

॥ सा विद्या या विमुक्तये ॥



स्वामी रामानंद तीर्थ मराठवाडा विद्यापीठ, नांदेड

“ज्ञानतीर्थ” परिसर, विष्णुपुरी, नांदेड - ४३१६०६ (महाराष्ट्र)

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY NANDED

“Dnyanteerth”, Vishnupuri, Nanded - 431606 Maharashtra State (INDIA)

Established on 17th September 1994 – Recognized by the UGC U/s 2(f) and 12(B), NAAC Re-accredited with 'A' Grade

ACADEMIC (1-BOARD OF STUDIES) SECTION

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विद्यापीठ अनुदान आयोगाने शैक्षणिक वर्ष २०२०-२१ पासून मान्यता दिलेल्या व्होकेशनल कोर्सेसचे (बी.व्होक पदवी, अॅडव्हॉस डिप्लोमा, डिप्लोमा व सर्टिफिकेट) अभ्यासक्रम शैक्षणिक वर्ष २०२०-२१ पासून लागू करणे बाबत.

परिपत्रक

या परिपत्रकान्वये सर्व संबंधितांना कळविण्यात येते की, विद्यापीठ अनुदान आयोगाने शैक्षणिक वर्ष २०२०-२१ पासून मान्यता दिलेल्या व्होकेशनल कोर्सेसच्या (बी. व्होक पदवी, अॅडव्हॉस डिप्लोमा, डिप्लोमा व सर्टिफिकेट्स) अभ्यासक्रमांना मा विज्ञान व तंत्रज्ञान विद्याशाखेने दिनांक ३१ मे २०२१ रोजीच्या बैठकीतील केलेल्या शिफारशीप्रमाणे व मा. विद्यापरिषदेच्या दिनांक १२ जून २०२१ रोजीच्या बैठकीतील विषय क्रमांक २६/५१-२०२१ च्या ठरावानुसार खालील अभ्यासक्रमांस मान्यता देण्यात आली आहे.

1. B. Voc. IT/Hardware and Networking.
2. B. Voc Software Development.
3. B. Voc. Medical Laboratory Technology.
4. B. Voc. Horticulture and Post-Harvest Technology.
5. B. Voc. Herbal Medicine.
6. B. Voc. Commercial Aquaculture.
7. B. Voc. Food Processing Technology.
8. B. Voc. Skill Based Zoology.
9. B. Voc. Vocational Biotechnology.
10. B. Voc. Plant Tissue Culture Secretary.
11. Advance Diploma Radiological Physics.
12. Diploma – Computer Hardware.
13. Diploma – Computer Network Assistant.
14. Diploma – PGDMLT.
15. Diploma – Embedded System Design.
16. Diploma- Biofertilizer.
17. Diploma- Fisheries and Farm Management.
18. Diploma - Bee Keeping.

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-
२०२०-२१/६८

दिनांक : ०५.०७.२०२१

प्रत माहिती व पुढील कार्यवाहीस्तव :

- १) मा. कुलसचिव यांचे कार्यालय, 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.

स्वाक्षरित

सहा कुलसचिव

शैक्षणिक (१-अभ्यासमंडळ) विभाग

**SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY,
NANDED**



UGC Sanctioned Vocational Course

Syllabus

Diploma in BEE KEEPING/APICULTURE TECHNOLOGY

(CBCS Pattern)

Semester I & II

Faculty: Science of Technology
(With Effect from Academic Year 2020-2021)

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
Diploma	12th pass or Diploma in relevant field after 10th	Two semester	42	18	60	5	English
Certificate		One semester	21	09	30	4	

1. CONDITION FOR ADMISSION FOR THIS DIPLOMA

A candidate who have passed the Higher Secondary Examination (Academic Stream) conducted by the state government board or an examination as equivalent to 10, +2 course including CBSE shall be permitted to appear and qualify for Diploma in Apiculture examination after a course of study of ONE academic year.

2. DURATION OF THE COURSE

The course of the professional Diploma in Apiculture shall consist of one academic year.

3. ELIGIBILITY FOR THE DIPLOMA

A candidate shall be eligible for the professional Diploma in Apiculture is he/she has satisfactorily undergone the prescribed course of study for a period of not less than one year and passed examinations in all papers

Exit Points /Awards	Job Role
Certificate in BEE KEEPING/APICULTURE TECHNOLOGY	Bee keeping assistant
Diploma in BEE KEEPING/APICULTURE TECHNOLOGY	Bee keeping entrepreneur

Introduction of the Course:

1. Preamble.

Honey bees are one of the important primitive social insects as well as a rich source of honey. Honey has been traditionally used in various diet preparations, medicines, cosmetics, ointments, candles and house-hold bee-wax items, besides Ayurvedic drug preparations. The propolis is used in lip balms and tonics, whereas royal jelly is used to strengthen the human body, for improving appetite, preventing aging of skin, leukaemia and for the treatment of other cancers. Honey bees during foraging for pollen and nectar from flowers of different plant species enhance agricultural productivity through cross-pollination. Honey production is frequently promoted as income generation activity as it is accessible to many members of a rural community, has low start-up costs and requires little land or labour. Five species of honey bees are found all over the world, namely *Apis florea*, *A. cerana*, *A. dorsata*, *A. mellifera* and *Trigonairidipennis*. However, *A. cerana* and *A. mellifera* are reared in hives in India. India produces about 70,000 tonnes of honey every year of which 25–27,000 tones is being exported to more than 42 countries, including the European Union, Middle East and the United States (2002–03). The major honey-producing states are Punjab, Haryana, Uttar Pradesh, Bihar and West Bengal and the hilly areas of Western Ghats including Konkan areas are the major producers of honey.

