

Mahatma Gandhi Vidyamandir's
**Loknete Vyankatrao Hiray Arts, Science and Commerce College,
Panchavati, Nashik M.S. India 422003**

**National Skill Qualification Framework (NSQF)
A UGC sponsored Scheme**

For

Certificate Course in Apiculture

(From the Academic Year 2020-2021)

Welcome to the Certificate course on Apiculture

❖ **AIMS:**

1. To promote the study of beekeeping for the improvement crop yield.
2. To establish areas of conservation throughout the Nashik district farmland for the conservation of honey bee.
3. To provide education on Bee to increase public awareness of the native honey bee.
4. To promote the formation of Bee Improvement groups
5. To act in an advisory capacity to groups and individuals who wish to promote it.
6. To co-operate with other Bee-Keeping organisations with similar aims and to seek the help of the scientific community and other stake holders in achieving our aims and objectives.
7. To control quality and promote markets of honeybee products.

❖ **OBJECTIVES:**

To establish areas of conservation throughout the Nashik district for the conservation of the native honey bee

1. To use honeybee colonies to best execute the beekeeping management plan to maximize the collection of nectar to maximize honey production.
2. To provide pollination services for local food crops.
3. Explain the basic concepts of apiculture like systematics, colony organization, polymorphism, morphology and foraging.
4. Producing other honeybee substances, including bee pollen, propolis, and royal jelly.
5. To provide **Knowledge of honeybee biology, Knowledge of local nectar flows, Deciding on the goals and how to best use the colonies**
6. **To** build human resource in the beekeeping sector.
7. **To** justify the presence of bees to increase the agriculture productivity.

❖ **Rationales:**

By the end of the course, the student must be able to:

- To understand the basic life cycle of the honeybees, beekeeping tools and equipments
- To learn for managing beehives, bee enemies for honey production and pollination.
- Describe the importance, biology and management of bees.
- Demonstrate bee keeping management skills
- Apply the knowledge on bee biology and management to the development of the bee industry in agriculture field.
- To establish small scale agriculture based industry.

❖ **Market Survey:**

1. Yashwantrao Chavan Maharashtra Open University running beekeeping course as distance education.
2. Madhuban Honey of Govt. of Maharashtra at Mahabaleshwar District Satara producing and marketing bee products as well as they are ready to guide for this course.
3. Suprkruti Madhushala at Gangapur near Nashik is the institute guiding and train to students as well as farmers Nashik. Director of this institute Dr. T. B. Nikam is agree to provide beekeeping equipments and necessary guidance.

Trade: Agriculture

Course: Apiculture

Duration: Six Months

Eligibility/Minimum Qualification: 10+2 (12th) of any discipline

‘Apiculture’

Program of the Course:

1. Course will be of 30 Credits (20 theory + 10 practical). One credit is equivalent to 15 hour of teaching (Lecture/Tutorial) or 4 hours of practical work/field work per week.
2. Maximum number of Students per batch will be 50.
3. The candidate required to attend 75% lectures/periods.
4. The candidate must obtained 35% of the total marks in theory and practical/project work separate to pass the course.
5. Candidate will be offered English as a medium of instructions/examination.
6. The admission shall be opened to any candidate who passed 10+2 examination.
7. There is no age bar to participate in the course.
8. Certificate: Successful persons will be awarded certificates issued by National Skill Qualification Framework (NSQF) under UGC & LVH College, Panchavati, Nashik.

Syllabus of the Certificate Course

Course	Code	Title of the Course	No. of Topics	Credit	Marks
Paper I	APC:101T	Basics of Apiculture	10	4	100 (T)
Paper II	APC:102T	Beekeeping & Management	10	4	100 (T)
Paper III	APC:103T	Beekeeping Economics	10	4	100 (T)
Practical I	APC:104P	Practicals of Basics of Apiculture	10	4	100 (P)
Practical II	APC:105P	Practicals of Beekeeping & Management	10	4	100 (P)
Practical III	APC:106P	Practicals of Beekeeping Economics	10	4	100 (P)
Project	APC:107	Project	---	6	150 (P)
Total	06	---	--	30	300 (T)+ 450(P) = 750

