

Skill Based Education under National Skill Qualification Framework

UNIVERSITY GRANTS COMMISSION

Details of the Certificate Course Programme on Bee Keeper

A new Certificate course **on Bee Keeper** will be started by Mizoram University from **October 2018** for enabling the people in the region who have a background in agriculture to get a formal education and training. This Programme is designated for the youths of rural and semi urban areas like you, who are willing to make their career in the beekeeping sector. The course “**Beekeeper**” (NSQF compliant level 4), comprising of theory and practical components and is intended to provide you self-confidence and a new avenue to the future. After completing this course you will acquire all the competencies to carry out beekeeping operations. This will be full time credit-based modular programmes (150 hours, 30 credits), wherein banking of credits for skill and general education components shall be permitted. The curriculum is designed to give overall training to the student on understanding bee biology and behaviour, Handle beekeeping systems and beekeeping equipments, Beehive management, Manage insects, diseases and nuisances in beehive to harvesting, processing and market of products to create and manage bee farming as one of the enterprises. The course has been developed to impart skill based education under National Skill Qualification Framework (NSQF) recognized by the UGC under MHRD, Government of India.

The curriculum in each of the semesters of the programme will be a suitable mix of general education and skill development components. The General Education Component shall have 40% of the total credits and balance 60% credits shall be of Skill Component.

Skill Component Credits	General Education Credits	Total Credits for Award	Normal Duration	Awards
18	12	30	One semester	Certificate

HIGHLIGHTS OF THE PROGRAMME

- Certificate Course on Bee Keeper is a unique course introduced by Mizoram University in the region for enabling the youths of rural and semi urban areas to get a formal training and education in bee farming.
- The course is open to candidates who are 12th pass or equivalent from any recognized board or university.
- There shall be **NO** age bar for admission into Certificate Course on Bee Keeper.
- Preference will be given to candidates who have a background in agriculture related enterprises.

AWARD DURATION:

- ✓ With the successful completion of the program the student will receive a course certificate **of Bee Keeper** from Mizoram University.
- ✓ The curriculum in each of the semester/years of the program will be a suitable mix of general education and skill development components. The General Education Component shall have 40% of the total credits and balance 60% credits shall be of Skill Component.
- ✓ The curriculum includes: understanding bee biology and behaviour, Handle beekeeping systems and beekeeping equipments, Beehive management, Manage insects, diseases and nuisances in beehive to harvesting, processing and market of products to create and manage bee farming.
 - Candidates will be sent on internship to premier institutions such as Khadi & Village Industries Commission, National Bee Board, Indian Institute of Entrepreneurship and field visits.
 - Experts from premier institutes will be invited to train the students in relevant subjects.
 - Scholarship of ` 1000 per month will be given to the students at the end of the semester after successful completion of one semester.

FOR FURTHER DETAILS PLEASE CONTACT

Prof. G. Gurusubramanian

Department of Zoology

Mizoram University

Tanhril, Aizawl -796004.

Mob. No: 9862399411

Email: gurus64@yahoo.com

Name of the sector: Agriculture **NSQF level:** 4 **OCCUPATION:** Bee-Keeping

Role Description: Managing colonies of bees, harvesting honey; selling of raw and finished products in the market.

No. of hours: 150 h

Minimum educational qualification: 10 + 2

Proposed intake of students (per semester):25

Progression from the qualification: Honey Technician, Organic Honey Supplier

Partner Industry: Mizoram Khadi Village Industries Board, MDTC, Zemabawk, Aizawl, Mizoram 796017

KrishiVigyan Kendra, Gautum Buddha Nagar, Uttar Pradesh



NSQF Level	Skill Component Credits	General Education Credits	Total Credits for Award	Normal Duration	Exit Points / Awards
4	18	12	30	One Semester (06 months)	Certificate

Beekeeper: The bee-keeper manages colonies of bees in order to harvest honey and other Bee related by-products (wax, pollen, propolis, royal jelly, bee venom etc). His responsibilities include nurturing the bees to sell the raw and finished products in the market.

Brief Job Description: The individual at work is responsible for carrying out bee-keeping operation right from understanding bee biology and behaviour to harvesting and processing of products.

Professional Knowledge: The individual need factual knowledge of handling beekeeping system, beekeeping equipments, harvesting and processing requirements etc.

Process required: Individual at this job role is requires to manage beehive for that purpose she/he also manage insects, diseases and nuisances in bee hive. Finally she/he requires doing all the familiar and predictable works like harvest, process and market the produce.

Professional Skills: The individual manage the operations and functions of farms mostly routine & repetitive, such as handling beekeeping equipments, and other systems, colony management, record keeping of all the activities etc. in order to achieve qualitative final produce.

Core Skills: In order to correctly perform the tasks related to handling, processing, pest and disease management, etc. and to ensure health and safety, individual requires communication skills with required clarity, and basic understanding of social, political and natural environment.

