Bee Keeping (BEKPA)
Syllabus

(Safety Practices 25 Hrs, Theory 100 Hrs, Practical 450 Hrs, Employability Skill 75 Hrs)

Details of Safety, Theory & Practical Syllabus

Sl. No	CONTENT	DETAILS	HOURS
1	**Maintain safety at the Apiary (25Hrs)**		
	Theory	1. Knowledge of aggressive nature and stringing habit of honey bees. 2. Use the appropriate tools (like smoker) required for handling the bees. 3. Knowledge of protective dress for the bee keeper. 4. Ensure that the necessary protective equipment (like bee vail, gloves) are available. 5. Follow safety methods while using sharp tools. 6. Do not move too much while handling bees. 7. Measures to be taken after stringing of bees. 8. Remove burrs or stuck material from the head of the chisel and the edges of tools. 9. Wear protective dress while opening the bee box 10. Clean all the tools properly after use. 11. Keep all the tools properly after use in clean place. 12. Inspect the tools regularly.	**25**
	I	**Safety**	**25**
2.	**Handling of bee box (22 Hrs) -** Illustrate handling of bee box		
	Practical	1. Practical handling of bee colonies 2. Demonstrate Knowledge of Safe working practices(like less movement of body parts), in apiary 3. Always wear protective dress and vail. 4. Method of opening of bee box. 5. Method of inspection of bee frames (like gentle movement of bee frames, both side inspection), of the bee box.	**22**
3	**Basic concept of bee keeping (29 Hrs) -** Explain bee keeping, its importance, its season wise nectar and pollen producing plants and the products obtained.		
	Theory	3.1 Definition of bee keeping 3.2 Importance of bee keeping as an income generation option. 3.3 Importance of bee keeping in agriculture 3.4 Season wise nectar and pollen producing plants(like coriander in winter) 3.5 Different products obtained from bee keeping(like bee wax, honey)	**7**
	Practical	1. Identification of different products obtained from bee keeping 2. Identification of nectar and pollen producing plants in the	**22**

		locality. 3. Identification of different equipment used in bee keeping. 4. Survey on abundance of nectar and pollen producing plants in the locality.	
4	**Life cycle of honey bee (58Hrs) –** Illustrate the life cycle of honey bee i.e. about its species, casts, nesting behavior, its relation with flowers, its nectar and pollen collecting organs		
	Theory	1. Different species of honey bees(like *Apis dorsata, Apis mellifera*) 2. Different casts of honey bees(like queen, drone, worker) 3. Nesting behavior of different species of honey bees 4. Life cycle of different casts in the colony 5. Work performed by different casts in the colony 6. Relation of honey bee and flower 7. Nectar and pollen collection organs of honey bees(name them mouth parts of honey bee, pollen basket) 8. Nectar and pollen collection methods (like nector lapping) of honey bees	**13**
	Practical	1. Identification of different species of honey bees 2. Identification of different casts of honey bees 3. Observation on nesting behavior of different species of honey bees 4. Observation on different stages of life cycle of different casts in the colony 5. Observation on work performed by different casts in the colony 6. Observation on honey and pollen collecting organs of honey bees 7. Observation on honey and pollen collection method of honey bees	**45**
5	**Methods of bee keeping (120 Hrs) -** Demonstrate methods of bee keeping involving arranging bee boxes, following artificial feeding methods at dearth period, extraction of honey and maintenance of hygiene.		
	Theory	5.1 Different methods of bee keeping for different species 5.2 Structures of bee boxes for different species 5.3 Arrangement of frames inside the bee box 5.4 Use of different equipment and tools in bee keeping 5.5 Artificial feeding methods(like sugar solution) for honey bees at dearth period 5.6 Methods of combining two bee colonies 5.7 Methods of splitting a bee colony into two colonies 5.8 Methods of honey extraction. 5.9 Selection of site for apiary 5.10 Maintenance of hygiene and sanitation in apiary site	**20**
	Practical	1. Demonstration on different methods of bee keeping for different species 2. Measurement of different parameters of bee boxes for different species 3. Measurement and arrangement of frames inside the bee box 4. Methods of putting new frame in a bee colony	**100**

