



॥ 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

B. Voc. Degree in

Horticulture and Post-Harvest 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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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.

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 Horticulture and Post-Harvest 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 Horticulture 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 horticultural 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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Swami Ramanand Teerth Marathwada University, Nanded

Syllabus structure for, B.Voc. Horticulture and Post-Harvest Technology

	Paper No.	Course Number	Course Title	Hr/Week	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	HORT-235	Ornamental Horticulture	4	CC	4	75	25	100
	Paper-XXIII	HORT-236	Weed Management in Horticultural Crops	4	CC	4	75	25	100
	Paper-XXIV	H/FL-231	Commercial Floriculture	4	CC	4	75	25	100
	Practical Skill Courses								
	Paper-XXV	Practical Based on HORT-235		2	PR	2	50	-	50
	Paper-XXVI	Practical Based on HORT-236		2	PR	2	50	-	50
	Paper-XXVII	Practical Based on H/FL-231		2	PR	2	50	-	50
	Paper-XXVIII	Report on Summer Activity		-	PR	3	75		75
Sem. IV	Paper No.	Course Number	Course Title	Hr/Week	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	HORT-247	Processing of Horticultural Crops	4	CC	4	75	25	100
	Paper-XXXIII	HORT-248	Dry Land Horticulture	4	CC	4	75	25	100
	Paper-XXXIV	H/FL-242	Orchard and Estate Management	4	CC	4	75	25	100
	Practical Skill Courses								
	Paper-XXXV	Practical Based on HORT-247		3	PR	3	50	25	75
	Paper-XXXVI	Practical Based on HORT-248		3	PR	3	50	25	75
	Paper-XXXVII	Practical Based on H/FL-242		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 Faculties)

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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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.

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B.Voc Degree Horticulture & Post Harvest Technology

Second Year (Semester III)

Paper-XXII: Ornamental Horticulture (HORT-235)

Marks: 100

Credits: 4

Unit-I: Introduction to Ornamental Horticulture:

History, definitions, scope of ornamental horticulture, aesthetic values, Floriculture industry, Importance, area and production, industrial importance of ornamental plants and flowers.

Unit-II: Classification of Ornamental Plants:

Importance, classification, design values and general cultivation aspects for ornamental plants viz. Annuals, biennales herbaceous perennials, grasses and bulbous ornamentals. shrubs, climbers, trees, indoor plants, palms and cycads, ferns and sellagenellas, cacti and succulents,

Unit-III: Garden Designing:

Importance, design and establishment of garden features/components viz. hedge, edge, borders, flower beds, bridges, paths, drives, fences, garden walls, gates, carpet bed, arbour, Patio, decking, retaining walls, shade garden, sunken garden, roof garden, terrace garden, pebble garden, rockery, pools, waterfalls, fountains, bog garden, avenue planting and children garden. Lawn types, establishment and maintenance. Importance of Garden adornments viz. floral clock, bird bath, statutes, sculptures, lanterns, water basins, garden benches etc.

Unit-IV: Application of Gardening:

Importance of flower arrangement, Ikebana, techniques, types, suitable flowers and cut foliage, uses of vertical garden, bottle garden, terrariums, art of making bonsai, culture of bonsai and maintenance.

Suggested Reading:

- Arora, J.S. 2006. Introductory Ornamental Horticulture. Kalyani Publishers, Ludhiana
- Bimaldas Chowdhury and Balai Lal Jana.2014.Flowering Garden trees. Pointer publishers, Jaipur. India.
- Bose, T.K. Mukherjee, D. 2004. Gardening in India. Oxford & IBH Publishers.
- Randhawa, G.S. Amitabha Mukhopadhyay, 2004. Floriculture in India. Allied Publishers Pvt. Ltd., New Delhi.
- Richard Bird. 2002. Flowering trees and shrubs. Printed in Singapore by Star Standard Industries pvt. Ltd.

e-reading: <http://ecourses.iasri.res.in/>

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B.Voc Degree Horticulture & Post Harvest Technology

Second Year (Semester III)

Paper-XXIII: Weed Management in Horticulture Crops (HORT-236)

Marks: 100

Credits: 4

Unit-I: Introduction to Weeds:

Definition, introduction, harmful and beneficial effects, classification, propagation and dissemination, weed biology and ecology, crop weed association, crop weed competition and allelopathy.

Unit-II: Weed Control:

Concepts of weed prevention control and eradication, Methods of weed control: physical, cultural, chemical and biological methods.

