

Credits: 4

Periods: 45

Unit-I: Introduction to Production and Processing:

Production and processing scenario of fruits and vegetables in India and World. Scope of fruit and vegetable preservation industry in India. Present status, constraints and prospects, Overview of principles and preservation methods of fruits and vegetables.

Unit-II: Commercial processing technology:

Commercial processing technology of fruits and vegetables, Primary processing and pack house handling of fruits and vegetables; Peeling, slicing, cubing, cutting and other size reduction operations for fruits and vegetables, Minimal processing of fruits and vegetables Blanching operations and equipment.

Unit-III: Preparation and Preservation:

Canning: Definition, processing steps, and equipment, cans and containers, quality assurance and defects in canned products, Preparation and preservation of juices, squashes, syrups, sherbets, nectars, cordials, etc; Problems on squash and RTS; Processing and equipment for above products and FSSAI specification Preparation, preservation and machines for manufacture of crystallized fruits and preserves, jam, jelly and marmalades, problems, candies, Preparation, preservation and machines for manufacture of preserve, concentrate, fruit wine, sauerkraut, chutney, pickles, sauce, puree, paste, ketchup; toffee, cheese, lather, dehydrated, wafers and papads, soup powders; FSSAI specification.

Unit-IV: Food Preservatives:

Production of pectin and vinegar; Commercial processing technology of selected fruits and vegetables for production of various value added processed products.

References:

1. Fruit and Vegetable Preservation Principles and Practices Srivastava R.P. and Sanjeev Kumar International Book Distributing Company, New Delhi 2005.
 2. Preservation of Fruits and Vegetable G. Lal, G.S. Siddappa, G.L. Tandan ICAR Publication, New Delhi 1996.
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Swami Ramanand Teerth Marathwada University, Nanded

B. Voc. Food Processing Technology

Second Year (Semester III)

Paper-XXIII: Wheat Milling and Baking Technology (FPT-237)

Marks: 100

Credits: 4

Periods: 45

Unit-I: Nutritional Properties of Wheat:

Wheat – importance, production varieties used for cultivation, Types of wheat, grading and quality of wheat Structure of wheat chemical constituents, their distribution, Physico-chemical and Rheological properties, Enzymes in wheat, damage wheat.

Unit-I: Introduction to Wheat Milling:

Conditioning of wheat – principles and methods of conditioning, Milling of wheat – Roller flour milling process Break rolls, reduction rolls, The design and operation, Wheat milling process, Products of wheat milling industry, flour, atta, etc. flour grades, supplementation, Fortification, Flour additives, flour improvers, Bleaching, Oxidizing agents.

Unit-III: Introduction to Bakery Technology:

Bakery products, role of bakery ingredients (major and minor), from hard wheat: bread processes of bread making using straight and sponge, dough methods role of each ingredient, quality control Testing of raw material testing of final product Bread faults, staleness, roppiness.

Unit-IV: Bakery Products:

Baked Products from soft wheat: cookies, crackers, biscuits, cakes: types, ingredients, process, fault causes and remedy Other bakery products: using very hard wheat. pizza, pastry and its types. Macaroni products: Including spaghetti, noodles, vermicelli-process. Nutritional improvement of bakery products setting of bakery unit, bakery norms, specifications for raw materials, Packaging, marketing of products, project report preparation

TEXT BOOKS:

1. Bakery Science and Cereal Technology Khetarpaul. And Daya Books, New Delhi 2005.
2. Flour Milling Process Scott JH Chapman & Hall, 1951.
3. Bakery Products Science and Technology Zhou and Hui John Wiley and Sons, 2014

REFERENCE BOOKS:

1. Dough Wheat and Baked Products Faridi and Faubin Springer, 2012
 2. Modern Bakery Products EIRI EIRI Publication, New Delhi
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Swami Ramanand Teerth Marathwada University, Nanded

B. Voc. Food Processing Technology

Second Year (Semester III)

Paper-XXIV: Food Safety and Microbial Standards (FMS-232)

Marks: 100

Credits: 4

Periods: 45

Unit-I: Importance of Food Safety:

Hazards in food chain: physical, chemical and biological. Importance of Food Safety.

