



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

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विद्यापीठ अनुदान आयोगाने शैक्षणिक वर्ष २०२०-२१ पासून मान्यता दिलेल्या बी. व्होक (व्होकेशनल कोर्सेसचे) पदवी तृतीय वर्षाचे अभ्यासक्रमाचे (Syllabus) शैक्षणिक वर्ष २०२२-२३ पासून लागू करणे बाबत.

### प रि प त्र क

या परिपत्रकान्वये सर्व संबंधितांना कळविण्यात येते की, विज्ञान व तंत्रज्ञान विद्याशाखेतील विद्यापीठ अनुदान आयोगाने शैक्षणिक वर्ष २०२०-२१ पासून मान्यता दिलेल्या बी. व्होक (व्होकेशनल कोर्सेसचे) पदवी अभ्यासक्रमाचे तृतीय वर्षाचे Syllabus शैक्षणिक वर्ष २०२२-२३ पासून लागू करण्यास मा. कुलगुरू महोदयांनी मा. विद्यापरिपदेच्या मान्यतेच्या अधीन राहून मान्यता दिलेली आहे. त्यानुसार खालील अभ्यासक्रम लागू करण्यात येत आहेत.

1. B. Voc Software Development III year
2. B. Voc. Bachelor of Medical Laboratory Technology. III year
3. B. Voc. Herbal Medicine III year
4. B. Voc. Agriculture/commercial Aquaculture III year
5. B. Voc. Horticulture and Post Harvest Technology III year
6. B. Voc. Food Processing /Food Processing Technology III year
7. B. Voc. Chemical & Petrochemical Applied Analytical Chemistry III year
8. B. Voc. Life Science/Skill Based Zoology III year

सदरील परिपत्रक व अभ्यासक्रम प्रस्तुत विद्यापीठाच्या [www.srtmun.ac.in](http://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-

२०२२-२३/६२५

दिनांक : २९.०९.२०२२

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) साहाय्यक कुलसचिव, पदव्युत्तर विभाग, प्रस्तुत विद्यापीठ.
- ५) उपकुलसचिव, पात्रता विभाग, प्रस्तुत विद्यापीठ.
- ६) सिस्टम एक्सपर्ट, शैक्षणिक विभाग, प्रस्तुत विद्यापीठ. याना देवून कळविण्यात येते की, सदरील परिपत्रक विद्यापीठाच्या संकेतस्थळावर प्रसिध्द करण्यात यावे.

*(Signature)*

**सहाकुलसचिव**

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)**

**Third Year (Semester V & VI)**

**Faculty: Science and Technology**

**(w.e.f. 2022-23 )**

**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       | <b>12<sup>th</sup></b> pass or <b>Diploma</b> in relevant field after 10 <sup>th</sup> | 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 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. V                | General Education Component |                                                            |                                                    |         |                |         |       |     |       |
|                       | Paper-XXXVIII               | BAAGE - 3513                                               | Marketing Analytics                                | 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                 | H/ENTO-351                                                 | Apiculture, Sericulture and Lac culture            | 4       | CC             | 4       | 75    | 25  | 100   |
|                       | Paper-XXXXII                | H/AEN-351                                                  | Farm Power, Machinery and Renewable Energy         | 4       | CC             | 4       | 75    | 25  | 100   |
|                       | Paper-XXXXIII               | H/PATH-351                                                 | Mushroom Production Technology                     | 4       | CC             | 4       | 75    | 25  | 100   |
|                       | Practical Skill Courses     |                                                            |                                                    |         |                |         |       |     |       |
|                       | Paper-XXXXIV                | Practical Based on H/ENTO-351                              |                                                    | 2       | PR             | 2       | 50    | -   | 50    |
|                       | Paper-XXXXV                 | Practical Based on H/AEN-351                               |                                                    | 2       | PR             | 2       | 50    | -   | 50    |
|                       | Paper-XXXXVI                | Practical Based on H/PATH-351                              |                                                    | 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                                               | Farm Management, Production and Resource Economics | 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 Title                    | Type of Course | Credit | Marks |     | Total |
|--------------------------------|----------------|---------------------------------|----------------|--------|-------|-----|-------|
|                                |                |                                 |                |        | ESA   | CIA |       |
| <b>Sem. VI<br/>Elective-II</b> | Paper-XXXXVIII | 3 Months Industrial Training    | CC             | 30     | 750   | -   | 750   |
|                                |                | 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.