Theory Syllabus for the six months Certificate Course

Paper I APC: 101T **Basics of Apiculture** 4C Total Lecture: 60

1. Introduction to Apiculture: Scope, importance, history of bee keeping 04
2. Types: Traditional bee keeping, Modern beekeeping, Urban or backyard beekeeping. 06
3. Apiculture development in India: institutions involved. Role of Central Honey Bee Research & Training Institute. 08
4. Basic Taxonomy: Honey bee species and identification. Origin, systematic and distribution of honey bees. Types of honey bees, Species of honey bees. Bee identification. 06
5. Basic concepts of morphology of Honey bees - indigenous, exotic 06
6. Social organization in honey bees: Drone, Worker and Queen, Colony life and social organization, Annual biological cycle of the bee colony. 06
7. Social behaviour and Communication 04
8. Production of Honey by honeybee: its medicinal properties, application in various fields, other valuable by products of honey bees 08
9. Honey: its medicinal properties - application in various fields - other valuable by products of honey bees. 06
10. Nutrients and composition of honey, Acid content and flavour effects, Value added honey products. Properties of honey products 06

1. Basic requirements of Tools for starting bee keeping: Getting Started in Beekeeping 08
2. Land and Buildings, Equipment and supplies. 06
3. Bee flora, importance propagation, congenial conditions for starting up of apiculture. 06
4. Migratory Bee Keeping: transportation of Colonies, floral Calendar designing 06
5. Bee keeping equipment - introduction to types of bee boxes - BIS standard Tools used in apiculture. 08
6. Bee breeding multiplication of colonies - Queen reaching technique. 06
7. Honey extraction & handling - Quality control standards - Honey testing kit 06
8. Processing of honey. Other valuable by products of honey bees 06
9. Bee venom & Royal jelly extraction. 04
10. Seasonal Management of bee colonies 04

1. Beekeeping as small scale agriculture industry 02
2. Pollination: Self and cross pollination 04
3. Improved Agricultural practices - crop pollination - Pesticides impact on Honey bees. 04
4. Bee as pollinators, types of crop pollinated by bees 06
5. Crop improvement: Quality and yield through honeybee pollination 06
6. Bee enemies and diseases: Introduction, Enemies of honeybees – Wax Moth, Ants, Wasps, Microbes, Pests; Diagnosis and identification. 06
7. Bacterial, viral, fungal and protozoan diseases; Mites attacking honeybees. 06
8. Economics in small scale and large scale bee keeping. Economic Value of Commercial Beekeeping. 04
9. Preparing bankable bee keeping project: Steps involved in starting a beekeeping project, Funding sources for beekeeping projects. 08
10. Types of value added honey products Marketing of bee products: Definition of marketing, Marketing Honey Comb and Honey 06
11. Marketing Pollination Services, Marketing Wax, Marketing Propolis, Marketing Pollen, Marketing Royal Jelly, Marketing Bee Venom, 04
12. Marketing Adult and Larval bees, Costing and Financing the Marketing Activities 04

1. Study of morphology and anatomy of honey bee (different body parts of honey bees and their modifications)
2. Identification of different species and sub-species of honeybees.
3. Study of development stages of life cycle of the different types of bees and time needed to complete each stage.
4. To observe organization of a honey bee colony and become familiar with their duties
5. To become familiar with developmental stages and life cycle of different castes of honey bees.
6. Social behaviour of honey bees: To understand communication system of a honey bee colony.
7. To become familiar with different equipments used in modern beekeeping for domesticating hive bees.
8. To understand technique of mass queen rearing of honey bees which include prerequisite to produce good queen, basic grafting, management of cell builder colony and handling of queens produced.
9. To become familiar with important bee enemies and their management.
10. To familiarize with honey bee diseases, their symptoms and management.

1. To understand basic principles of honey bee management.
2. To get detailed information on structure and size of movable frame hives used for domestication of *Apis cerana* and *Apis mellifera*.
3. To become familiar with parameters required for selection of good apiary site.
4. To learn handling of bee colonies, recording of colony data and precautions required.
5. To become familiar with flora used by honey bees during different period, supplementary feeding and honey extraction.
6. To know importance of different flora as nectar and pollen source and their flowering period.
7. To understand management practices required for scientific management of honey bee colonies during spring season.
8. To understand management of bee colonies for efficiently availing the honey flow.
9. To know method of honey extraction and preparing colonies for summer season, ensuing dearth period and attack of bee enemies, checking robbing and absconding of bee colonies.
10. To become familiar with different manipulations required in the management of bee colonies during different periods which includes uniting, dividing, queen management, supplementary feeding, robbing, absconding, etc.

1. Study of Bee products – An introduction, honey, pollen, royal jelly, bees wax, propolis & venom,
2. Significance of bee products.
3. To know expenditure involved and income generation from commercial bee keeping.
4. To learn manipulations required for quality honey production,
5. Safety of honey bees and increasing colony productivity.
6. To prepare colonies for successful wintering in case of stationary beekeeping and procedure of migrations in case of migratory bee keeping.
7. To understand management of bee diseases and enemies.
8. **Benefits of Bee keeping A:** Honey extraction, processing, bottling, Bees wax rendering, purification,
9. **Benefits of Bee keeping B:** Royal jelly preparation, Bee pollen, propolies extraction and Value added honey product preparation.
10. **To understand** Economic Value of Commercial Beekeeping.