		5. Demonstration on use of different equipments and tools in bee keeping 6. Artificial feeding methods for honey bees at dearth period with sugar solution and solid food. 7. Hand on practice on different methods of combining two bee colonies 8. Hand on practice on different methods of splitting a bee colonies in two colony 9. Honey extraction by squeezing method 10. Honey extraction by use of honey extractor 11. Survey for suitable site for apiary in the locality 12. Maintenance of hygiene and sanitation in apiary site by proper observation and cleaning.	
6	**Diseases, parasites and predators of honey bees (63Hrs) -** Illustrate Diseases, parasites and predators of honey bees.		
	Theory	1. Different diseases of honey bees a. Causal organism of the disease b. Epidemiology of the disease c. Symptom of the disease d. Progress of the disease e. Prevention and cure of the disease 2. Different parasites of honey bees a. Description of the parasite b. Pattern of infestation of parasites in honey bees c. Seasonal pattern of infestation d. Symptom of parasite infestation in honey bee e. Prevention and cure of parasite infestation in honey bees 3. Different predators of honey bee a. Descriptions of the predator b. Symptom of predator attack c. Methods of prevention against predator attack	**13**
	Practical	1. Identification of different diseases of honey bees a. Identification of symptoms of the diseases b. Observation on progress of the diseases c. Adoption of prevention and cure methods of the diseases 2. Different parasites of honey bees a. Identification of the parasite b. Identification of symptoms of parasite infestation in honey bee c. Adoption of prevention and cure methods of parasite infestation in honey bees 3. Different predators of honey bee a. Identification of the predator b. Identification of Symptoms of predator attack c. Adoption of methods of prevention against predator attack	**50**
7	**Seasonal management of Bee colony (59hrs) -** Explain the seasonal management of Bee		

	colony through management practices, methods of swarming control and swarm catch and appropriate time and methods of queen replacement		
	Theory	1. Seasonal management of bee colony a. Summer season management b. Winter season management c. Rainy season management 2. Swarming season of honey bee 3. Growth period of honey bee 4. Methods of swarming control 5. Methods of swarm catch 6. Appropriate time of queen replacement 7. Methods of queen replacement	**9**
	Practical	1. Seasonal management of bee colony 2. Methods of maintenance of ambient temperature in different seasons in bee colony (like covering the bee box with wet gunny bag in summer) 3. Observation on symptoms of swarming in honey bee colony 4. Observation on different parameters (like approximate number of egg laid per week) to measure the growth of honey bee colony 5. Practicing different methods of swarming control 6. Practicing different methods of swarm catch 7. Observation on appropriate time of queen replacement 8. Practice of methods of queen replacement in selected bee colony	**50**
8.	**Queen rearing in honey bee (41Hrs) -** Demonstrate Queen rearing in honey bee		
	Theory	1. Tools used for queen rearing 2. Different methods of queen rearing 3. Selection of healthy queen for queen replacement in bee colony	**6**
	Practical	1. Identification of tools (like queen rearing frame) used for queen rearing 2. Hands on practice of different methods of queen rearing 3. Selection criteria for healthy queen for queen replacement in bee colony 4. Process of queen replacement in bee colony.	**35**
9.	**Products obtained from bee keeping (71Hrs) -** Enlist the products obtained from bee keeping.		
	Theory	1. Different products obtained from bee keeping (like honey, bee wax) 2. Importance of different products obtained from bee keeping 3. Different tools used for production of different products of bee keeping (like honey extractor) 4. Production procedure of pollen 5. Production procedure of bee venom 6. Production procedures of propolis 7. Production procedures of royal jelly. 8. Production procedures bee wax	**11**
	Practical	1. Identification of different products obtained from bee keeping 2. Practical use of different products obtained from bee keeping.	**60**