Apiculture Sector

Apiculture is a technique that involves cultivation of honey bees for production of honey, propolis, pollens, wax and bee venom. and the apiculture industry actually comes under the purview of the agricultural sector. The apiculture sector plays a major role in the development of the rural economy.

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 one exit and one entry. This single entry and exit enables the learner to seek employment after level 4 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 advanced diploma of B.Voc degree programme after one year diploma.

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

Aim of the Diploma course in Bee Keeping

This Diploma/program is aimed at training candidates for the job of a “Bee Keeping Assistant”, Bee colony Multiplication Assistant, Honey Collector, Bee Wax Collector, Bee Pests Controller or Bee Pests Manager in the “Agriculture & Allied” Sector/Industry.

Professionally qualified Diploma with a sound knowledge and expertise in a concerned skill will have more openings in service, industry and self-employment sectors. Demand and scope for such professionally trained Diploma are visible in the applied fields of almost all basic/core disciplines and faculties in the current changing global scenario and is likely to increase in the future. This syllabus, emphasis on development of entrepreneurial potential and skills amongst the students.

OBJECTIVES OF THE COURSE:

1. To inculcate importance of Bee keeping and honey processing in relation with entrepreneurship development by understanding bee biology and behavior and technique of mass queen rearing.
2. To give students knowledge about various techniques of Bee keeping and honey processing and its marketing to make them self sustainable by teaching techniques of construction of Bee Hives and its maintenance.
3. Handle installation of beekeeping systems/hives and beekeeping equipments/tools including Beehive Management/Colony Management and health related problems with Honey bees etc
4. To teach students about Method of Harvesting, time of harvesting, tools and equipments required for Honey production Harvest Royal Jelly, Propolis, Pollen and Bee venom and marketing etc
5. To Understand the shelf-life of the produce, Select the materials required for packaging and storage of the produce ,Practice proper packaging and storage of the processed honey
6. labelling and storage of Royal Jelly, Propolis, Pollen and Bee venom
7. Identify the market platform for the products and by products

Outcome of the course:

1. This program will train and orient the students in the field of Beekeeping under the field of Agriculture.
2. This program will help the students for their career development as this Diploma in Bee keeping/ Apiculture Technology is based on hands on training course in our region which will generate ample of opportunities to become successful entrepreneur in the apiculture sector, as this sector requires skilled educated hands.
3. Other than individual entrepreneurship the trained students has ample of job opportunities and can work as
 - a. **Bee Keeping Assistant-** trained person will be competent in carrying out Bee Keeping Operations in large bee farms.
 - b. **Bee colony Multiplication Assistant-** trained person would be able to work in large bee farms or work independently as a bee keeper
 - c. **Honey Collector** trained person will be competent in collecting honey in a bee farm
 - d. **Bee Wax Collector** trained person will be competent in collecting bee wax and process them in a bee farm

e. **Bee Pests Controller or Bee Pests Manager** trained person will be competent in protecting the bees from various diseases, insects, pests and predators in large bee farms

f. **Beehive Manufacturer** trained person with basic knowledge of carpentry will be competent in manufacturing beehives

. EXAMINATIONS

The examinations shall be three hours duration to each paper at the end of each semester. The candidate failing in any subject(s) will be permitted to appear for each failed subject(s) in the subsequent examination.

. PASSING MINIMUM

A candidate shall be declared to have passed examinations in theory of study only if he/she scores not less than 40 marks out of 100 in the University examinations.

. CLASSIFICATION OF SUCCESSFUL CANDIDATES

Candidate who secures not less than 60% of the aggregate marks in the whole examination shall be declared to have passed the examination in **FIRST CLASS**. All other successful candidates shall be declared to have passed in **SECOND CLASS**. Candidates who obtain 75% in **FIRST CLASS WITH DISTINCTION** provided they pass all the examinations prescribed for the course in the first appearance.

QUESTION PAPER PATTERN: For theory and Practical Papers is given at the end of syllabus.

Credits

Credits can be defined as the workload of a student in 1. Lectures 2. Practical's 3. Seminars 4. Private work in the Library/home 5. Examination 6. Other assessment activities. The following formula should be used for conversion of time into credit hours. One Credit would mean equivalent of 15-16 periods of 60 minutes each, for theory, → workshops /labs and tutorials. For internship/field work, the credit weightage for equivalent hours shall be 50% → of that for lectures/workshops. For self-learning, based on e-content or otherwise, the credit weightage for → equivalent hours of study should be 50% or less of that for lectures/workshops.