Individual projects mainly based on field visits with allotted project guides. Final submission with thesis, presentation and viva-voce at the end examination.

Suggested Field Visits

Field visits are to be organised to facilitate students to have first-hand experience and exposure to technology / production / functioning of an organisation / unit or witness a relevant activity.

- Visit to one of the units with one or multiple activities such as, Honey bee Keeping / Honey Processing / Honey Marketing.
- Visit any production units such as, Honey Processing Unit or any Food industry Government Offices such as
 - National Bee Board (NBB), New Delhi.
 - Central Bee Research and Training Institute, Khadi and Village Industries Commission, Pune.
 - Local Apiculture centres such as Suprakruti Madhushala at Gangapur near Nashik, Pimpalgaon Apiculture centre, Agriculture research station, MPKV Igatpuri.
 - Madhuban Honey of Govt. of Maharashtra at Mahabaleshwar District Satara

Reference Books

- ABC & XYZ of Bee culture - A. I. Root
- 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.
- Alison Benjamin, By (author) Brian McCallum, 2008. Keeping Bees and Making Honey. David & Charles, Newton Abbot.
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- Asian Bee Journal
- Bee Keeping in India - G. K. Ghosh
- Beekeeping: A personal journey – Dennis Brown
- Craig Hughes, 2010. Urban Beekeeping: A Guide to Keeping Bees in the City. e Good Life Press, Preston.
- David Cramp, 2009. A Practical Manual of Beekeeping: How to Keep Bees and Develop Your Full Potential as an Apiarist. Spring Hill, London.
- 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, 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.
- Dewey M. Caron, 2013. Honey Bee Biology and Beekeeping, Revised Edition. Wicwas Press, Kalamazoo.
- Eva Crane, 1999. The World History of Beekeeping and Honey Hunting. Routledge, India.
- Hunt, G.J., 2000. Using honey bees in pollination Purdue University.
- Indian Bee Journal - All India Bee Keeping Association
- Kim Flottum, 2014. The Backyard Beekeeper: An Absolute Beginner's Guide to Keeping Bees in Your Yard and Garden. Quarry Books.
- Kim Pezza, 2013. Backyard Farming: Keeping Honey Bees: From Hive Management to Honey Harvesting and More. Hatherleigh Press, U.S.
- Kim Pezza, 2013. Backyard Farming: Keeping Honey Bees: From Hive Management to Honey Harvesting and More. Hatherleigh Press, U.S.
- Laidlaw, H.H., 1997. Contemporary queen rearing. Published by Dadant and Sons. R. A. Morse, Rearing queen honey bees. Wicwas press, NY.

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- Pradip V Jabde, 1993. Text Book of Applied Zoology: Vermiculture, Apiculture, Sericulture, Lac Culture, Agricultural Pests and their Controls. Discovery Publishing House, New Delhi.
- Prospective in Indian Apiculture - R.C. Mishra
- Rearing queen bees in India - M.C. Suryanarayana et. al.
- Roger A. Morse, Kim Flottum, 1998. Honey Bee Pests, Predators and Diseases. Wicwas Pr; 3rd edition.
- Technology and value addition of Honey - Dr. D. M. Wakhle and K. D. Kamble.
- Ted Hooper, 2010. Guide to Bees & Honey: The World's Best Selling Guide to Beekeeping. Northern Bee Books, Oxford.
- Ted Hooper, 2010. Guide to Bees and Honey: The World's Best Selling Guide to Beekeeping. Northern Bee Books. Oxford.8
- The Backyard Beekeeper - 3rd Edition: An Absolute Beginner's Guide to Bee Keeping – Kim Flottum

WEB ADDRESS:

<http://nbb.gov.in/>

www.kvic.org.in

www.honeyflow.com

https://practicalaction.org/docs/technical_information_service/honey_processing.pdf

YOU TUBE VIDEOS LINKS:

<https://www.youtube.com/watch?v=1rhm4uvkcUs>

<https://www.youtube.com/watch?v=I6E0yB0Ev0o>

<https://www.youtube.com/watch?v=RCfNG14aO4Y>

<https://www.youtube.com/watch?v=J0bl0HqN4Nk>

<https://www.youtube.com/watch?v=GMfCGhyS7fw>