Savitribai Phule Pune University

Shri Gurudeo Shikshan Prasarak Mandal's

Swami Muktanand College of Science, Yeola Dist: Nasik

Department of Zoology

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Title of the Certificate Course: Beekeeping

Annual Report

I have great pleasure to submit the report on "Certficate course of Beekeeping" Department of Zoology, Swami Muktanand College of science, Yeola Dist: Nasik, affiliated to Savitribai Phule Pune University Pune, newly started a certificate course as titled"BEEKEEPING" from August 2019.

Students of the college are from agricultural back ground. The main earning source of the citizens of Yeola thasil of Nasik district is the farming.. Main cash crop of farmers of this tehsil is the onion, and vegetables. The annual rain is moderate, but canal water sources available so many horticultures gardens of Pomegranate, Mango, Moring, Chiku (Achrus sapota), apple ber. Gava, Grapes, Papaya etc. But farmers are not aware about beekeeping. They don't know the advantages of beekeeping. So Department of Zoology take the initiative to start the Certificate course on Beekeeping by taking the prior permission of Management of Shei Gurudeo shikshan prasarak Mandal Yeola, and savitribai Phule Pune University Pune. Syllabus was approved by Board of Studies of Zoology, Savitribai Phule Pune university,Pune.

Objectives of the Certificate course "Beekeeping:

- To increase productivity of crops in the State by providing honey bees to the farmers for pollination.
- To maintain ecological balance in nature by way of domestication of honey bee species.
- To maintain small apiaries for demonstration, pollination, extraction and popularization of honey and other by-product of beekeeping.
- To encourage farmers' participation in scientific beekeeping. To provide technical knowledge to the farmers of the State and organization of short duration training courses in beekeeping.
- Motivation of unemployed youth to adopt beekeeping as source of their livelihood

After the prior permission, admission given to the students who are interested. Twenty students were taken admission to this Six month Certificate course.
The list of admitted students is as follows:

Sr. No	Name of the Student	Class
1	Miss More Rohini Pandit	S.Y.B.Sc
2	Miss Wakhare Kirti Subhash	S.Y.B.Sc
3	Miss. Rajpurohit Anita Kansing	S.Y.B.Sc
4	Miss. Dhandre Pooja Lahanu	S.Y.B.Sc
5	Miss .Dhandre Poonam Lahanu	S.Y.B.Sc
6	Miss Gavandi Sujata Ajay	S.Y.B.Sc
7	Miss. Suryavanshi Savita Dattatray	S.Y.B.Sc.
8	Miss. Gaikwad Sarika Janrdhan	S.Y.B.Sc.
9	Miss. Gaikwad Sonali Dnyandeo	S.Y.B.Sc.
10	Miss Kokate Poonam Sakharchand	S.Y.B.Sc.
11	Miss Kaharate Pratiksha Gorakhnath	T.Y. B.Sc.
12	Miss. Varhe Priyanka Tukaram	T.Y. B.Sc.
13	Miss. Yeole Kanchan Sainath	T.Y. B.Sc.
14	Miss. Kolhe Dipali Daulat	T.Y.B.Sc
15	Miss Shide Dipali Vijay	T.Y.B.Sc
16	Miss. Divte Ankita Prakash	T.Y.B.Sc.
17	Miss. Teke Mayuri Madhukar	T.Y.B.sc.
18	Miss. Lone Vaishali Ashok	T.Y.B.Sc.
19	Miss. SomvanshiVaishali Gorakhnath	T.Y.B.Sc.
20	Miss. Paithankar Nikita Balasaheb	T.Y.B.Sc.

Lectures and practical started from 16 August 2019. Three lecture and one practical were conducted every week. Lectures schedule time was 4 to 5 P.M, on Monday, Tuesday, and Wednesday while on Thursday practical at 4.00p.m to 5.pm. There was 48 hours Syllabus of this certificate course including two theory paper of 16 lectures and 16 practical.

This certificate course is mostly on practical and field based so, we were arranged the visits to apiary center. Department zoology setup the hive boxes of colonies of *Apis indica* and *Apis melifera* for practical purpose and to get the knowledge of life cycle of bees. Cast system of bees, importance of inspection of hive colony regularly. How the bees collect the pollen and nectar from flowers and store in the hive cells. How identified the ripened honey and when it extracted. Also gave the information about various products of beekeeping like bee wax, pollen, royal jelly. propolis, bee venom. Students worked on bee pollination and kept records of the flora where bees were visited.