Unit-III: Herbicides:

Integrated weed management, Herbicides: advantages and limitation of herbicide usage in India, Herbicide classification, formulations, methods of application, Introduction to Adjuvants and their use in herbicides; Introduction to selectivity of herbicides; Compatibility of herbicides with other agro chemicals;

Unit-IV: Weed Management:

Weed management in major field and horticultural crops, shift of weed flora in cropping systems, aquatic and problematic weeds and their control.

Suggested Reading:

- Crafts, A.S. and Robbins, W.W. 1973. *Weed Control*. Tata McGraw-Hill Publishing Co. Ltd., New Delhi.
 - Chadha, K.L. (ICAR) 2002, 2001. *Hand book of Horticulture*. ICAR, New Delhi
 - Gupta, O.P. 1984. *Scientific Weed Management*. Today and Tomorrow Printers and Publishers, New Delhi.
 - Gupta, O.P. 2015. *Modern Weed Management*. Agro Bios (India), Jodhpur.
 - Naidu, V.S.G.R., *Handbook of Weed Identification*. Directorate of Weed Research, Jabalpur.
 - Rajagopal, A., Aravindan, R. and Shanmugavelu, K.G., 2015. *Weed management of Horticultural Crops*. Agrobios (India), Jodhpur.
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B.Voc Degree Horticulture & Post Harvest Technology

Second Year (Semester III)

Paper-XXIV: Commercial Floriculture (H/FL-231)

Marks: 100

Credits: 4

Unit-I: Introduction to commercial floriculture:

Scope and importance of commercial floriculture in India, Production techniques of ornamental plants for domestic and export market for following flower crops.

Unit-II: Production of Flowers:

Rose, Marigold, Chrysanthemum, Anthurium, Gladiolus, Jasmine, Dahlia, Tuberose, Bird of Paradise, China Aster, gaillardia, Gerbera, Orchid, Crossandra.

Unit-III: Protected Cultivation:

Growing of flowers under protected environments such as glass house, plastic house, net house, Green House etc.

Unit-IV: Post-Harvest Technology:

Post-harvest technology of cut and loose flowers in respect of commercial flower crops. Dehydration techniques for drying of flowers, scope, importance and status. Production techniques for bulbous crops.

Suggested Reading:

- A.K.Singh.2006.*Flower crops, cultivation and management*. New India publishing agency, Pitampura, New Delhi.
 - Arora, J.S. 2006. *Introductory Ornamental Horticulture*. Kalyani Publishers, Ludhiana - 141 008.
 - Bhattacharjee, S.K. *Advanced Commercial Floriculture*. Aavishkar Publishers Distributors, Jaipur - 320 003
 - Dewasish Choudhary and Amal Mehta. 2010. *Flower crops cultivation and management*. Oxford book company Jaipur, India.
 - Randhawa, G.S. Amitabha Mukhopadhyay, 2004. *Floriculture in India*. Allied Publishers Pvt. Ltd:
 - *e-reading: <http://ecourses.iasri.res.in/>*
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Swami Ramanand Teerth Marathwada University, Nanded
B.Voc Degree Horticulture & Post Harvest Technology
Second Year (Semester III)

Paper-XXV: Practical based on Ornamental Horticulture (HORT-235)

Marks: 50

Credits: 2

Pr. No.	Practical Title
1	Identification and description of annuals, herbaceous, perennials.
2	Identification and description of climbers, creepers, foliage flowering shrubs
3	Flower arrangement practices
4	Bonsai practicing and training
5	Identification and description of ornamental grasses; cacti succulents.
6	Planning and designing gardens-Formal
7	Planning and designing gardens- Informal
8	Functional uses of plants in the landscape
9	Planning design of house garden, roadside planting, avenues for new colonies, traffic islands
10	Preparation of land for lawn and planting.
11	Maintenance of Lawn
12	Description and design of garden structures

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B.Voc Degree Horticulture & Post Harvest Technology
Second Year (Semester III)
Paper-XXVI: Practical based on
Weed Management in Horticulture Crops (HORT-236)

Marks: 50

Credits: 2

Pr. No	Practical Title
1	Identification of weeds;
2	Survey of weeds in orchard other habitats
3	Survey of weeds in other habitats
4	Preparation of herbarium of weeds
5	Herbicide label information
6	Various methods of weed control in orchard
7	Mechanical method of weed control
8	Chemical method of weed control
9	Biological method of weed control
10	Study of phyto-toxicity symptoms of herbicides in different crops

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B.Voc Degree Horticulture & Post Harvest Technology

Second Year (Semester III)

Paper-XXVII: Practical based on Commercial Floriculture (H/FL-231)