		3. Identification of different tools used for production of different products of bee keeping 4. Hands on practice on production procedure of pollen 5. Hands on practice on production procedure of bee venom 6. Hands on practice on production procedures of propolis. 7. Hands on practice on production procedures of royal jelly. 8. Hands on practice on production procedures of bee wax	
10.	**Manufacturing of Bee Box (50 Hrs) -** Demonstrate manufacturing procedure of Bee Box		
	Theory	1. Tools used for manufacturing of bee box and wax sheet(like nail, wood cutter, screw driver) 2. Specification of bee box for different bee species 3. Specification of brood chamber and super chamber 4. Specification of bee frame 5. Specification of wax sheet	**5**
	Practical	1. Identification of tools used for manufacturing of bee box and wax sheet 2. Measurement of different parts of bee box for different bee species 3. Manufacturing of brood chamber and super chamber 4. Manufacturing of bee frame for different species 5. Manufacturing of wax sheet	**45**
11.	**Processing of honey (26Hrs) -** Illustrate methods of honey processing, packaging and preservation.		
	Theory	Methods of honey processing and preservation(like sheaving, heating etc)	**4**
	Practical	1. Straining of honey to remove foreign particles 2. Removal of excess moisture 3. Proper mixing of honey 4. Proper packaging and sealing of honey	**22**
12	**Quality testing of honey (11Hrs) -** Demonstrate Quality testing of honey		
	Theory	1. Measurement of pH of honey 2. Measurement of moisture content of honey	**2**
	Practical	1. Measurement of pH of honey by pH meter 2. Measurement of moisture content of honey by hygrometer	**9**
13.	**Preparation of bankable project proposal on bee keeping (10 hrs)**		
	Theory	1. Trainee will be able to explain his planning for a small scale entrepreneurship on bee keeping consisting of land selection, no of bee boxes and their arrangement, honey bee selection, bee rearing, market survey, cost estimation, packaging, processing and quality methods and loan proposal to financial institution for actual execution.	**10**
II		Theory (100 hours) + Practical (450 Hours)	**550 hours**
III		Employability Skills	**75 hours**
I+II +III= Safety 25 + Theory 100 + Practical 450+Employability Skills 75 = 650 hours			

Detail of Employability Skills Syllabus – 75 HRS

Sl. No.	Content	Details
1.	English Literacy & Communication Skills	Accentuation (mode of pronunciation) on simple words, Diction (use of word and speech) Transformation of sentences, Voice change, Change of tense, Spellings. Reading and understanding simple sentences about self, work and environment. Construction of simple sentences, Writing simple English. Speaking with preparation on self, on family, on friends, classmates, on know, picture reading gain confidence through role-playing . Taking messages, passing messages on and filling in message forms Greeting and introductions office hospitality, Resumes or curriculum vita essential parts, letters of application reference to previous communication. Communication and its importance, Principles of Effective communication, Types of communication – verbal, non verbal, written, email, talking on phone. Non verbal communication –characteristics, components-Para-language, Body – language, Barriers to communication and dealing with barriers. Handling nervousness/ discomfort. Self awareness, Importance of Commitment, Ethics and Values, Ways to Motivate Oneself, Personal Goal setting and Employability Planning. Manners, Etiquettes, Dress code for an interview, Do's & Don'ts for an interview, Problem Solving, Confidence Building, Attitude.
2.	I.T. Literacy	Introduction, Computer and its applications, Hardware andperipherals, Switching on-Starting and shutting down ofcomputer. Basics of Operating System, WINDOWS, The user interfaceof Windows OS, Create, Copy, Move and delete Files andFolders, Use of External memory like pen drive, CD, DVDetc, Use of Common applications. Basic operating of Word Processing, Creating, opening andclosing Documents, use of shortcuts, Creating and Editing ofText, Formatting the Text, Insertion & creation of Tables.Printing document. Basics of Excel worksheet, understanding basic commands,creating simple worksheets, understanding sample worksheets,use of simple formulas and functions, Printing of simple excelsheets Internet, Concept of Internet (Network of Networks), Meaning of World Wide Web (WWW), Web Browser, WebSite, Web page and Search Engines. Accessing the Internetusing Web Browser, Downloading and Printing Web Pages,Opening an email account and use of email. Social media sitesand its implication. Information Security and antivirus tools, Do's and Don'ts in Information Security, Awareness of IT – ACT, types of cyber crimes.
3.	Entrepreneurship Skills	Entrepreneurship vs. management, Entrepreneurial motivation. Performance & Record, Role & Function of Entrepreneur, Qualities of a good Entrepreneur, SWOT and RiskAnalysis. Concept & application of PLC, Sales &distribution Management. Different Between Small Scale &Large Scale Business, Market Survey, Method of marketing, Publicityand advertisement, Marketing Mix. Preparation of Project. Role of Various Schemes andInstitutes for self-