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# **Swami Ramanand Teerth Marathwada University, Nanded**

**Certificate, Diploma, Advanced Diploma and B.Voc Degree**

**(Agriculture and Allied Faculties)**

**Third Year (Semester V)**

**Paper- XXXVIII: Marketing Analytics (BAAGE-3513)**

**Maximum Marks: 100**

**Credits: 4**

**Periods: 45**

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## **Unit I: Marketing Mix optimization (15)**

Marketing Mix optimization: Use of various techniques like multivariate regression to analyze sales and marketing time series data, Effects of various marketing tactics in order to find out the optimal mix of various marketing activities to maximize revenue and /or profitability.

## **Unit II: Marketing Mix Modelling (10)**

Marketing Mix Modelling: Use of this technique to analyze and optimize the marketing spends.

## **Unit III: Price Analysis (10)**

Price Analysis: Determination of the price elasticity of a product using historical price and sales data, Application of results to find out expected volume at new prices, key price points, changing price sensitivity, and competitive price matching.

## **Unit IV: Promotions Analysis (10)**

Promotions Analysis : Analysis of promotions data to understand the sales lift and ROI from various promotional activities such as In-store displays, Newspaper & Pre-print features, coupons, In-store, Mail/ online offers, Special packs, Special events, and discounts etc.

## **Reference books:**

1. Marketing Mix Optimization Rules by Andrew A. Mitchell, College of Business Administration Pennsylvania State University, 1975.
  2. Market Response and Marketing Mix Problems : Trends and Research Opportunities , Douglas Bowman and Hubert Gatignon, New Publishers Inc.
  3. Pring on Price patterns: the definitive guide to price pattern analysis and interpretation, Martin J. Pring, Mc Graw Hill Publications
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**Swami Ramanand Teerth Marathwada University, Nanded**

**Certificate, Diploma, Advanced Diploma and B.Voc Degree**

**(Agriculture and Allied Faculties)**

**Third Year (Semester V)**

**Paper- XXXIX: Climate Change and Agriculture (BAAGE-3514)**

**Maximum Marks: 100**

**Credits: 4**

**Periods: 45**

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**Unit-I: Composition and structure of atmosphere (10)**

Composition and structure of atmosphere and definition of weather and climate, aspects involved in weather and climate, atmospheric temperature, soil temperature, solar radiation, atmospheric pressure, atmospheric humidity, evaporation and transpiration, monsoons, rainfall, clouds, drought, weather disasters and their management atmospheric pollution. Basics of weather forecasting.

**Unit-II: Climate change (10)**

Climate change causes, Global warming-causes and remote sensing. Effect of climate change on horticulture past and future changes in greenhouse gases within the atmosphere. Sources and sinks for greenhouse gases. Atmospheric chemistry.

**Unit-III: Effect on Plant and Plant Response (15)**

Plants sense and respond to changes in CO<sub>2</sub> concentration. Measurement of short-term effects and mechanisms underlying the observed responses in C<sub>3</sub> and C<sub>4</sub> species. Plant development affected by growth in elevated CO<sub>2</sub>. Physiology of rising CO<sub>2</sub> on nitrogen use and soil fertility, its implication for production. Methodology for studying effect of CO<sub>2</sub>. Change in secondary metabolites and pest disease reaction of plants.

**Unit-IV: Social responsibility and business ethics (10)**

The mechanisms of ozone and UV damage and tolerance in plants. Increased temperature and plants in tropical/sub-tropical climates- effect on growing season, timing of flowering, duration of fruit development and impacts on crop yields and potential species ranges, interaction of temperature with other abiotic/biotic stress. Mitigation strategies and prospects for genetic manipulation of crops to maximize production in the future atmosphere. Modifying Rubisco, acclimation, metabolism of oxidizing radicals, and sink capacity as potential strategies.