Unit-II: Food Toxins:

Biological Toxins in food: naturally occurring, bacterial and fungal Intrinsic toxins produced during processing and storage Metals as toxins: Sources, contamination, toxicity and elimination Pesticide residues as toxin:

Unit-III: Food Additives:

Chlorinated and nonchlorinated Permitted and non-permitted food additives as an amended Microbial standards of fresh and processed foods.

Unit-IV: HACCP:

Risk assessment and management during food preparation.

TEXT BOOK:

1. Food Safety and Toxicology Vries JD CRC Press, 1996.
2. Food Safety: Theory and Practice Knechtges PL Jones and Bartlett Publishers, 2011.
3. Principles of Food Sanitation Marriot and Gravi Springer, 2006.

REFERENCE BOOKS:

4. The Safety of Foods Graham HD AVI Publishing 1968.
 5. Food Safety Management: A
 6. Practical Guide for the Food Industry Yasmine and Huub Academic Press, 2013
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B. Voc. Food Processing Technology

Second Year (Semester III)

Paper-XXV: Fruits and Vegetables Processing (FPT-236)

Marks: 50

Credits: 2

Pr. No.	Practical Title
1	Primary processing of selected fruits and vegetables
2	Canning of mango/guava/ papaya
3	Preparation of jam/ jelly/ marmalade from selected fruit
4	Preparation of squash
5	Preparation of dried fig / banana fig
6	Preparation of fruit candy
7	Preparation of fruit toffee
8	Preparation of pickle
9	Preparation of dried onion/garlic/ginger
10	Preparation of banana/ potato wafers
11	Preparation of dehydrated tomato powder
12	Visit to fruits and vegetables processing unit

Swami Ramanand Teerth Marathwada University, Nanded

B. Voc. Food Processing Technology

Second Year (Semester III)

Paper-XXVI: Wheat Milling and Baking Technology (FPT-237)

Marks: 50

Credits: 2

Pr. No.	Practical Title
1	Determination of physical properties of cereal grains
2	Determination of chemical properties of cereal grains
3	Germination of grains
4	Studies on cooking quality of cereals (cooking time, grain elongation, etc)
5	Functional properties of different cereal flour
6	Determination of starch content of cereal
7	Determination of amylase content of rice
8	Determination of fat acidity of cereals

Swami Ramanand Teerth Marathwada University, Nanded

B. Voc. Food Processing Technology

Second Year (Semester III)

Paper-XXVII: Food Safety and Microbial Standards (FMS-232)

Marks: 50

Credits: 2

Pr. No.	Practical Title
1	Estimation of Salmonella / Shigella / Staphylococcus from food samples
2	Estimation of fungal toxins from different foods (Different types of foods)
3	Detection of Lead
4	Detection of Bacillus cereus
5	Detection of Campylobacter
6	Detection of Escherichia coli and coliforms
7	HACCP for food industries by taking few models
8	Study of National and International microbial quality standards
9	Visit to food industry to study microbial safety

Swami Ramanand Teerth Marathwada University, Nanded
Certificate, Diploma, Advanced Diploma and B.Voc Degree (Agriculture and Allied
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Second Year (Semester IV)

Paper-XXIX: Agriculture Extension (BAAGE-2410)

Maximum Marks: 100

Credits: 4

Periods: 45

Unit-I: Introduction to Extension Education:

Extension Education-Meaning, definition, need, scope and process; history, objectives, philosophy, principles and approaches. Extension Programme Planning- Meaning, process, principles and steps in programme development. Present extension System : Department of Agriculture : Structure, Function.

Unit-II: Extension Programme:

Various extension/ agriculture development programmes launched by ICAR/ Government of India: Introduction, Objectives and Salient Achievements Intensive Agricultural District Programme (IADP), Intensive Agricultural Area Programme (IAAP), High Yielding Varieties Programme (HYVP), Institution-Village Linkage Programme (IVLP) 151, Operational Research Project (ORP), National Agricultural Technology Project (NATP), Rashtriya Krishi Vikas Yojana (RKVY).