\Swami Ramanand Teerth Marathwada University, Nanded
Shivaji Mahavidyalaya, Udgir

Syllabus structure for

Diploma in BEE KEEPING/APICULTURE TECHNOLOGY

(Certificate, Diploma, (Agriculture and Allied Faculties))

	Paper No.	Course Number	Course Title	Hr/Week	Type of Course	Credits	Marks		Total
							ESA	CIA	
Sem. I	General Education Component								
	Paper-I	BAAGE -111	Communication Skills	4	GE	4	75	25	100
	Paper-II	BAAGE -112	Basics of Computer	4	GE	4	75	25	100
	Paper-III	BAAGE -113	Seminar*	1	GE	1	-	25	25
	Skill Courses								
	Paper-IV	DBK-01	Basics of beekeeping	4	CC	4	75	25	100
	Paper-V	DBK-02	Bee keeping techniques	4	CC	4	75	25	100
	Paper-VI	DBK-03	Bee enemies, diseases, pesticide poisoning and Bee Pests Management	4	CC	4	75	25	100
	Practical Skill Courses								
	Paper-VII	DBK-04	Practical-Basics of beekeeping	3	PR	3	50	25	75
	Paper-VIII	DBK-05	Practical-Bee keeping techniques	3	PR	3	50	25	75
	Paper-IX	DBK-06	Practical-Bee enemies, diseases, pesticide poisoning and Bee Pests Management	3	PR	3	50	25	75
	Sem. II	Paper No.	Course Number	Course Title	Hr/Week	Type of Course	Credits	Marks	
							ESA	CIA	
General Education Component									
Paper-X		BAAGE -124	Personality Development	4	GE	4	75	25	100
Paper-XI		BAAGE -125	Environmental Study	4	GE	4	75	25	100
Paper-XII		BAAGE -126	Field Visit*	1	GE	1	-	25	25
Skill Courses									
Paper-XIII		DBK-07	Bee Products, Economics and Marketing	4	CC	4	75	25	100
Paper-XIV		DBK-08	Beehive Manufacturer and Bee Keeping Multiplier	4	CC	4	75	25	100
Paper-XV		DBKT-09	Honey and Bee Wax Collection	4	CC	4	75	25	100
Practical Skill Courses									
Paper-XVI		DBK-10	Practical-Bee Products, Economics and Marketing	3	PR	3	50	25	75
Paper-XVII		DBK-11	Practical-Beehive Manufacturer and Bee Keeping Multiplier	3	PR	3	50	25	75
Paper-XVIII	DBK-12	Practical-Honey and Bee Wax Collection	3	PR	3	50	25	75	

*Indicate that the activity should be related to general education components of that particular semester. The institute level coordinator shall decide about the execution.

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.

NSQF Level	Skill Component Credits	General Education Credits	Total Credits for Award	Normal Duration	Exit Points/Awards
5	42	18	60	Two semester	Diploma
4	21	09	30	One semester	Certificate

Swami Ramanand Teerth Marathwada University, Nanded
Diploma in BEE KEEPING/ APICULTURE TECHNOLOGY (Agriculture and Allied Faculties)
First Year (Semester I)

Paper-I: Communication Skills (BAAGE-111)

Maximum Marks: 100

Credits:04

Periods:64

Unit I:BasicGrammar:(16 Periods)

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

Unit II:Vocabulary:(16 Periods)

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

Unit III:Communication Skills: (16 Periods)

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

Unit IV:Writing Skills: (16 Periods)

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

Reference Books:

1. Developing of Communication Skills -Krishna Mohan & Meera Banerji
2. A Practical English Grammar A.J. Thomson –Oxford
3. Mastering English Grammar – S.H.Burton
4. Technical Communication- Raman Sharma- Oxford
5. Written Communication in English – Sarah Freeman Orient Longman Pvt. Ltd.
6. A Course in Phonetics & Spoken English -J.Sethi&P.V.Dhamija
7. Radiance-Tense

Swami Ramanand Teerth Marathwada University, Nanded

Diploma in BEE KEEPING/ APICULTURE TECHNOLOGY (Agriculture and Allied Faculties)

First Year (Semester I)

Paper-II Basics of Computer (BAAGE-112)

Maximum Marks: 100

Credits:04

Periods:64

Unit I: Basics of Computer:(16 Periods)

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

Unit II:Computer Operation:(16 Periods)

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

Unit III:MS-Office:(16 Periods)

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

Unit IV:Computer Networking:(16 Periods)

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

Reference Books:

1. Introduction of Computer Science- Pcushman& R. Mata Toledo, McGraw Hill
2. Computer fundamentals – P.K. Sinha – BPB New Delhi.
3. Microsoft Office – 2000Complete – BPB Practicals

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Diploma in BEE KEEPING/ APICULTURE TECHNOLOGY (Agriculture and Allied Faculties)

First Year (Semester I)

Paper-IV: Basics of beekeeping (DBK-01)

Maximum Marks: 100

Credits:04

Periods: (64 Periods) 4hrs

per week

UNIT 1

History of bee keeping: Definition, Bee keeping in world wide, In India. Traditional bee keeping, Modern beekeeping, Urban or backyard beekeeping. 11P

UNIT 2

Honey bee species and identification: Introduction to honey bee; Origin, systematics and distribution; Types of honey bees, Species of honey bees. Bee identification. 11P

UNIT 3

Social organization in honey bees: Colony life and social organization – Queen, drone, worker. Annual biological cycle of the bee colony. Role of Central Honey Bee Research & Training Institute. 10P

UNIT 4

Communication in honey bees: Bee learning and communication – Learning - Color learning in honeybees, Color discrimination, Color learning rates and preferences, Color memory, Timing in color learning, Neurobiology of color vision; Communication - Odor plume, Trophallaxis, 11P

UNIT 5

Adaption of honey bees: Structural, Behavioral, Ecological and Physiological Adaptations of Bees. Necessities of honey bee adaptations. 11P

UNIT-6

Study of Challenges and Opportunities of bee keeping in India special refrence to Maharashtra. Bee keeping schemes and Programmes in India 10P

References:

Dewey M. Caron, 2013. Honey Bee Biology and Beekeeping, Revised Edition. Wicwas Press, Kalamazoo.

