

PERIYAR INSITUTE OF DISTANCE EDUCATION (PRIDE)

PERIYAR UNIVERISTY

DIPLOMA IN APICULTURE

Regulations

1. CONDITION FOR REGULATIONS

A candidate who have passed the Higher Secondary Examination (Academic Stream) conducted by the government of Tamilnadu or an examination as equivalent to 10, +2 course including CBSE, which have been recognized by the Periyar University or any other University accepted by the syndicate as equivalent there to subject to such conditions as may be prescribed therefore shall be permitted to appear and qualify for Professional Diploma in Apiculture examination of this University 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 Apriculture 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.

4. COURSE OF STUDY

The course of study shall comprise instruction in books prescribed from time to time

1. Paper 1: Basics of beekeeping
2. Paper 2: Bee keeping techniques
3. Paper 3: Bee enemies, diseases, pesticide poisoning
4. Paper 4: Bee Products, Economics and Marketing
5. Paper 5 : Practical bee keeping -Lab
6. Paper 6: Benefits of Bee keeping - Lab

5. EXAMINATIONS

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

6. SCHEME OF EXAMINATIONS

The scheme of the Examinations shall be follows:

S.NO	PAPER CODE	TITLE OF THE PAPER	EXAM DURATION	MAX.MARKS
1.	PAPER 1	Basics of beekeeping	3	100
2.	PAPER 2	Bee keeping techniques	3	100
3.	PAPER 3	Bee enemies, diseases, pesticide poisoning	3	100
4.	PAPER 4	Bee products, economics and marketing	3	100
5.	PAPER 5	Practical bee keeping -Lab	3	100
6.	PAPER 6	Benefits of Bee keeping - Lab	3	100
TOTAL MARKS				600

7. PASSING MINIMUM

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

8. CLASSIFICATION OF SUCCESS FUL 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.

9. QUESTION PAPER PATTERN:

TIME: 3 hours

Max.marks: 100

PART A: 5 X 5=25

Answers all questions

Two questions from each unit with Internal Choice

PART: 5 X 15=75

Answer all questions

Two questions from each unit with Internal Choice

Diploma in Apiculture

Paper 1: Basics of beekeeping

UNIT 1

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

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.

UNIT 3

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

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,

UNIT 5

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

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.

Paper 2: Bee keeping techniques

UNIT 1

Basic requirements for starting bee keeping: Getting Started in Beekeeping - Land and Buildings, Equipments and supplies - Vehicle, hives.

UNIT 2

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 hives.

UNIT 3

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

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

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

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.

Paper 3: Bee enemies, diseases, pesticide poisoning

UNIT 1

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

UNIT 2

Mites attacking honey bees: Varroa mites, Mite Biology, Controlling Varroa Mites, Mechanical control, Mite-tolerant stocks, Biopesticides, Chemical (synthetic pesticide) treatments.

UNIT 3

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

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.

UNIT 5

v) 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.

Paper 4: Bee Products, Economics and Marketing

UNIT 1

Bee products – An introduction, honey, pollen, royal jelly, bees wax, propolis & venom, Significance of bee products.

UNIT 2

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

Economics of bee keeping: Economics in small scale and large scale bee keeping. Economic Value of Commercial Beekeeping.

UNIT 4

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

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.

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.

Apiculture - Practical papers

Practical 1: Practical bee keeping

1. Identification of different bee species and castes.
2. Hive inspection.
3. Dividing, uniting bee colonies, supering.
4. Supplementary feeding and honey extraction.
5. Swarm management.
6. Management of bee diseases and enemies.

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.

Practical 2: Benefits of Bee keeping

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.

References:

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

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.