## Reference books:

- K. Srivastava and P. K. Tyagi, 2011. Practical Agricultural Meteorology. New Delhi Publishing Agency, New Delhi.
  - D. Lenka, 2006. Climate, Weather and Crops in India. Kalyani Publishers, New Delhi.
  - G. S.L. H. V. Prasad Rao, 2008. Agricultural Meteorology. Prentice Hall of India Pvt. Ltd., New Delhi.
  - H. S. Mavi and Graeme J. Tupper, 2005. Agrometeorology- Principles and applications of climate studies in agriculture. International Book Publishing Co. Lucknow.
  - H. S.Mavi, 1994. Introduction to Agrometeorology. Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.
  - H. V. Nanjappa and B. K. Ramachandrappa, 2007. Manual on Practical Agricultural Meteorology. Agrobios India. Jodhpur.
  - S. R. Reddy, 1999. Principles of Agronomy. Kalyani Publishers, New Delhi.
  - T. Yellamanda Reddy and G. H. Sankara Reddi, 2010. Principles of Agronomy. Kalyani Publishers, New Delhi.
  - Pattersen, S. 1958. Introductionto Meteorology. Me. Graw Hill BookCo. Inc., New York
  - Tailor, J. T. 1967. Agricultural Climatology. Pergman Press Ltd. Headington Hill Hall, Oxford, Englandd
  - Trewarthe, T. G. 1968. AnIntroductionto Climate. Me Graw Hill Book Co. Ine., New York
  - Mavi, H. S. 1985. Introductionto Agrometeorology. Oxford & IBH Publishing Co. New Delhi.
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# Swami Ramanand Teerth Marathwada University, Nanded

Certificate, Diploma, Advanced Diploma and B.Voc Degree

(Agriculture and Allied Faculties)

Third Year (Semester V)

Paper- XXXXI: Apiculture, Sericulture and Lac culture (H/ENTO-351)

Maximum Marks: 100

Credits: 4

Periods: 45

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## Unit-I: Introduction to Insects (10)

Introduction to beneficial insects. Importance and History of apiculture. Species of honey bees, Rock bee, Little bee, Indian bee, European bee, Italian bee and Dammar bee, lifecycle and caste determination.

## Unit-II: Components of Apiculture (10)

Bee colony maintenance, bee colony activities, starting of new colony, location site, transferring colony, replacement of queen, combine colonies, swarm prevention, colony management in different seasons, Equipment for apiary, types of bee hives and their description. Bee pasturage Honey extraction, honey composition and value, bee wax and tissues.

## Unit-III: Components of Sericulture (15)

Importance, History and development in India, silkworms kinds and their hosts, systematic position, distribution, lifecycles in brief, Silk glands. Mulberry silkworm-morphological features, races, rearing house and equipments, disinfection and hygiene. Grainage acid treatment, packing and transportation of eggs, Incubation, black boxing, hatching of eggs. Silkworm rearing young age /chawki rearing and old age rearing of silkworms. Feeding, spacing, environmental conditions and sanitation. Cocoon characters colour, shape, hardness and shell ratio. Defective cocoons and stifling of cocoons. Uses of silk and by-products. Economics of silk production.

## Unit-IV: Lac Culture (10)

Moriculture: Mulberry varieties, package of practices, Pests and diseases and their management. Lac growing areas in India, Lac insects, biology, behavior, lac cultivation, food plants, pruning, inoculation, cropping, kinds of lac. Enemies of lac-insects.