Pradip V Jabde, 1993. Text Book of Applied Zoology: Vermiculture, Apiculture, Sericulture, Lac Culture, Agricultural Pests and their Controls. Discovery Publishing House, New Delhi.

Eva Crane, 1999. The World History of Beekeeping and Honey Hunting. Routledge, India.

Ted Hooper, 2010. Guide to Bees & Honey: The World's Best Selling Guide to Beekeeping.

Northern Bee Books, Oxford.

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Diploma in BEE KEEPING/ APICULTURE TECHNOLOGY (Agriculture and Allied Faculties)

First Year (Semester I)

Paper-V: Bee keeping techniques (DBK-02)

Maximum Marks: 100

Credits:4

Periods: (64 Periods) 4hrs

per week

UNIT-1

11P

Basic requirements for starting bee keeping: Getting Started in Beekeeping - Land and Buildings, (Beehives(Newton and Langstroth bee hives and their modifications). Study and use of beekeeping equipment such as Bee Box, Nucleus Box, Bee Veil, Hive Tool, Honey Extractor, Hive Stand and other accessories.

UNIT 2

11P

General management practices in bee keeping: Best management practice – definition, requirements to register, swarms and bee enquiries, hive densities, hive placement, water provisions, queens and robbing behavior, disease control, transportation of beehives. Prerequisites/requirements of Installation of Beehives in new area

UNIT 3

10P

Bee pasturage and pollination: Definition, types of bee pasturage – single year productive, multi year productive, permanent productive. Installing a bee pasture. Pollination by bees – pollinator.

UNIT 4

11P

Seasonal management of honey bees: Honey bees on Canola, Spring management of bees, Wintering bees, Apiary management for winter/early spring pollination. Summer management honey production.

UNIT 5

11P

Queen rearing and colony multiplication: Raising honey bee queens. Developmental stages of queen bee, Requirements for rearing good queens, Methods of rearing queens, Hopkins Method, Alley Method, Miller Method, Dequeening Method, Raising Queen on double and Whole Brood Comb

UNIT-6

10P

Preparaing List of Beekeeping and Honey Processing equipments manufacturers /suppliers from India special refrence to Maharashtra. Preperation of List Bee apiary farms in India and Maharashtra.

References:

Laidlaw, H.H., 1997. Contemporary queen rearing. Published by Dadant and Sons. R. A. Morse, Rearing queen honey bees. Wicwas press, NY.

Alison Benjamin, By (author) Brian McCallum, 2008. Keeping Bees and Making Honey. David & Charles, Newton Abbot.

Kim Pezza, 2013. Backyard Farming: Keeping Honey Bees: From Hive Management to Honey Harvesting and More. Hatherleigh Press, U.S.

Kim Flottum, 2014. The Backyard Beekeeper: An Absolute Beginner's Guide to Keeping Bees in Your Yard and Garden. Quarry Books.

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Diploma in BEE KEEPING/ APICULTURE TECHNOLOGY (Agriculture and Allied Faculties)

First Year (Semester I)

Paper-VI: : Bee enemies, diseases, pesticide poisoning and Bee Pests Management (DBK-03)

Maximum Marks: 100

Credits:4

Periods: (64 Periods) 4hrs

per week

UNIT 1

11P

Bee enemies and diseases: An introduction, Bee enemies – Wax Moth, Ants, Wasps, Microorganisms, Pests. Diagnosis and Identification.

UNIT 2

11P

Study of life cycle of wax moth and mite pests.

Mites attacking honey bees: Varroa mites, Mite Biology, Controlling Varroa Mites, Mechanical control, Mite-tolerant stocks, Biopesticides, Study of chemicals used in treating brood diseases and mites
Chemical (synthetic pesticide) treatments.

UNIT 3

10P

Honeybee diseases, insects, pests, and predators.

Bacterial, viral, fungal & protozoan diseases:

Bacterial disease - American Foulbrood, European Foulbrood,

Viral disease - Deformed Wing Virus, Sacbrood Virus, Black Queen Cell Virus, Kashmir Bee Virus, Acute Bee Paralysis Virus;

Fungal disease - Chalkbrood, Stonebrood;

Protozoan disease - Nosemosis, Nosema cerana.

UNIT 4

11P

Pesticide poisoning of bees and mitigation: Definition of pesticides, types of pesticides and their length of residual toxicity, Pesticides and pollinators, Toxicity to bees – Honey bee health, Colony collapse disorder. Identification and control of brood diseases.

UNIT 5

11P

Study of effect of pesticides on bee foraging and multiplication.

Study of integrated pest management.

UNIT-6

10P

Pollinator conservation methods: Pollinators definition, Types of pollinators, Pollinators at Risks, Threats to Pollinators, Actions to Help Pollinators, Conservation methods.

References:

Roger A. Morse, Kim Flottum, 1998. Honey Bee Pests, Predators and Diseases. Wicwas Pr; 3rd edition.

Alethea Morrison (Author), Mars Vilaubi (Photographer), 2013. Homegrown Honey Bees: An Absolute Beginner's Guide to Beekeeping Your First Year, from Hiving to Honey Harvest. Storey Publishing, LLC; 1 edition.

Hunt, G.J., 2000. Using honey bees in pollination Purdue University.