		employment i.e. DIC, SIDA, SISI, NSIC, SIDO, Idea for financing/ non financing support agencies to familiarizes with the Policies /Programmes& procedure & the available scheme. Project formation, Feasibility, Legal formalities i.e.,Shop Act, Estimation & Costing, Investment procedure – Loan procurement – Banking Processes.
4.	Productivity &Quality Tools	Definition, Necessity, Meaning of GDP. Personal / Workman – Incentive, Production linked Bonus,Improvement in living standard. Industry Nation. Skills, Working Aids, Automation, Environment, Motivation. How improves or slows down. Banking processes, Handling ATM, KYC registration, safecash handling, Personal risk and Insurance. Meaning of quality, Quality characteristic. Definition, Advantage of small group activity, objectives of quality Circle, Roles and function of Quality Circles in Organization, Operation of Quality circle. Approaches to starting Quality Circles, Steps for continuation Quality Circles. Idea of ISO 9000 and BIS systems and its importancein maintaining qualities. Purpose of Housekeeping, Practice of good Housekeeping.Basic quality tools with a few examples

Outcomes

OUTCOMES TO BE ASSESSED	ASSESSMENT CRITERIA FOR THE OUTCOME
1. Maintain safety at the Apiary	1.1 Assessor will judge if the trainee is able to explain the techniques of handling the aggressive nature and stringing habit of honey bees. 1.2 Trainee will be able to identify appropriate tools (like smoker, screw driver etc.) required for handling the bees and ensure that necessary protective equipment (like beevail, gloves)is available. 1.3 Trainee will be able to explain the measures to be taken while handling bees and the tools (such as not move too much while handling bees, Remove burrs or stuck material from the head of the chisel and the edges of tools, Clean all the tools properly after use, Inspect the tools regularly etc.) 1.4 Trainee will be able to demonstrate safety methods of using sharp tools. 1.5 Trainee will be able to list the antidotes (like removal of the string from skin, application of socked lime), their application method of bee stringing and measures to be taken while handling bees.

2. Illustrate handling of bee box	2.1 Trainee will be able to demonstrate practical process of handling bee colonies. 2.2 Trainee will be able to demonstrate Safe working practices (like less movement of body parts, gentle movement of bee frames) in apiary 2.3 Trainee will be able to demonstrate proper wearing of protective dress and vail for the bee keeper. 2.4 Trainee will be able to demonstrate safe method of opening the bee box and inspection of the bee frames of the bee box. 2.5 Trainee will be able to demonstrate methods (like presence of queen, presence of fresh eggs) of inspection of bee frames of the bee box.
3. Explain bee keeping, its importance, its season wise nectar and pollen producing plants and the products obtained.	3.6 Trainee will be able to define bee keeping and state importance as an income generation option. 3.7 Trainee will be able to explain the importance of bee keeping in agriculture. 3.8 Trainee will be able to identify season wise nectar and pollen producing plants (like mustard in winter, sesame in summer etc.) 3.9 Trainee will be able to make a survey on the abundance of nectar and pollen producing plants in the locality. 3.10 Trainee will be able to list different products (like bee wax, bee pollen etc) obtained from bee keeping. 3.11 Trainee will be able to identify different equipment (like smoker, encapping knife etc.) used for handling the bees.
4. Illustrate the life cycle of honey bee i.e. about its species, casts, nesting behavior, its relation with flowers, its nectar and pollen collecting organs.	4.1 Trainee will be able to identify different species (like *Apis dorsata. Apis mellifera* etc.) and casts (like queen, worker etc.) of honey bees. 4.2 Trainee will be able to demonstrate nesting behavior of different species of honey bees through chart preparation. 4.3 Trainee will be able to explain the life cycle of different casts in the colony and the work performed by them in the colony. 4.4 Trainee will be able to illustrate the life cycle of different casts in the colony and the work performed by them in the colony through chart preparations. 4.5 Trainee will be able to depict the relation of honey bee and flower through flow charts or line diagrams (example : (Flower + honey bee -> pollination -> development of fruit and seed -> germination of seed -> new plant) 4.6 Trainee will be able to demonstrate nectar and pollen collection organs (like pollen basket) of honey bees through pictorial presentation. 4.7 Trainee will be able to illustrate the nectar and pollen collection methods (like collection of nectar ->maturation of nectar -> sealing of honey chamber) of honey bees through flow charts.