Unit-III: Cyber Extension Programme:

New trends in agricultural extension: Meaning , Objectives, Salient features, Privatization in extension, ICT in Extension education - Cyber extension/ e-extension, Market-led extension, Farmer-led extension.

Unit-IV: Rural Development Extension Programme:

Rural Development: Concept, meaning, definition, objectives. Various rural development programmes launched by Government of India : Introduction, Objectives and salient features Swarnajayanti Gram SwarajYojana (SGSY), Indira AwasYojana (IAY), Mahatma Gandhi National Rural Employment Guarantee Act, Prime Ministers' RozgarYojana (PMRY), District Rural Development Agency (DRDA), Integrated Watershed Development Programme (IWDP) Capacity building of extension personnel and farmers : Meaning, Training and Education, Types of training, Training institutes in India, Concept of Human Resource Development.

Suggested Readings:

1. Dahama, O.P. and Bhatnagar, O.P. 1980. Education and Communication for

Development. Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.

2. Dudhani, C.M.; Hirevenkatgoudar, L.V., Manjunath, L.; Hanchinal, S.N. and Patil, S.L. (2004). Extension Teaching Methods and Communication Technology, UAS, Dharwad.
 3. Kamat, M.G. (1985). Writing for Farm Families. Allied Publishers, New Delhi.
 4. Kelsey, L.D. and Hearne, G.C. (1963). Cooperative Extension Work, Comstar Publishing Associate, New York.
 5. Mehta, D.S.(1981). Mass Communication and Journalism in India. Vikas Publication, New Delhi.
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Swami Ramanand Teerth Marathwada University, Nanded
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Second Year (Semester IV)

Paper-XXX: Agriculture Business Management (BAAGE-2411)

Maximum Marks: 100

Credits: 4

Periods: 45

Unit I: Introduction of agriculture Business Management:

Definition, history and scope of agri-business (Input, Farm Product Sectors). Importance of agri-business in the Indian economy. Agri-business Management-distinctive features, nature and components. Introduction to management-Management functions -Management levels-Managerial roles Management skills-Definitions of management-Role of management. Elements, Levels, Process & Functions of Management, Functions of Management:

Unit II: Planning of agribusiness management:

Planning: Definition importance, characteristics, Steps in planning. Types of planning; Forms of planning, Nature and importance, Purpose of planning, Steps in planning , Limitations of planning.

Unit III: Organization of agribusiness management:

Organization: Meaning, definition, importance, Characteristics, Nature of organization. Principles & Process of organization. Directing; definition, functions, techniques, qualities of good supervisor.

Unit IV: Controlling and Farm business analysis:

Controlling –Definition, Elements, Process of control, Techniques, Tools of control. Farm business analysis; Farm efficiency measures, farm financial & cash accounts, Net worth statement, systems of book keeping.

Reference Books:

1. K.Loknandhan, K.Mani, K.Mahendran Innovations in AB
 2. D.K.Tripathi Principles & Practices of Management.
 3. S.S.Johl, T.R.Kapoor Fundamentals of farm business management
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Swami Ramanand Teerth Marathwada University, Nanded

B. Voc. Food Processing Technology

Second Year (Semester IV)

Paper-XXXII: Legumes and Oilseeds Technology (FPT-248)

Marks: 100

Credits: 4

Periods: 45

Unit-I: Introduction to legumes and Oilseeds:

Present status and future prospects of legumes and oilseeds; Morphology of legumes and oilseeds; Classification and types of legumes and oilseeds.

Unit-II: Nutritional Value of Legumes and Oilseeds:

Anti-nutritional compounds in legumes and oilseeds; Methods of removal of anti-nutritional compounds,

Unit-III: Milling Aspects:

Milling of legumes: home scale, cottage scale and modern milling methods, milling quality, efficiency and factors affecting milling; problems in dhal milling industry, Soaking and germination of pulses, Cooking quality of legumes – factors affecting cooking quality, Oilseeds: composition, methods of extraction.