Swami Ramanand Teerth Marathwada University, Nanded

Diploma in BEE KEEPING/ APICULTURE TECHNOLOGY (Agriculture and Allied Faculties)

First Year (Semester I)

Paper-VII: Practical on Basics of bee keeping (DBK-04)

Maximum Marks: 75

Credits:3

Periods: (48 Periods) 3hrs per

week

1. Identification of different bee species and castes.
2. Hive inspection.
3. Dividing, uniting bee colonies, supering.
4. Supplementary feeding and honey extraction.
5. Management of bee diseases and enemies.
- 6 Identification of pests, diseases, predators and enemies of honeybees
- 7 Methods of controlling pests and diseases
- 8 Working out the economics of bee keeping
9. Swarm management. Prevention of swarming and absconding
- 10 Importance of bee colonies in crop pollination

References:

David Cramp, 2012. The Complete Step-by-step Book of Beekeeping: A Practical Guide to Beekeeping, from Setting Up a Colony to Hive Management and Harvesting the Honey. Lorenz Books. London.

David Cramp, 2009. A Practical Manual of Beekeeping: How to Keep Bees and Develop Your Full Potential as an Apiarist. Spring Hill, London

Swami Ramanand Teerth Marathwada University, Nanded

Diploma in BEE KEEPING/ APICULTURE TECHNOLOGY (Agriculture and Allied Faculties)

First Year (Semester I)

Paper-VIII: Practical on Bee keeping techniques (DBK-05)

Maximum Marks: 75

Credits:03

Periods: (48 Periods) 3hrs

per week

1. Practice of constructional details and use of beekeeping equipment such as Bee Box, Nucleus Box, Bee Veil, Hive Tool, Honey Extractor, Hive Stand and other accessories.
2. Identification of bee flora and their flowering calendar
- 3 Searching techniques for floral colonies.
4. Practicing hiving of natural colonies and catching swarms
5. Practicing division of bee colonies
6. Practicing the identification of honey bee casters
- 7 Practicing of the inspection of bee colonies
- 8 Installation of CF (Comb Foundation) Sheet
- 9 Providing artificial food to the bee colonies with different methods
- 13 Extraction of pollen and propolis
- 14 Practicing uniting of weak colonies
- 15 Practicing migration of colonies to overcome scarcity of food and helping pollination
- 16 Identification of pests, diseases, predators and enemies of honeybees
- 17 Practice of packing and marketing of honey
- 18 Working out the economics of bee keeping

References:

David Cramp, 2012. The Complete Step-by-step Book of Beekeeping: A Practical Guide to Beekeeping, from Setting Up a Colony to Hive Management and Harvesting the Honey. Lorenz Books. London.

David Cramp, 2009. A Practical Manual of Beekeeping: How to Keep Bees and Develop Your Full Potential as an Apiarist. Spring Hill, London

Swami Ramanand Teerth Marathwada University, Nanded

Diploma in BEE KEEPING/ APICULTURE TECHNOLOGY (Agriculture and Allied Faculties)

First Year (Semester I)

Paper-XI: Practical on Practical on Bee enemies, diseases, pesticide poisoning and Bee Pests Management (DBK-06)

Maximum Marks: 75

Credits:03

Periods: (48 Periods) 3hrs

per week

- 1 Practicing identification of wax moth, yellow banded wasp and predators.
- 2 Identification of brood disease and mites
- 3 Protecting bee colony from wasps, ants and birds.
- 4 Practicing remedies against wax moth, mites and brood diseases.
- 5 Practicing prevention and control methods.
- 6 Practicing strengthening of bee colonies against insects, pests and diseases
- 7 Practicing artificial swarming to overcome diseases
- 8 Practicing identification and prevention of robbing among bee colonies.
- 9 Practicing protection of colonies from enemies like birds, monkeys

References:

Roger A. Morse, Kim Flottum, 1998. Honey Bee Pests, Predators and Diseases. Wicwas Pr; 3rd edition.

Alethea Morrison (Author), Mars Vilaubi (Photographer), 2013. Homegrown Honey Bees: An Absolute Beginner's Guide to Beekeeping Your First Year, from Hiving to Honey Harvest. Storey Publishing, LLC; 1 edition.

Hunt, G.J., 2000. Using honey bees in pollination Purdue University.

Swami Ramanand Teerth Marathwada University, Nanded

Diploma in BEE KEEPING/ APICULTURE TECHNOLOGY (Agriculture and Allied Faculties)

First Year (Semester II)

Paper-X: Personality Development (BAAGE-124)

Maximum Marks: 100

Credits:04

Periods: 64

UNIT-I:Personality Development: (Periods: 16)

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

UNIT-II:Attitude & motivation:(Periods:16)

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

UNIT-III:Interpersonal Relationship:(Periods: 16)

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

UNIT-IV:Overall personality development:(Periods: 16)

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

Reference Books:

1. “Personality Development and Soft Skills” by Barun Mitra
2. The Only Skill That Matters by Jonathan A. Levi
3. “Personality Development” by Swami Vivekananda
4. “Personality Development for Students” by Dr Vijay Agrawal
5. Soft Skills Personality Development for Life Success- 2nd Edition by Prashant Sharma

Swami Ramanand Teerth Marathwada University, Nanded

Diploma in BEE KEEPING/ APICULTURE TECHNOLOGY (Agriculture and Allied Faculties)

First Year (Semester II)

Paper-XI: Environmental Study (BAAGE-125)

Maximum Marks: 100

Credits:04

Periods: 64

Unit-I:Ecosystems: (Periods: 16)

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

Unit-II: Biodiversity:(Periods: 16)

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

Unit-III:Environmental Biology:(Periods: 16)

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

Unit-IV: Natural Resources:(Periods: 16)

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

REFERENCES:

1. Agarwal, K.C.2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.
2. BharuchaErach, The Biodiversity of India, Mapin Publishing Pvt. Ltd. Ahmedabad — 380 013, India, Email: mapin@icenet.net (R)
3. Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc.480p

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

Swami Ramanand Teerth Marathwada University, Nanded

Diploma in BEE KEEPING/ APICULTURE TECHNOLOGY (Agriculture and Allied Faculties)

First Year (Semester II)

Paper-XIII: Bee Products, Economics and Marketing. (DBK-07)

Maximum Marks: 100

Credits:4

Periods: (64 Periods) 4hrs per week

UNIT 1	11
Bee products – An introduction, honey, pollen, royal jelly, bees wax, propolis & venom, Significance of bee products.	
UNIT 2	11
Value added honey products. Properties of honey products, Nutrients and composition of honey, Acid content and flavor effects. Types of value added honey products.	
UNIT 3	10
Economics of bee keeping: Economics in small scale and large scale bee keeping. Economic Value of Commercial Beekeeping.	
UNIT 4	11
Marketing of bee products: Definition of marketing, Marketing Honey Comb and Honey, Marketing Pollination Services, Marketing Wax, Marketing Propolis, Marketing Pollen, Marketing Royal Jelly, Marketing Bee Venom, Marketing Adult and Larval bees, Costing and Financing the Marketing Activities.	
UNIT 5	11
Preparing bankable bee keeping project: Steps involved in starting a beekeeping project, Funding sources for beekeeping projects. Funds mobilization from state and national banks. Grant Resource and utilization.	
UNIT-6	10
Agmark Standard of Honey. Testing Facilities requirements for Honey and Honey Products. Facilities provided by central/State Government. Opportunities for developing a business model of beekeeping.	
References:	
Craig Hughes, 2010. Urban Beekeeping: A Guide to Keeping Bees in the City. e Good Life Press, Preston.	
Ted Hooper, By (author) Clive De Bruyn, By (author) Margaret Thomas, 2014. The Beginner's Bee Book. Stenlake Publishing, Ayrshire.	

Swami Ramanand Teerth Marathwada University, Nanded

Diploma in BEE KEEPING/ APICULTURE TECHNOLOGY (Agriculture and Allied Faculties)

First Year (Semester II)

Paper-XVI: Beehive Manufacturer and Bee Keeping Multiplier (DBK-08)

Maximum Marks: 100

Credits:4

Periods: (64 Periods) 4hrs per week

UNIT-I	11
1. Knowledge on health, safety precautions and first aid	
2. Brief account of honey bee colonies and scope of scientific bee keeping History of natural and ancient bee hives.	
3 Study of different types of natural, ancient and modern beehives.	
4 Scope and development of different beehives for domesticated species of honey bees	
UNIT_II	11
1. Wood selection for bee hive parts	
2 Types of existing beehives	
3. Design and construction of beehives. Equipments required for construction of beehives.	
4. Study of available polishing and painting techniques of bee hives	
UNIT-III	10
1 Selection and utility of different beehives	
2. Specification of different types of beehives used for modern / scientific bee culture.	
3. Scope of marketing of standard beehives	
4 An overview of proper waste disposal	
UNIT_IV	11
1. Queen life cycle	
2. Worker life cycle	
3. Royal Jelly production for Queen rearing	
4. Workers behavior in a Queen-less colony	
5 Workers behavior when they find artificial Queen Cup	
UNIT-V	11
1. Workers behavior while they starts feeding the larvae in the Queen Cup with Royal Jelly	
2. Queen marking and requeening	
3. Grafting, Cell punch, overcrowding, Queen castle, Splits and other recent methods of requeening	
UNIT-VI	10
Economics of setting up a beehive	

References:

1. Ted Hooper, 2010. Guide to Bees and Honey: The World's Best Selling Guide to Beekeeping. Northern Bee Books. Oxford.
2. David Cramp, 2012. The Complete Step-by-step Book of Beekeeping: A Practical Guide to Beekeeping, from Setting Up a Colony to Hive Management and Harvesting the Honey. Lorenz Books. London.
3. Graham, J M (1992) The hive and the honey bee. Dadant and Sons, Hamilton, Illinois.
4. Mishra R.C. (1995) Honey bees and their management in India. ICAR Publication, New Delhi.
5. Singh, S. (1971) Beekeeping in India, ICAR publication.

Further Readings:

1. Gupta, J.K., Sharma, H K and Thakur, R K. **2009**. Practical Manual on Beekeeping. Department of Entomology and Apiculture, Dr Y S Parmar University of Horticulture and Forestry, Nauni, Solan, p 83.
2. Gupta, J K. **2010**. Spring management of honey bee colonies. In “OAPI-012 Management of honey bee colonies; Seasonal and specific management (Block 2), Indira Gandhi National open university, school of Agriculture, New Delhi,, pp 5-14, p 105.
3. Gupta, J K. **2010**. Management in summer. In “OAPI-012 Management of honey bee colonies; Seasonal and specific management (Block 2), Indira Gandhi National open university, school of Agriculture, New Delhi,, pp 15-25, p 105.
4. Gupta, J K. **2010**. Management in monsoon season. In “OAPI-012 Management of honey bee colonies; Seasonal and specific management (Block 2), Indira Gandhi National open university, school of Agriculture, New Delhi, pp 26-33, p 105.
5. Gupta, J K. **2010**. Management in autumn season. In “OAPI-012 Management of honey bee colonies; Seasonal and specific management (Block 2), Indira Gandhi National open university, school of Agriculture, New Delhi, pp 34-40, p 105.
6. Gupta, J K. **2010**. Management in winter. In “OAPI-012 Management of honey bee colonies; Seasonal and specific management (Block 2), Indira Gandhi National open university, school of Agriculture, New Delhi, pp 41-50, p 105.
7. Gatoria, G.S., Gupta, J. K., Thakur, R.K. and Singh, J. **2011**. Mass queen bee rearing and multiplication of honey bee colonies. All India Co-ordinated project on honey bees and pollinators, ICAR, HAU, Hisar, p70.