5. Demonstrate methods of bee keeping involving arranging bee boxes, following artificial feeding methods at dearth period, extraction of honey and maintenance of hygiene.	5.11 Trainee will be able to explain different methods of bee keeping (like small box for *Apis cerena indica*)for different species(like *Apis cerena indica, Apis mellifera*) 5.12 Trainee will be able to measure different parameters of bee boxes for different species. 5.13 Trainee will be able toillustrate structures of bee boxes for different species through drawings. 5.14 Trainee will be able to demonstrate measurement and arrangement of frames inside the bee box and methods of putting new frame in a bee colony. 5.15 Trainee will be able to demonstrate the use of different equipment and tools in bee keeping. 5.16 Trainee will be able to explain the artificial feeding methods (like feeding of sugar solution) for honey bees at dearth period with sugar solution and solid food. 5.17 Trainee will be able to demonstrate the methods of combining two bee colonies and also splitting a bee colony into two colonies. 5.18 Trainee will be able to explain manual and mechanical honey extraction process. 5.19 Trainee will be able to demonstrate honey extraction by squeezing method and honey extraction by use of honey extractor. 5.20 Trainee will be able to list the criteria for selection of a site for apiary. 5.21 Trainee will be able to explain the ways of maintaining hygiene and sanitation in apiary site.
6. Illustrate Diseases, parasites and predators of honey bees.	6.1 Trainee will be able to explain different features about the diseases of honey bees (such as causal organism of the disease, epidemiology of the disease, progress of the disease, prevention and cure of the disease). 6.2 Trainee will be able to explain different features about parasites of honey bees(such as Description of the parasite, Pattern of infestation of parasites in honey bees, Seasonal pattern of infestation, Symptom of parasite infestation in honey bee, Prevention and cure of parasite infestation in honey bees. 6.3 Trainee will be able to identify symptoms of different disease and parasite attack of honey bees. 6.4 Trainee will be able to identify different parasites of honey bees, symptoms of parasite infestation. 6.5 Trainee will be able to explain different features of the predators of honey bee (such as descriptions of the predator, symptom of predator attack, methods of prevention against predator attack). 6.6 Trainee will be able to identify different predators of honey bee, Symptoms of predator attack. 6.7 Trainee will be able to list the precautionary measures for each disease, parasite and predator attack and the medicines for controlling those.