Certificate course completed in the middle of Dec.2019. After then Theory and practical examination was arranged on in the first week of January 2020. The result was declare on 25 Jan .2020 and Certificates of completion with grades were distributed on 29 Jan 2020.

Outcomes of the Projects: Work Responsibilities of the students

1) Raise bees to produce honey pollinate crops

2) Assemble beehives, using hand tools

3) Arrange with sellers for purchases of honeybee colonies

4) Insert honeycomb of bees into beehive or inducts wild swarming bees into hive of prepared honeycomb frames

5) Place screen plug in hive entrance to confine bees and sets hive in orchard, clover field, or near other source of nectar pollen

6) Force bees from hive, using smoke pot or by placing carbolic acid soaked pad over hive to inspect hive to harvest honeycombs

7) Scrape out parasites, like wax moth larvae, and removes vermin, like birds mice

8) Destroy superfluous queen bee cells to prevent division of colony by swarming

9) Destroy diseased bee colonies, using fire

10) Burn hive of diseased bee colony or sterilizes hive, using caustic soda solution

11) Uncap harvested honeycombs extracts honey

12) Arrange with buyers for sale of honey

13) May cultivate bees to produce bee colonies and queen bees for sale be designated Bee Producer agriculture; Queen Producer agriculture.

Prof.Ajay P. Tribhuwan	Dr.Balasaheb B.Rahane	Dr. Dhanraj B.Goswami
Course Coordinator	Head of the Department	Principal

Savitribai Phule Pune University

Shri Gurudeo Shikshan Prasarak Mandal's

Swami Muktanand College of Science, Yeola Dist: Nasik

Department of Zoology

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Title of the Certificate Course: Beekeeping

Syllabus of Certificate Course

(From August, 2019)

Title of the Certificate Course: Beekeeping

Objectives:

1. To increase productivity of crops in the State by providing honey bees to the farmers for pollination.
2. To maintain ecological balance in nature by way of domestication of honey bee species.
3. To maintain small apiaries for demonstration, pollination, extraction and popularization of honey and other by-product of beekeeping.
4. To encourage farmers' participation in scientific beekeeping.
5. To provide technical knowledge to the farmers of the State and organization of short duration training courses in beekeeping.
6. Motivation of unemployed youth to adopt beekeeping as source of their livelihood.

Paper –I Theory Course
Fundamental Study of Beekeeping

Total Lectures: 16

Topic No.	Topic	Subtopics	No. of Periods
01	Introduction to Beekeeping	Modern Beekeeping and Its Management	02L
02	Honey Bee Species	Classification and Its Morphology	02L
03	Methods of Beekeeping	Scientific Bee Keeping with *Apis cerena* and *Apis mellifera*	04L
04	Caste System in honey bees	Life Cycle, Division of Labor and Beekeeping Equipments.	03L
05	Bee Behavior and Bee Communication	Swarming, absconding, Bee Language	03L
06	Breeding and Reproduction	Bee Breeding and Colony Reproduction	02L

Paper –II Theory Course
Technical Study of Beekeeping

Topic No.	Topic	Subtopic	No. of Period
01	Bee Management	Inspection of Colonies and Seasonal Management of Apiary.	02L
02	Bee Management	Inspection of Colonies and Seasonal Management of Apiary.	02L
03	Bee Pollination	Importance of Induced Pollination in Agriculture, Horticulture and in Forest.	02L
04	Beekeeping Status in India and Abroad.	Beekeeping development and institute pertaining to apiculture	02L
05	Honey Bee Products and their Values	Commercial Production	02L
06	Bee Product Export, Self Employment-	Women's, Tribal's and Farmer's Empowerment.	03L
07	Pesticides, Bee Diseases and its Control.	Types of Bee Diseases and their control measure.	03L

References:-

- Honey Bee and Their Management by S.B.Withhead.
- Apiculture in India by Atuar Rehman.
- Apiculture by K.V.Jayshree and C.S.Tharadevi
- The Honey Bee by Frank Benton.
- Guide to Bees and Honey by Ted Hooper
- The Bee Book by D.K.
- Bee Manual by Claire Waring.
- Natural Beekeeping by Ross Conrad.
- Bee Beekeeping by Eva Cranes.