## Reference books:

- Singh, S., 1975. Bee keeping in India – ICAR, New Delhi., 214p.
- Sunita, N.D, Guled, M.B, Mulla S.R and Jagginavar, 2003, Beekeeping, UAS Dharwad
- Mishra, R.C. and Rajesh Gar. 2002. Prospective in Indian Apiculture. Agrobios, Jodhpur.
- Singh, D and Singh, D.P. 2006. A hand book of Beekeeping, Agrobios (India).
- Paul DeBach and Devid Rosen 1991. Biological control by natural enemies. Cambridge University Press; 2 edition (27 June 1991)
- Y.A. Shinde and B.R. Patel. Sericulture in India

- Tribhuwan Singh. Principles and Techniques of Silkworm Seed Production, Discovery publishing House Pvt. Ltd
- M.L. Narasaiah. Problems and Prospects of Sericulture. discovery publishing House Pvt. Ltd.
- Ganga, G. and Sulochana Chetty, J. 1997. An introduction to Sericulture (2nd Edn.). Oxford & IBH publishing Co. Pvt. Ltd., New Delhi.
- Krishnaswamy, S. (Ed). 1978. Sericulture Manual - Silkworm Rearing. FAO Agrl. Services bulletin, Rome.
- Singh, S. 1975. Bee keeping in India. ICAR, New Delhi.
- Glover, P.M. 1937. Lac cultivation in India. Indian Lac Research Institute, Ranchi.
- Jolly, M.S. 1987. "Appropriate sericulture techniques" International centre for training and Research in Tropical Sericulture, Mysore, 209.
- B.R. David and V.V. Ramamurthy. Elements of Economic Entomology, 7<sup>th</sup> Edition. Namrutha Publications, Chennai

**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)**

**Third Year (Semester V)**

**Paper-XXXXII: Farm Power, Machinery and Renewable Energy (H/AEN-351)**

**Marks: 100**

**Credits: 4**

**Periods: 45**

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## **Unit-I: Introduction to engines (10)**

Farm power in India: sources, I.C engines, working principles, two- stroke and four stroke engines, I.C. engine terminology, different systems of I.C. engine.

## **Unit-II: Tractor and types of implements (10)**

Tractors, Types, Selection of tractor and cost of tractor power. Tillage implements: Primary and secondary tillage implements, Implements for inter-cultural operations, seed drills, paddy transplanters, plant protection equipment and harvesting equipment;

## **Unit-III: Energy Sources (15)**

Energy sources, Introduction, 'Classification, Energy from Biomass, Types of biogas plants, Biogas production and its utilization, Agricultural wastes, Principles of combustion, pyrolysis and gasification, Types of gasifiers, Producer gas and its utilization. Briquettes, types of Briquetting machines, uses of Briquettes, Shredders. Solar energy,' Solar air heaters, Solar. space heating and cooling.

## **Unit-IV: Applications of Solar energy (10)**

Solar energy applications/Solar energy gadgets, Solar cookers, Solar water, heating systems, solar grain dryers, Solar photo voltaic systems, solar lantern, Solar street lights, Solar pumping systems. Wind energy, Types of wind mills. Liquid Bio fuels, Bio diesel and Ethanol from agricultural produce, uses.

## **Reference Books:**

1. Farm Power and Machinery ICAR e-Course [www.agrimoon.com](http://www.agrimoon.com).
  2. Textbook of Renewable Energy 2018 Edition by S.C. Bhatia, R.K. Gupta, Woodhead.
  3. Farm Power and Machinery Management 10th Edition by Donnell Hunt.
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**Swami Ramanand Teerth Marathwada University, Nanded**

**Certificate, Diploma, Advanced Diploma and B.Voc Degree**

**(Agriculture and Allied Faculties)**

**Third Year (Semester V)**

**Paper-XXXXIII: Mushroom Production Technology (H/PATH-351)**

**Marks: 100**

**Credits: 4**

**Periods: 45**

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**Unit-I: Introduction to mushroom (10)**

Introduction to mushroom, Nutritional and medicinal value of mushroom. Morphology and types of mushroom.

**Unit-II: Mushroom Production (10)**

Material equipment and basic facilities required for mushroom entrepreneurship. Preparation of mushroom culture by tissue isolation method. Spawn production: Types of spawn and method of spawn production.

**Unit-III: Methodology of production (15)**

Preparation of compost for button mushroom production. Preparation of substrate for oyster mushroom production. Spawning and methods of spawning. Casing for button mushroom production and after care during spawn run. In button and oyster mushroom production. Harvesting indices, packing and preservation of Button. Harvesting indices, packing and preservation of oyster mushroom. Preparation of mushroom recipes.