Marks: 50

Credits: 2

Pr. No	Practical Title
1	Identification of commercially important floricultural crops.
2	Propagation technique in gladiolus, carnation.
3	Propagation technique in chrysanthemum and tuberose.
4	Sowing of seeds and raising of seedlings of annuals.
5	Propagation of ornamental plants with particular reference to cutting
6	Propagation of ornamental plants with particular reference to layering
7	Propagation of ornamental plants with particular reference to budding
8	Training and pruning of roses.
9	Drying and preservation of flowers.
10	Visit to commercial floriculture unit

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Certificate, Diploma, Advanced Diploma and B. Voc. Degree (Agriculture and Allied Faculties)

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 SwarajgarYojana (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
Certificate, Diploma, Advanced Diploma and B. Voc. Degree (Agriculture and Allied
Faculties)

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. Degree Horticulture & Post Harvest Technology

Second Year (Semester IV)

Paper-XXXII: Processing of Horticultural Crops (HORT-247)

Marks: 100

Credits: 4

Unit-I: Fruit and vegetable preservation:

Importance and scope of fruit and vegetable preservation industry in India, food pipeline, losses in post-harvest operations, unit operation in food processing.

Unit-II: Processing Units:

Principles and guidelines for the location of processing units. Principles and methods of preservation by heat pasteurization, canning, bottling.

Unit-II: Preparation Methodologies:

Methods of preparation of juices, squashes, syrups, cordials and fermented beverages viz., wine, cider and neera. Jam, jelly and marmalade.

Unit-II: Preservation Techniques:

Preservation by sugar and chemicals, candies, crystallized fruits, preserves chemical preservatives, preservation with salt and vinegar, pickling, chutneys and sauces, tomato and mushrooms, freezing preservation. Processing of plantation crops, products, spoilage in processed foods, quality control of processed products, Govt. policy on import and export of processed fruits. Food laws.

Reference Books:

- Bhatti, S. 1995. Vame, Fruit and vegetable processing. CBS Publishers, Distributors, New Delhi.
- Chadha, K. L. 2003. Hand book of horticulture, ICAR, New Delhi.
- Chadha, K. L. and Kalloo, G. 1993. Advances in Horticulture. Vol. 4 to 10. MPH, New Delhi
- Fruit and vegetable processing. International Book Distribution Co, Lucknow.
- Verma, L. R. and Joshi, V. K. 2000. Post-Harvest Technology of Fruits and Vegetables. Vol. I & II. Indus Publishing Co., New Delhi.
- Vijay, K. 2001. Text Book of Food Sciences and Technology. ICAR, New Delhi.

e-reading: <http://ecourses.iasri.res.in/>

www.fssai.org

http://www.fao.org/infoods/index_en.stm

<http://www.postharvest.com.au>

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B. Voc. Degree Horticulture & Post Harvest Technology

Second Year (Semester IV)

Paper-XXXIII: Dry Land Horticulture (HORT-248)

Marks: 100

Credits: 4

Unit-I: Introduction to Dry Land Horticulture:

Definition, importance and limitations of dry land horticulture. Present status and future scope. Constraints encounter in dry lands.

Unit-II: Techniques and management of dry land horticulture:

Agro-climatic features in rain shadow areas, scarce water resources, high temperature, soil erosion, run-off losses etc. Techniques and management of dry land horticulture. Watershed development, soil and water conservation methods-terraces, contour bunds, etc.

Unit-III: Water Management:

Methods of control and impounding of run-off water-farm ponds, trenches, macro catch pits, etc., *in-situ* water harvesting methods, micro catchment, different types of tree basins etc. Methods of reducing evapotranspiration, use of shelter belts, mulches, antitranspirants, growth regulators, etc. water use efficiency-need based, economic and conjunctive use of water, micro systems of irrigation etc. Selection of plants having drought resistance.

Unit-III: Dryland Techniques:

Special horticultural features of dry land horticultural crops, Special techniques, planting and after care-use of seedling races, root stocks, *in-situ* grafting, deep pitting/planting, canopy management etc. Characters and special adaptation of crops: ber, aonla, annona, jamun, wood apple, bael, date palm, phalsa, fig, and tamarind, Markingnut, Charoli, Passion fruit & Jackfruit, Pomegrante.