Paper –III Practical Course (Any 15 Practicals to be performed)

Sr.No.	Topic	E/D
01	Study of honey bee species with the help of domesticated bee colonies & wild bee colonies. **1)** ***Apis cerena indica*** **2)** ***Apis mellifera*** **3)** ***Apis dorsata*** 4) ***Apis florea***	D
02	Study of caste system & division of labor in ***Apis cerena indica/ Apis mellifera.*** Queen bee, drone bee, worker bee. Worker bees (division of labor): cleaners, young nurse bees, builders, guard bees, foragers, fanners, Scouts bees.	D
03	Study of modern Beekeeping techniques of ***Apis cerena indica*** (Indian hive bee) **&** ***Apis mellifera*** (Italian/ Europe bee) & study of beekeeping equipments.	D
04	Study of life cycle of ***Apis cerena indica/ Apis mellifera*** with the help of domesticated honey bee colony.	D
05	To demonstrate method of honey extraction in ***Apis cerena indica/ Apis mellifera.***	E
06	Study of bee products and their uses.	D
07	To study method of wire embedding and attaching comb foundation sheets in ***Apis cerena indica and Apis mellifera***	E
08	To study method of preparation of sugar syrup and pollen supplement.	D
09	To study method of inspection of bee colony (***Apis cerena indica and Apis mellifera***)	D
10	To study chemical analysis of honey sample for testing its purity.	D
11	Microscopic observation of pollen grains from honey sample and identification of unifloral and multifloral honey.	E
12	To study bee enemies and bee diseases and their control measures.	D

13	To demonstrate method of capturing of wild colony of ***Apis cerena indica*** to start scientific beekeeping.	E
14	To study artificial queen rearing by crafting method.	D
15	To study method of colony division in ***Apis cerena indica & Apis mellifera.***	D
16	To prepare floral calendar of local area.	D
17	To demonstrate the methods of pollen collection ,royal jelly & bee venom	E
18	Field visit to Apiary or bee research/ training institute/ honey processing unit.	D
19	Project Report based on field studies/ laboratory work as per the guidance of academic adviser/ project guide.	D
20	Submission of herbarium including the presentation of crosses pollinated crops/ bee plants (floral structure).	D

Grading System will be followed for the evaluation on a ten point scale. The details of the grading system are given in the following Table.

Percentage Equivalence of Grade:

Range of % of Marks	**Grade Letter**	**Performance**	**Grade Point**
95 - ≤ 100	O	Outstanding	10
85 - < 95	A plus	Excellent	9
75 - < 85	A only	Very Good	8
65 - < 75	B plus	Good	7
55 - < 65	B only	Above Average	6
45 - < 55	C	Average	5
40 - < 45	P	Pass	4
< 40	F	Fail	0
Absent	Ab	Absent	0

Prof.Ajay P. Tribhuwan
Course Coordinator

Dr.Balasaheb B.Rahane
Head of the Department

Dr. Dhanraj B.Goswami
Principal

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Shri Gurudeo Shikshan Prasarak Mandal's

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Department of Zoology

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Result of the Certificate Course: Beekeeping