Unit-IV: Refining and Byproducts:

Desolventization and refining of oils: degumming, neutralization bleaching, filtration, deodorization, etc. New technologies in oilseed processing, Utilization of oil seed meals for food uses i.e. high protein products like concentrate, isolates Byproduct of pulses and oil milling and their value addition.

Text Books:

1. Post-harvest technology of cereals: pulses and oilseeds Chakraverty A. Oxford & ibh publishing company, 1988 isbn: 9788120402898
2. Bailey's Industrial Oil & Fat Products Bailey A.E. and Shahidi F. Wiley Publciation, 2005 ISBN: 9780471385462

REFERENCE BOOKS:

1. Food and Feed from Legumes and Oilseeds Smartt J and Nwokolo E. Springer, 2012 ISBN: 9781461304333
 2. Legumes and Oilseed Crops Bajaj YPS Springer, 2012 ISBN: 9783642744488
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Swami Ramanand Teerth Marathwada University, Nanded

B. Voc. Food Processing Technology

Second Year (Semester IV)

Paper-XXXIII: Food Additives and Preservatives (FCN-241)

Marks: 100

Credits: 4

Periods: 45

Unit-I: Introduction to Food Additives:

Introduction to Food Additives, Scope of food additives; Functions and uses of Food Additives; Classification- Intentional & Unintentional Food additives; Types of food additives Toxicology and Safety Evaluation of Food Additives: Effects of Food Additives; Food Additives generally recognized as safe (GRAS); Tolerance levels & Toxic levels in Foods; Legal safeguard; Risks of food additives

Unit-II: Classification of Food Additives and Preservatives:

Naturally occurring food additives: Classification; Health Implications; Role in Foods Acidulants: Introduction; Different acidulants; Role in food processing Food colorants: Introduction; Natural & Synthetic food colorants; Classification of Food colorants; Chemical nature; Impact on health. Pigments: Importance; Classification: Utilization as food color Food Preservatives : Introduction; Classification- Natural & chemical preservatives; Mode of action; Role in Food processing.

Unit-III: Antioxidants & chelating agents:

Antioxidants & chelating agents: Introduction; Role in foods; Types of antioxidants -natural & synthetic; Mode of action of antioxidants in foods; Chelating agents- Naturally & synthetic; Mode of action of chelating agents; Applications of antioxidants and chelating agents Stabilizers, thickeners and Emulsifiers: Introduction; Types; Applications in food processing; Sweeteners: Introduction; Classification- Artificial sweeteners & Non-nutritive sweeteners; Health implications; Role in food processing. Bleaching & maturing agents: Introduction; Different bleaching & maturing agents; Role in food processing Taste and

Unit-IV: Flavoring agents:

Flavoring agents: Introduction; Classification of flavors- natural & synthetic; Flavor enhancer/ Potentiator; Importance of taste and flavours; Role of flavoring agents in food processing. Anti-caking agents and Humectants: Introduction; Different Anti-caking agents and Humectants; Role in food processing Starch modifiers: Introduction; Chemical nature; Role in food processing. Antimicrobial agents, Clarifying agents, antifoaming agents, Fat mimetics and replacers: Introductions; Role in food processing;

Text Books:

1. Food Additives A Larry Branen, P Michael Davidson and Seppo Salminen CRC Book Press. USA.
2. Food Additives S.N. Mahindru APH Publishing Corporation, Drya Ganj, New Delhi.
3. Food colours, Flavours and Additives Technology Handbook NIIR Board of Consultants and Engineers Natonal Institute of Industrial Research, Kamla Nagar, Delhi

Reference Books:

1. Food chemistry H.D. Belitz, W. Grosh and P. Schieberle 4 th Revised & Extended Edition, Springer. 2009
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Swami Ramanand Teerth Marathwada University, Nanded

B. Voc. Food Processing Technology

Second Year (Semester IV)

Paper-XXXIV: Food Refrigeration and Cold Storage (FE-241)

Marks: 100

Credits: 4

Periods: 45

Unit-I: Principles of refrigeration:

Definition, background with second law of thermodynamics, unit of refrigerating capacity, coefficient of performance; Production of low temperatures Common refrigerants and their properties: classification, nomenclature, desirable properties of refrigerants- physical, chemical, safety, thermodynamic and economical Azeotropes;

Unit-II: Refrigeration Systems:

Components of vapour compression refrigeration system, evaporator, compressor, condenser and expansion valve Ice manufacture, principles and systems of ice production, Treatment of water for making ice, brines, freezing tanks, ice cans, air agitation, quality of ice Cold storage:

Unit-III: Refrigeration Systems Designing:

Cold store, design of cold storage for different categories of food resources, size and shape, construction and material, insulation, vapour barriers, floors, frost-heave, interior finish and fitting, evaporators, automated cold stores, security of operations Refrigerated transport: Handling and distribution, cold chain, refrigerated product handling, order picking, refrigerated vans, refrigerated display.

Unit-III: Air-conditioning Systems:

Air-conditioning: Meaning, factors affecting comfort air-conditioning, classification, sensible heat factor, industrial air-conditioning Problems on sensible heat factor; Winter/summer/year round air conditioning, unitary air-conditioning systems, central air-conditioning Physiological principles in air conditioning, air distribution and duct design methods Design of complete air-conditioning systems; humidifiers and dehumidifiers Cooling load calculations: Load sources, product cooling, conducted heat, convected heat, internal heat sources, heat of respiration, peak load; etc

TEXT BOOKS:

1. Refrigeration and Air Conditioning C.P. Arora 2 nd Ed. Tata McGraw-Hill Publishing Co. Ltd., New Delhi. 2000
 2. Basic Refrigeration and Air Conditioning Ananthanarayan PN 4 th Edition, McGraw Hill, Delhi 2013
 3. Refrigeration and Air Conditioning Hundy GF, Trott AR and Welch TC Elsevier,
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Swami Ramanand Teerth Marathwada University, Nanded

B. Voc. Food Processing Technology

Second Year (Semester IV)

Paper-XXXV: Legumes and Oilseeds Technology (FPT-248)

Marks: 75

Credits: 3

Pr. No.	Practical Title
1	Determination of physical properties of legumes/oilseeds
2	Determination of antinutritional factors in legumes
3	Puffing of legumes
4	Preparation of composite legume flour
5	Preparation of soy milk and soy paneer
6	Preparation of protein isolate
7	Measurement of physico-chemical properties of oils
8	Preparation of peanut butter
9	Visit to dhal mill and oil mill

Swami Ramanand Teerth Marathwada University, Nanded

B. Voc. Food Processing Technology

Second Year (Semester IV)

Paper-XXXVI: Food Additives and Preservatives (FCN-241)

Marks: 75

Credits: 3

Pr. No.	Practical Title
1	Evaluation of GRAS aspects of Food Additives
2	E numbers for different food additives
3	Qualitative Tests for presence of benzoic acid in foods
4	Qualitative Tests for presence of sulphurous acid in foods
5	Qualitative for presence of non-nutritive sweeteners
6	Identification of colorsin food by TLC
7	Determination of diacetyl content in dairy products
8	Detection of chemical preservatives in foods
9	Study of effect of stabilizers/thickeners on quality of foods
10	Role and mode of action of antioxidant in food products

Swami Ramanand Teerth Marathwada University, Nanded

B. Voc. Food Processing Technology

Second Year (Semester IV)

Paper-XXXVII: Food Refrigeration and Cold Storage (FE-241)

Marks: 75

Credits: 3

Pr. No.	Practical Title
1	Study of vapour compression refrigeration system
2	Determination of COP of vapour compression refrigeration system
3	Study of various types of compressors and condensers used in refrigeration system
4	Study of various types of evaporative coils and expansion valves used in refrigeration system
5	Study of direct and indirect contact freezing equipments for foods
6	Study of spray freezing process for food
7	Study of food cold storage
8	Study of refrigeration system for dairy plant
9	Study of cooling system for bakery and estimation of refrigeration loads
10	Study of refrigerated display of foods and estimation of cooling load

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).