Suggested reading:

- Chadha, K. L. (ICAR)2002, 2001.*Hand book of Horticulture*. ICAR, New Delhi
- Chundawat, B.S. 1990. *Arid Fruit Culture*. Oxford and IBH, New Delhi.
- P.L. Taroj, B.B. Vashishtha, D.G.Dhandar. 2004. *Advances in Arid Horticulture*. Internal Book Distributing Co., Lucknow.
- T. Pradeep Kumar, B. Suma, Jyothi Bhaskarand K.N.Sathesan. 2008. *Management of Horticultural Crops*. New India Publishing Agency.
- Fruit culture in India, Shyam Singh, S. Krishnamurthy & S. L. Katyal.
- Production technology of fruit crops, K. G. Shanmmugavellu.

e-reading: <http://ecourses.iasri.res.in/>

Swami Ramanand Teerth Marathwada University, Nanded

B. Voc. Degree Horticulture & Post Harvest Technology

Second Year (Semester IV)

Paper-XXXIV: Orchard and Estate Management (H/FL-242)

Marks: 100

Credits: 4

Unit-I: Introduction to Orchard and estate management:

Importance, objectives, merits and demerits, clean cultivation, sod culture, Sod mulch, herbicides and inorganic and organic mulches.

Unit-II: Horticultural Systems:

Tropical, sub-tropical and temperate horticultural systems, competitive and complimentary effect of root and shoot systems. Biological efficiency of cropping systems in horticulture,

Unit-III: Irrigation Systems and Nutrient Management:

systems of irrigation. Soil management in relation to nutrient and water uptake and their effect on soil environment, moisture, organisms and soil properties. Factors influencing the fruitfulness and unfruitfulness. Rejuvenation of old orchards, top working, frame working, Integrated nutrient and pest management.

Unit-IV: Resource Utilization:

Utilization of resources constraints in existing systems. Crop model and crop regulation in relation to cropping systems. Climate aberrations and mitigation measures of Horticultural crops.

Reference Books:

- B .C. Mazumdar. 2004. *Principles and Methods of Orchard Establishment*. DayaPublishing House, New Delhi.
- Chadha,K.L. (ICAR)2002,2001.*Hand book of Horticulture*. ICAR, New Delhi
- Kumar, 1990. *Introduction to Horticulture crops*. Rajyalakshmi Publications, Nagercoil, Tamilnadu.
- Palaniappan, S.P. and Sivaraman, K. 1996. *Cropping systems in the Tropics*. New age International (P) Ltd., Publishers, New Delhi.
- Shanmugavelu, K.G.1989. *Production Technology of Fruit Crops*. Oxford & IBH Publishing Co. Pvt.Ltd., New Delhi.
- W. S. Dhillon and Bhatt. 2011. *Fruit Tree Physiology*. Narendra Publishing House, New Delhi.

e-reading: <http://ecourses.iasri.res.in/>

Swami Ramanand Teerth Marathwada University, Nanded

B.Voc Degree Horticulture & Post Harvest Technology

Second Year (Semester IV)

Paper-XXXV: Practical based on Processing of Horticultural Crops (HORT-247)

Marks: 75

Credits: 3

Pr. No	Practical Title
1	Equipments used in food processing units
2	Physico-chemical analysis of fruits and vegetables-TSS and Acidity
3	Canning of fruits- mango, pineapple, guava etc
4	Canning of vegetables- peas, tomato etc.
5	Preparation of RTS
6	Preparation of squash
7	Preparation of syrup
8	Preparation of cordial
9	Preparation of jam
10	Preparation of jelly
11	Preparation of marmalade
12	Preparation of preserves
13	Preparation of candies
14	Preparation of chutneys
15	Preparation of tomato ketchup

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B.Voc. Degree Horticulture & Post Harvest Technology

Second Year (Semester IV)

Paper-XXXVI: Practical based on Dry Land Horticulture (HORT-248)

Marks: 75

Credits: 3

Pr. No	Practical Title
1	Study of rainfall patterns
2	Contour bunding
3	Trenching
4	Micro catchments
5	Soil erosion and its control.
6	Study of evapotranspiration,
7	Mulching
8	Irrigation systems-Surface
9	Irrigation systems-Sub Surface
10	Micro irrigation
11	Special techniques of planting and aftercare in dry lands
12	Special horticultural practices in dry land plants
13	Training in dry land plants
14	Pruning in dry land plants

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B.Voc. Degree Horticulture & Post Harvest Technology

Second Year (Semester IV)

Paper-XXXVII: Practical based on Orchard and Estate Management (H/FL-242)

Marks: 75

Credits: 3

Pr. No	Practical Title
1	Layout of different systems of orchard
2	Layout of different systems of estate
3	Soil management Practices
4	Study of Clean cropping
5	Study of Inter cropping and Fillers crop
6	Study of Cover cropping
7	Study of Mixed cropping
8	Moisture conservation measures
9	Study of methods of weed control
10	Use of organic and inorganic mulch materials
11	Types of weed and weed control
12	In situ grafting
13	Layout of various irrigation systems.
14	Integrated nutrient pest management

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).