**Unit-IV: Disease Management (10)**

Disease management in mushroom production. Pest management in mushroom production. Methods of disinfection and fumigation in Mushroom house.

**Reference Books:**

1. Mushroom cultivation Technology- S. T. Change

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

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**Swami Ramanand Teerth Marathwada University, Nanded**

**B.Voc Degree Horticulture & Post Harvest Technology**

**Third Year (Semester V)**

**Paper- XXXXIV: Practical based on**

**Apiculture, Sericulture and Lac culture (H/ENTO-351)**

**Marks: 50**

**Credits: 2**

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| <b>Pr. No</b> | <b>Practical Title</b>                                                                                     |
|---------------|------------------------------------------------------------------------------------------------------------|
| 1             | Honey bee colony, different bee hives and apiculture equipment.                                            |
| 2             | Honey extraction and bottling.                                                                             |
| 3             | Study of pests and diseases of honeybees.                                                                  |
| 4             | Establishment of mulberry garden.                                                                          |
| 5             | Sericulture equipments for silkworm rearing.                                                               |
| 6             | Mulberry silkworm rearing room requirements.                                                               |
| 7             | Rearing of silkworms-chalky rearing.                                                                       |
| 8             | Lac insects-biology, behaviour, lac cultivation, food plants, pruning, inoculation, cropping, kinds of lac |

**Swami Ramanand Teerth Marathwada University, Nanded**

**B.Voc Degree Horticulture & Post Harvest Technology**

**Third Year (Semester V)**

**Paper- XXXXV: Practical based on**

**Farm Power, Machinery and Renewable Energy (H/AEN-351)**

**Marks: 50**

**Credits: 2**

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| <b>Pr. No.</b> | <b>Practical Title</b>                                                                                                            |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------|
| 1              | Study of different components of I.C. Engine; Study of working of four stroke engine                                              |
| 2              | Study of working of two stroke engine                                                                                             |
| 3              | Study of M.B. plough, measurement of plough size, different parts, horizontal and vertical suction, determination of line of pull |
| 4              | Study of disc plough                                                                                                              |
| 5              | Study of seed-cum-fertilizer drills-furrow opener, metering mechanism, and calibration                                            |
| 6              | Study, maintenance and operation of tractor                                                                                       |
| 7              | Learning of tractor driving                                                                                                       |
| 8              | Study of different intercultivation equipments in terms of efficiency, field capacity                                             |
| 9              | Constructional details of KVIC & Janatha type biogas plants                                                                       |

**Swami Ramanand Teerth Marathwada University, Nanded**  
**B.Voc Degree Horticulture & Post Harvest Technology**  
**Third Year (Semester V)**  
**Paper- XXXXVI: Practical based on**  
**Mushroom Production Technology (H/PATH-351)**

**Marks: 50**

**Credits: 2**

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| <b>Pr. No</b> | <b>Practical Title</b>                                           |
|---------------|------------------------------------------------------------------|
| 1             | Preparation of mushroom culture by tissue isolation method       |
| 2             | Spawn production                                                 |
| 3             | Preparation of compost                                           |
| 4             | Harvesting indices, packing and preservation of oyster mushroom. |
| 5             | Visit to nearby Mushroom Unit.                                   |

**Swami Ramanand Teerth Marathwada University, Nanded**

**Certificate, Diploma, Advanced Diploma and B. Voc. Degree**

**(Agriculture and Allied Faculties)**

**Third Year (Semester VI) Paper- XXXXVIII:**

**Farm Management, Production and Resource Economics (BAAGE-3616)**

**Maximum Marks: 100**

**Credits: 4**

**Periods: 45**

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**Unit-I: Introduction to Farm Management (10)**

Meaning and concept of farm management, objectives and relationship with other sciences. Meaning and definition of farms, its types and characteristics, factor determining types and size of farms. Principles of farm management: concept of production function and its type, use of production function in decision-making on a farm, factor-product, factor-factor and product-product relationship,

**Unit-II: concept of cost (15)**

Meaning and concept of cost, types of costs and their interrelationship, importance of cost in managing farm business and estimation of gross farm income, net farm income, family labor income and farm business income. Farm business analysis: meaning and concept of farm income and profitability, technical and economic efficiency measures in crop and livestock enterprises.