Responsibility: The individual is responsible for own work such as installation of beehive, colony management, colony inspection, processing and selling the produce (level 4).

Personal Attributes: The job requires the individual to have mental and physical ability, good sight, attention to details, capability to follow safety procedures and stamina to work for long hours.

Course Structure:

Formal structure of the qualification							
Unit Title	Unit Code	Mandatory/Optional	Estimated size (learning hours)	Level	Theory Marks [credit]	Skill practical Marks [credit]	Total Marks [credit]
Understand bee biology and bee behaviour	AGR/N5301	Mandatory	20	4	23 [2]	22 [3]	45 [5]
Handle beekeeping systems and beekeeping equipments	AGR/N5302	Mandatory	30		15 [1]	15 [2]	30 [3]
Beehive management	AGR/N5303	Mandatory	35		45 [4]	45 [5]	90 9
Manage insects, diseases and nuisances in beehive	AGR/N5304	Mandatory	30		30 [2]	30 [4]	60 [6]
Harvest, process and market the produce	AGR/N5305	Mandatory	35		37 [3]	38 [4]	75 [7]
			150 h				
Grand Total marks					150	150	300
Grand Total Credits					[12]	[18]	[30]

- The concerned Sector Skill Council will support in framing the regionally relevant skill curriculum based on the appropriate QPs / NOSs in the sector.
- The minimum educational qualification for admission under this scheme will be class 12 pass or equivalent from any recognized board or university.
- Reservation to SC, ST, OBC and PwD categories will be available as per the extant National / State policy.
- There shall be no age bar for admission in the skill based certificate /diploma/ degree programmes

under NSQF.

- While deciding criteria for admission into any particular trade, the institutions will consider students having background in relevant stream at 10+2 level.
- In the syllabus course 60% weightage is given to skill development components and 40% weightage to general education component.
- The general education component may also include the course(s) which are supportive to core trade in addition to communication skills, soft skills, ICT skills, critical thinking, problem solving, environmental studies and value education.
- The practical / hands-on portion of the skills component of the curriculum shall be transacted in face to face mode. The skill component of these programmes will conform to the QPs/NOSs and the general education component will conform to the university norms.

NSQF Level	Skill Component Credits	General Education Credits	Total Credits for Award	Normal Duration	Exit Points / Awards
4	18	12	30	One semester	Certificate

- The NSQF Levels in above illustrations indicate that there should be at least one job role at the concerned NSQF Level in the curriculum to be assessed and certified for skill component. The normal training hours for skilling should be proportionate to the weightage for skill credits and an appropriate component of skill training may be imparted as on-site training at actual work place.
- One credit is equivalent to one hour of teaching (lecture or tutorial) or two hours of practical work/field work per week. Accordingly, one Credit would mean equivalent of 14-15 periods of 60 minutes each or 28 – 30 hrs of workshops/ labs.
- For internship / field work, the credit weightage for equivalent hours shall be 50% of that for lectures / tutorials.
- For self-learning, based on e-content or otherwise, the credit weightage for equivalent hours of study shall be 50% of that for lectures / tutorials.
- UGC guidelines on Choice Based Credit System (CBCS), and Guidelines on Curricular Aspects, Assessment Criteria and Credit System in Skill based Vocational Courses may be referred for further illustration on computation of SGPA, CGPA etc. to confer the awards as above.
- Letter Grades and Grade Points: it is recommended to adopt 10- point grading system with the Letter grades as given below:

Letter Grade	Grade Point
O (Outstanding)	10
A+ (Excellent)	9
A (Very Good)	8
B+ (Good)	7
B (Above Average)	6
C (Average)	5
P (Pass)	4
F(Fail)	0
Ab (Absent)	0

- A student obtaining Grade F and Ab shall be considered failed and will be required to reappear in the examination.
- Computation of Semester Grade Point Average System (SGPA) and Cumulative Grade Point Average (CGPA): Following SGPA and CGPA computed as per procedure enumerated below.
- The SGPA is the ratio of sum of the product of the number of credits with the grade points scored by a student in all the course components taken by a student and the sum of the number of credits of all the courses undergone by a student in a semester, i.e

$$\text{SGPA (S}_i\text{)} = \sum(C_i \times G_i) / \sum C_i$$

where 'C_i' is the number of credits of the ith course component and 'G_i' is the grade point scored by the student in the ith course component.

- The CGPA is also calculated in the same manner taking into account all the courses undergone by a student over all the semesters of a programme, i.e.

$$\text{CGPA} = \sum(C_i \times S_i) / \sum C_i$$

where 'S_i' is the SGPA of the ith semester and C_i is the total number of credits in that semester.

- The SGPA and CGPA shall be rounded off to 2 decimal points and reported in the transcripts.
- The skill component would be taken as one of the course component in calculation of SGPA and CGPA with given credit weightage at respective level.
- In case of Community Colleges, admissions may be done twice a year, depending on the duration of the programmes, to facilitate a steady stream of learners joining the college and moving out as trained work force to the job market. The applicants seeking re-entry into the CC should get preference in admission over the new applicants.
- Student fee should be decided as per the prevalent practice for fee fixation taking into account for the

sustainability of the programme. Attempt should be made to recover part of the expenditure under the scheme from the student fee.