7. Explain the seasonal management of Bee colony through management practices, methods of swarming control and swarm catch and appropriate time and methods of queen replacement	7.1 Trainee will be able to explain seasonal (summer, winter, Rainy) management of bee colony. 7.2 Trainee will be able to demonstrate the methods of maintenance of ambient temperature in different seasons in bee colony. 7.3 Trainee will be able to list the management practices for each season. 7.4 Trainee will be able to demonstrate at least one important management for each season. 7.5 Trainee will be able to list the different parameters (like approximate number of worker after one month) to measure the growth of honey bee colony. 7.6 Trainee will be able to illustrate swarming season and growth period of honey bee. 7.7 Trainee will be able to demonstrate Methods of swarming control and swarm catch. 7.8 Trainee will be able to determine the appropriate time and methods of queen replacement
8. Demonstrate Queen rearing in honey bee	8.1 Trainee will be able to identify the tools (like grafting spoon) used for queen rearing. 8.2 Trainee will be able to demonstrate different methods of queen rearing. 8.3 Trainee will be able to explain the selection criteria (like robust queen, disease free queen) for healthy queen for queen replacement in bee colony. 8.4 Trainee will be able to explain the process of queen replacement in bee colony. 8.5 Trainee will be able to illustrate the process of queen rearing through flow chart.
9. Enlist the products obtained from bee keeping.	9.1 Trainee will be able to identify the tools required (like honey extractor)for production of different products (like honey)obtained from honey bee. 9.2 Trainee will be able to explain the importance of different products obtained from bee keeping. 9.3 Trainee will be able to make a flow chart on production of different products obtained from honey bee. 9.4 Trainee will be able to identify different tools used for production of different products of bee keeping. 9.5 Trainee will be able to demonstrate production procedure of pollen, bee venom, propolis, royal jelly, bee wax. 9.6 Demonstration of at least one production procedures of different products obtained from honey bee.

10.Demonstrate manufacturing procedure of Bee Box	10.1 Trainee will be able to identify different types of bee box. 10.2 Trainee will be able to list the specifications for different types of bee box. 10.3 Trainee will be able to identify tools used for manufacturing of bee box and wax sheet. 10.4 Trainee will be able to illustrate specification of bee box for different bee species, brood chamber and super chamber, bee frame, wax sheet. 10.5 Trainee will be able to demonstrate measurement of different parts of bee box for different bee species. 10.6 Trainee will be able to demonstrate preparation of one frame of bee box. 10.7 Trainee will be able to demonstrate the manufacturing process of brood chamber and super chamber, bee frame for different species, wax sheet.
11. Illustrate methods of honey processing, packaging and preservation.	11.1 Trainee will be able to identify different tools and equipment used for honey processing. 11.2 Trainee will be able to explain the different methods of honey processing and preservation. 11.3 Trainee will be able to explain the different steps of honey processing (such as straining of honey to remove foreign particles, removal of excess moisture, proper mixing of honey) 11.4 Trainee will be able to demonstrate at least one step of honey processing. 11.5 Trainee will be able to illustrate the methods of packaging & sealing of honey.
12.Demonstrate Quality testing of honey	12.1 Trainee will be able to identify tools and equipment used for honey testing. 12.2 Trainee will be able to demonstrate measurement of pH of honey by pH meter, moisture content of honey by hygrometer.
13. Prepare a bankable project proposal on bee keeping	13.1 Trainee will be able to explain his planning for a small scale entrepreneurship on bee keeping consisting of land selection, no of bee boxes and their arrangement, honey bee selection, bee rearing, market survey, cost estimation, packaging, processing and quality methods and loan proposal to financial institution for actual execution.
14. Understand and practice soft skills	14.1 Assessor will rate the trainee on his ability to practice soft skills, including clear and concise communication, in day-to-day work with team and with higher authority
15. Demonstrate knowledge of concept and principles of basic arithmetic and financial calculation and apply knowledge of specific area to perform practical operations.	15.1 Apply basic arithmetic calculations for arriving dimensional parameters as per drawing. 15.2 Apply basic financial calculation to understand cost of materials & labour and basic concepts of profit/loss, 15.3 Engage in basic banking transactions as customer

16. Explain time management, entrepreneurship and manage/organize related task in day-to-day work for personal & social growth.	16.1 Ascertain appropriate time for the assigned task. 16.2 Execute the assigned task within time frame. 16.3 Manage own work within specified time. 16.4 Explain importance & factors affect the development of entrepreneurship. 16.5 Identify service providers for developing entrepreneur/business establishment.