Year 2019-20

Sr. No	Name of the Student	Class	Paper I	PaperII	PaperIII	Total	%	Grade
1	Miss More Rohini Pandit	S.Y.B.Sc	**91**	**90**	**92**	**273**	**91**	**A +**
2	Miss Wakhare Kirti Subhash	S.Y.B.Sc	**87**	**84**	**90**	**261**	**87**	**A**
3	Miss. Rajpurohit Anita Kansing	S.Y.B.Sc	**95**	**96**	**95**	**286**	**95.3**	**O**
4	Miss. Dhandre Pooja Lahanu	S.Y.B.Sc	**73**	**74**	**75**	**222**	**74**	**B+**
5	Miss .Dhandre Poonam Lahanu	S.Y.B.Sc	**72**	**74**	**75**	**221**	**73.6**	**B+**
6	Miss Gavandi Sujata Ajay	S.Y.B.Sc	**77**	**78**	**80**	**235**	**78.3**	**A**
7	Miss. Suryavanshi Savita Dattatray	S.Y.B.Sc.	**94**	**96**	**95**	**285**	**95**	**O**
8	Miss. Gaikwad Sarika Janrdhan	S.Y.B.Sc.	**93**	**91**	**92**	**276**	**92**	**A+**
9	Miss. Gaikwad Sonali Dnyandeo	S.Y.B.Sc.	**78**	**79**	**84**	**241**	**80.3**	**A**
10	Miss Kokate Poonam Sakharchand	S.Y.B.Sc.	**71**	**72**	**77**	**220**	**73.3**	**B+**
11	Miss Kaharate Pratiksha Gorakhnath	T.Y.B.Sc.	**74**	**73**	**75**	**222**	**74**	**B+**
12	Miss. Varhe Priyanka Tukaram	T.Y.B.Sc.	**79**	**80**	**84**	**243**	**81**	**A**
13	Miss. Yeole Kanchan Sainath	T.Y. B.Sc.	**81**	**82**	**85**	**248**	**82.6**	**A**
14	Miss. Kolhe Dipali Daulat	T.Y.B.Sc	**87**	**88**	**90**	**265**	**88.3**	**A+**
15	Miss Shide Dipali Vijay	T.Y.B.Sc	**64**	**62**	**68**	**194**	**64.6**	**B**
16	Miss. Divte Ankita Prakash	T.Y.B.Sc.	**71**	**73**	**76**	**220**	**73.3**	**B+**
17	Miss. Teke Mayuri Madhukar	T.Y.B.Sc.	**79**	**82**	**84**	**245**	**81.6**	**A+**
18	Miss. Lone Vaishali Ashok	T.Y.B.Sc.	**73**	**72**	**77**	**222**	**74**	**A**
19	Miss. SomvanshiVaishali Gorakhnath	T.Y.B.Sc.	**78**	**77**	**85**	**240**	**80**	**A**
20	Miss. Paithankar Nikita Balasaheb	T.Y.B.Sc.	**81**	**79**	**87**	**247**	**82.3**	**A**