Swami Ramanand Teerth Marathwada University, Nanded
Diploma in BEE KEEPING/ APICULTURE TECHNOLOGY (Agriculture and Allied Faculties)
First Year (Semester II)

Paper-XV: Honey and Bee Wax Collection (DBK-09)

Maximum Marks: 100 Credits:4 Periods: (64 Periods) 4hrs per week

1 Nutritional and medicinal values of honey

2 Need and method of testing the purity of honey

3 Understanding bee behavior

4 Understanding response of bees to the smoke

UNIT-II 11

1 Knowledge about the stinging process of honeybees

2 Remedies and prevention against bee stinging and bee venom

3 extraction of raw honey from beehives

4 Purification of Honey, bottle packing

UNIT-III 10

1. Agmark standard of Honey

2. Fssai standards of Honey

3 Marketing honey

4 Economics of honey collection and marketing.

UNIT-IV 11

1 Study of abandoned honey combs of dorsata and flowering

2 Physical and chemical properties of bees wax

3. Methods of Beewax collection and separation/extraction of beewax from honey combs.

UNIT-V 11

1 Importance and methods of testing bees wax for its purity

2. Different uses of Bees wax

3. Preparation methods of wax comb sheet

UNIT_IV 10

1. Installation of bee wax comb sheets in bee hive

2. Knowledge of marketing the bee wax

3. Economics of Beewax collection and marketing

References:

1.Ted Hooper, 2010. Guide to Bees and Honey: The World's Best Selling Guide to Beekeeping.Northern Bee Books. Oxford.

2.David Cramp, 2012. The Complete Step-by-step Book of Beekeeping: A Practical Guide to Beekeeping, from Setting Up a Colony to Hive Management and Harvesting the Honey. Lorenz Books. London.

3.Graham, J M (1992) The hive and the honey bee. Dadant and Sons, Hamilton, Illinois.

4.Mishra R.C. (1995) Honey bees and their management in India. ICAR Publication, New Delhi.

5.Singh, S. (1971) Beekeeping in India, ICAR publication.

Further Readings:

1.Gupta, J.K., Sharma, H K and Thakur, R K. 2009. Practical Manual on Beekeeping. Department of Entomology and Apiculture, Dr Y S Parmar University of Horticulture and Forestry, Nauni, Solan, p 83.

2. Gupta, J K. **2010**. Spring management of honey bee colonies. In “OAPI-012 Management of honey bee colonies; Seasonal and specific management (Block 2), Indira Gandhi National open university, school of Agriculture, New Delhi,, pp 5-14, p 105.
3. Gupta, J K. **2010**. Management in summer. In “OAPI-012 Management of honey bee colonies; Seasonal and specific management (Block 2), Indira Gandhi National open university, school of Agriculture, New Delhi,, pp 15-25, p 105.
4. Gupta, J K. **2010**. Management in monsoon season. In “OAPI-012 Management of honey bee colonies; Seasonal and specific management (Block 2), Indira Gandhi National open university, school of Agriculture, New Delhi, pp 26-33, p 105.
5. Gupta, J K. **2010**. Management in autumn season. In “OAPI-012 Management of honey bee colonies; Seasonal and specific management (Block 2), Indira Gandhi National open university, school of Agriculture, New Delhi, pp 34-40, p 105.
6. Gupta, J K. **2010**. Management in winter. In “OAPI-012 Management of honey bee colonies; Seasonal and specific management (Block 2), Indira Gandhi National open university, school of Agriculture, New Delhi, pp 41-50, p 105.
7. Gatoria, G.S., Gupta, J. K., Thakur, R.K. and Singh, J. **2011**. Mass queen bee rearing and multiplication of honey bee colonies. All India Co-ordinated project on honey bees and pollinators, ICAR, HAU, Hisar, p70.

Swami Ramanand Teerth Marathwada University, Nanded

Diploma in BEE KEEPING/ APICULTURE TECHNOLOGY (Agriculture and Allied Faculties)

First Year (Semester II)

Paper-XVI: Practical on : Bee Products, Economics and Marketing (DBK-10)

Maximum Marks: 75

Credits:03

Periods: (48Periods) 3hrs per week

1. Honey extraction, processing, bottling.
2. Bees wax rendering, purification
3. Royal jelly preparation.
4. Bee pollen, propolies extraction.
5. Value added honey product preparation.
- 6 Practicing extraction of honey
- 7 Practicing extraction of bee wax
- 8 Agmark Standard of Honey
- 9. FSSAI laws and regulations.**
- 10. Benefits of Bee keeping**

References:

- 1.Ted Hooper, 2010. Guide to Bees and Honey: The World's Best Selling Guide to Beekeeping.Northern Bee Books. Oxford.
- 2.David Cramp, 2012. The Complete Step-by-step Book of Beekeeping: A Practical Guide to Beekeeping, from Setting Up a Colony to Hive Management and Harvesting the Honey. Lorenz Books. London.
- 3.Graham, J M (1992) The hive and the honey bee. Dadant and Sons, Hamilton, Illinois.
- 4.Mishra R.C. (1995) Honey bees and their management in India. ICAR Publication, New Delhi.
- 5.Singh, S. (1971) Beekeeping in India, ICAR publication.