**Unit-III: Farm Records (10)**

Importance of farm records and accounts in managing a farm, various types of farm records needed to maintain on farm, farm inventory, balance sheet, profit and loss accounts. Meaning and importance of farm planning and budgeting, partial and complete budgeting, steps in farm planning and budgeting-linear programming, appraisal of farm resources, selection of crops and livestock's enterprises.

**Unit-IV: Risk Management (10)**

Concept of risk and uncertainty occurs in agriculture production, nature and sources of risks and its management strategies, Crop/livestock/machinery insurance – weather based crop insurance, features, determinants of compensation. Concepts of resource economics, unique properties of natural resources. Important issues in economics and management of common property resources of land, water, pasture and forest resources etc.

**Suggested Readings:**

- 1) Economics of Agricultural Production and Resource Use: Heady, Earl O, Prentice Hall of India, Private Limited, New Delhi, 1964
  - 2) Fundamentals of Farm Business Management: S.S. Johl, J.R. Kapur, Kalyani Publishers,
  - 3) Agricultural Economics: Subba Reddy S., Raghuram P., NeelakantaSastry T.V., Bhavani Devi I., Oxford and IBH Publishing Company, Private Limited, New Delhi, 2006
  - 4) Farm Management Economics: Heady Earl O and Herald R. Jenson, Prentice Hall, Delhi, 1954
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**Swami Ramanand Teerth Marathwada University, Nanded**

**Certificate, Diploma, Advanced Diploma and B. Voc. Degree**

**(Agriculture and Allied Faculties)**

**Third Year (Semester VI)**

**Paper- XXXXIX: Human Resource Management (BAAGE-3617)**

**Maximum Marks: 100**

**Credits: 4**

**Periods: 45**

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**Unit-I: Introduction to HRD (15)**

HRD-Macro Perspective : HRD Concept, Origin and Need, HRD as a Total System; Approaches to HRD; Human Development and HRD; HRD at Macro and Micro Climate. HRD–Micro Perspective: Areas of HRD; HRD Interventions Performance Appraisal, Potential Appraisal, Feedback and Performance Coaching, Training,

**Unit-II: Instructional Technology for HRD (10)**

Learning and HRD; Models and Curriculum; Principles of Learning; Group and Individual Learning; Transactional Analysis; Assessment Centre; Behaviour Modeling and Self Directed Learning; Evaluating the HRD

**Unit-III: Training and Development (10)**

Human Resource Training and Development: Concept and Importance; Assessing Training Needs; Designing and Evaluating T&D Programmes; Role, Responsibilities and challenges to Training Managers.

**Unit-IV: Training Methods (10)**

Training with in Industry (TWI): On the Job & Off the Job Training; Management Development: Lecture Method; Role Play; In-basket Exercise; Simulation; Vestibule Training; Management Games; Case Study; Programmed Instruction; Team Development; Sensitivity Training; Globalization challenges and Strategies of Training Program, Review on T&D Programmes in India.

**Reference Books:**

1. Nadler, Leonard : Corporat Human Resource Development, Van Nostrand Reinhold, ASTD, New York .
  2. Rao, T.V and Pareek, Udai: Designing and Managing Human Resource Systems, Oxford IBH Pub. Pvt.Ltd., New Delhi , 2005.
  3. Rao, T.V: Readings in HRD, Oxford IBH Pub. Pvt. Ltd., New Delhi , 2004. 4. Viramani, B.R and Seth, Parmila: Evaluating Management Development, Vision Books, New Delhi .
  5. Rao, T.V.(et.al): HRD in the New Economic Environment, Tata McGraw-Hill Pub.Pvt, Ltd., New Delhi , 2003.
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**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**

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**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).

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**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**

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- 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).

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