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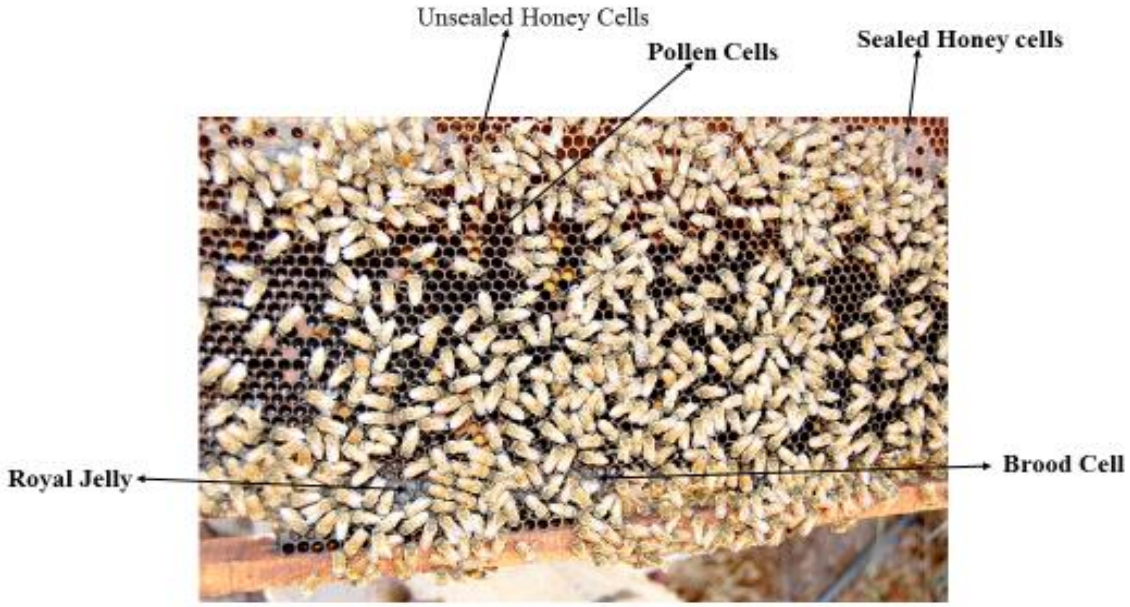
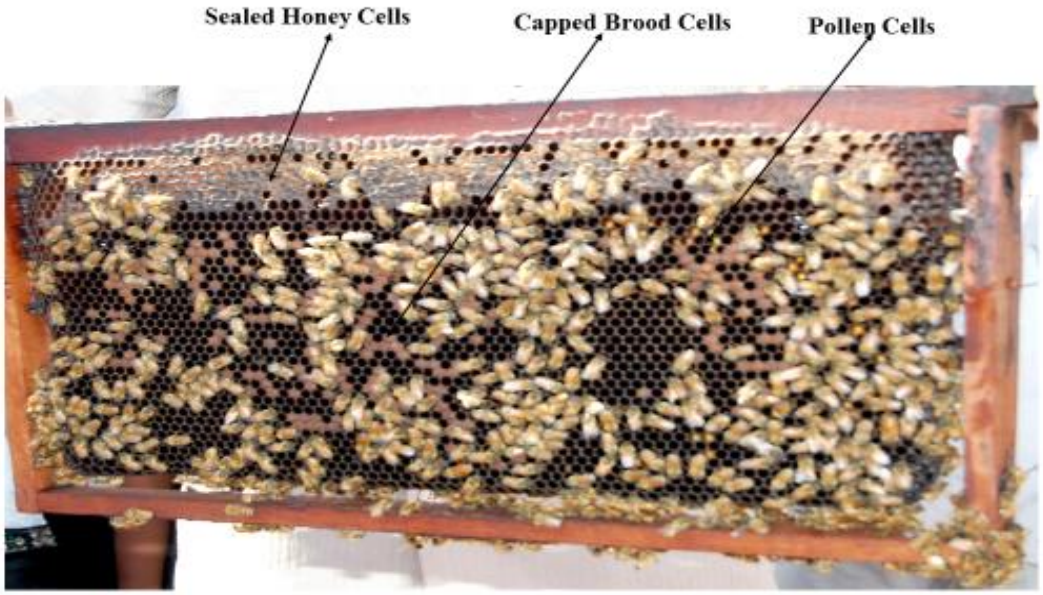
Photo Gallary of the Certificate Course: Beekeeping

1.Apis indica Bee hive boxes Kept in Pomegranate Garden 2.Bee hive boxes kept in Mango garden

3. Apis melifera hive boxes kept in Grapes and Pomegranate garden. 4. Lecture on LCD Projector in Laboratory



5. Live Hive frame of *Apis melifera* with Royal jelly, Brood, Pollen, Unsealed & sealed Honey Cells



6. **5. Live Hive frame of *Apis melifera* with , Capped Brood, Pollen, & sealed Honey Cells**

7. Demo of inspection of Colonies

8. Students handle the bee hive frame

9. Demo of inspection of Colonies

10. Students handle the bee hive frame

11. Students handle the bee hive frame **12. Students handle the bee hive frame**

13.Demo of extaction of honey . **14. Honey stored in botles.**

Prof.Ajay P. Tribhuwan
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Principal

II Parspar Deo Bhav II

Shri Gurudeo Shikshan Prasarak Mandal's

Swami Muktanand College of Science,Yeola Dist: Nasik

Affiliated to Savitribai Phule Pune University (ID No. PU/NS/ S/041 (1991)

DEPARTMENT OF ZOOLOGY

CERTIFICATE COURSE IN BEEKEEPING

(August 2019- January 2020)

CERTIFICATE of COMPLETION

This is to certify that Mr. /Mrs./Miss .

Class First/ Second/ Third B.Sc. Satisfactorily completed " CETIFICATE COURSE IN BEEKEEPING",

conducted by Department of Zoology, Swami Muktanand college of Science, Yeola Dist. Nasik from August 2019 to January 2020 with the Grade

Prof.Ajay P. Tribhuwan	Dr.Balasaheb B.Rahane	Dr. Dhanraj B.Goswami
Course Coordinator	Head of the Department	Principal