Swami Ramanand Teerth Marathwada University, Nanded

Diploma in BEE KEEPING/ APICULTURE TECHNOLOGY (Agriculture and Allied Faculties)

First Year (Semester II)

Paper-XVII: Practical on Beehive Manufacturer and Bee Keeping Multiplier (DBK-11)

Maximum Marks: 75

Credits:03

Periods: (48Periods) 3hrs per week

Lab course- Beehive Manufacturer

- 1 Practice health, hygiene and safety norms during working
- 2 Practicing care and maintenance and storage of tools, equipment and clothing
- 3 Identification of different types of wood used in beehive manufacturing
- 4 Practice drawing and measurements of all parts of the beehive such as ISI beehive, langsoth beehive, etc.
- 5 Identification and utility of tools
- 6 Practical handling of all tools and equipments.
- 7 Practicing cutting, joining, nailing, pasting and other carpentry work
- 8 Polishing manufactured beehives
- 9 Practicing packing and forwarding techniques

Practicals Lab course-Bee Keeping Multiplier

1. Identification of strong colonies
- 2 Identification of quality Queen
- 3 Preparing Queen builder colony
- 4 Practicing Queen cup preparation
- 5 Attaching Queen cups to the division frames
- 6 Practising use of grafting equipment
- 7 Identification of larvae aged below 48 hours
- 8 Practising placement of Royal Jelly before grafting the larvae
- 9 Practising grafting worker larvae into the queen cup
- 10 Observing development of Queen larvae in the Queen cup
- 11 Observing sealing of Queen cell
- 12 Confirming Queen emergence at appropriate day
- 13 Confirming Queen mating after 4 days of its emergence
- 14 Confirming egg laying by Queen
- 15 Preparing nucleus colony
- 16 Disposal of new colony
- 17 Cost analysis for multiplication of beecolony

References:

- 1.Ted Hooper, 2010. Guide to Bees and Honey: The World's Best Selling Guide to Beekeeping.Northern Bee Books. Oxford.
- 2.David Cramp, 2012. The Complete Step-by-step Book of Beekeeping: A Practical Guide to Beekeeping, from Setting Up a Colony to Hive Management and Harvesting the Honey. Lorenz Books. London.
- 3.Graham, J M (1992) The hive and the honey bee. Dadant and Sons, Hamilton, Illinois.
- 4.Mishra R.C. (1995) Honey bees and their management in India. ICAR Publication, New Delhi.
- 5.Singh, S. (1971) Beekeeping in India, ICAR publication.

Swami Ramanand Teerth Marathwada University, Nanded

Diploma in BEE KEEPING/ APICULTURE TECHNOLOGY (Agriculture and Allied Faculties)

First Year (Semester II)

Paper-XVII: Practical on Honey and Bee Wax Collection (DBK-12)

Maximum Marks: 75

Credits:03

Periods: (48Periods) 3hrs per week

Lab course-Honey collection

- 1 Practicing use of smokers to ward of bees from the colony
- 2 Practicing the use of honey extractor, uncapping knife, extraction tray, funnel, sieve, storage drums
- 3 Practicing cleaning, wiping of the equipment
- 4 Practicing safety and hygiene while extracting honey
- 5 Practicing the method of removing bees from honey combs
- 6 Practicing extraction without interference of bees on the extracted honey
- 7 Practicing honey extraction from Apisdorsata and Apis-florea bee colonies
- 8 Practicing use of safety outfit and veil
- 9 Practicing using ladders etc., to climb up to the wild bee colony
- 10 Practicing draining out honey from the cut combs.
- 11 Practicing filtering, processing and storing honey

Bee Wax Collection

Practicals

- 1 Practicing collection of black combs, cell scrapings after extraction of honey
- 2 Practicing extraction of wax from the bee womb by boiling water method.
- 3 Practicing extraction of wax by pressing method
- 4 Practicing bleaching of wax to obtain clean pure wax
- 5 Practicing use of bees for preparation of CF sheets
- 6 Practicing use of bees wax for Queen cup preparation
- 7 Storing of bees wax

References:

- 1.Ted Hooper, 2010. Guide to Bees and Honey: The World's Best Selling Guide to Beekeeping.Northern Bee Books. Oxford.
- 2.David Cramp, 2012. The Complete Step-by-step Book of Beekeeping: A Practical Guide to Beekeeping, from Setting Up a Colony to Hive Management and Harvesting the Honey. Lorenz Books. London.
- 3.Graham, J M (1992) The hive and the honey bee. Dadant and Sons, Hamilton, Illinois.
- 4.Mishra R.C. (1995) Honey bees and their management in India. ICAR Publication, New Delhi.
- 5.Singh, S. (1971) Beekeeping in India, ICAR publication.

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED
Choice Based Credit System (CBCS)
(Semester Pattern)
Theory Examination
Question Paper Pattern

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

Maximum Marks: 50

Time: 4.00 Hrs

-
- Q1.** Perform the Major Experiment(20 Marks).
OR
- Q1.** (a) Perform the Minor Experiment(10 Marks).
(b) Describe procedure and working of the Minor Experiment.....(10 Marks).
- Q2.** Perform the Major Experiment(20 Marks).
OR
- 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 Record book/Field Experiment Report/Collection and Samplings during Field Visits/Excursions.....(5 Marks).