- In order to motivate students to join courses in Community Colleges scheme, a scholarship of Rs. 1,000/- per month will be provided to the students at the end of each semester, subject to their satisfactory attendance and on successfully qualifying the end semester examination without any back paper/back log. In the event of short attendance or failure of student in the end semester examination, she/he will not be entitled for scholarship during that semester. No arrears shall be admissible to the student for such period.
- However, for the Community Colleges component, the institution / college concerned may itself award Diploma / Certificates under its own seal and signature after written authorization from affiliating University; name of the affiliating university and scheme should be mentioned on award certificate as notified by UGC letter F.No. 1- 54/2013(CC/NVEQF) dated 13th August, 2014.

1. Details of the Proposed Programmes:

S	Name of Trade or	Name of the	Duration	No. of	Job R o l e s	Partn er Indus	Pr op es
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1.	Agriculture	Certificate course on Bee Keeper	150 hours	No. of Semesters	<p>Bee Keeper Job roles:</p> <ul style="list-style-type: none"> • A Beekeeper does routine & predictable work such as managing the operations and functions required for Beehive and marketing the produce. • Works independently and is responsible for own work & learning. • He/she is the decision-maker in hiring workers if required; and in determining amounts and kinds of supplies to be purchased and taking preventive & control measures for any nuisances in Beehive. • He/she exhibits basic understanding of social, political & natural environment and communicate clearly with the workers and market agents. <p>Level Proposed: 4 Vide Annexure 1</p>	<p>Mizoram Khadi Village Industries Board, MDTC, Zemabawk, Aizawl, Mizoram 796017</p> <p>Mizoram Khadi Village Industries Board, New Capital Complex, Khatla, Aizawl, Mizoram</p> <p>Krishi Vigyan Kendra, Gautum Buddha Nagar, Uttar Pradesh</p>	50
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Alignment with National Occupational Standard of the Sector Skills Council and National Skill Qualification Framework:

S.No.	Name of the Sector / Programme	Semester	Job role(s) Covered	NSQF Level	Remarks
1.	Agriculture Certificate course on Beekeeper	1 (06 months)	<ul style="list-style-type: none"> • The course “Beekeeping” (NSQF compliant level 4), comprising of theory and practical components and is intended to provide you self-confidence and a new avenue to the future. • This Programme is designated for the youths of rural and semi urban areas like you, who are willing to make their career in the beekeeping sector. • After completing this course you will acquire all the competencies to carry out beekeeping operations right from understanding bee biology and behaviour, Handle beekeeping systems and beekeeping equipments, Beehive management, Manage insects, diseases and nuisances in beehive to harvesting, processing and market of products. • After completing this course you may either work independently or may work in a beekeeping farm. 	4	Syllabus is framed in arrangement with National Occupational Standard of the Sector Skills Council and National Skill Qualification Framework.

Proposed subjects / papers in each of the semester of proposed programmes to be offered in Centre separately for the General Education and Skill component.

Semester-1 – Unit and Unit code		Credits
1.	Understand bee biology and bee behaviour (AGR/N5301)	5
2.	Handle beekeeping systems and beekeeping equipments (AGR/N5302)	3
3.	Beehive management (AGR/N5303)	9
4.	Manage insects, diseases and nuisances in beehive (AGR/N5304)	6
5.	Harvest, process and market the produce (AGR/N5305)	7
Total credits		30

Course Structure

Formal structure of the qualification							
Unit Title	Unit Code	Mandatory/ Optional	Estimated size (learning hours)	Level	Theory Marks [credit]	Skill practical Marks [credit]	Total Marks [credit]
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Beehive management	AGR/N5303	Mandatory	35		45 [4]	45 [5]	90 9
Manage insects, diseases and nuisances in beehive	AGR/N5304	Mandatory	30		30 [2]	30 [4]	60 [6]
Harvest, process and market the produce	AGR/N5305	Mandatory	35		37 [3]	38 [4]	75 [7]
Grand Total					150 [12]	150 [18]	300 [30]

Guidelines for Assessment:

1. Criteria for assessment for each Qualification Pack is created by the Sector Skill Council. Each Performance Criteria (PC) will be assigned marks proportional to its importance in National Occupational Standards (NOS).Sector Skill Council (SSC)is also lay downproportion of marks for Theory and Skills Practical for each PC.
2. The assessment for the theory part is based on knowledge bank of questions created by the SSC.
3. MZU creates*unique question papers for theory part for each candidate at each examination* as per assessment criteria.
4. MZU creates*unique evaluations for skill practical for every student at eachexamination* based on this criteria.
5. To pass the Qualification Pack (QP), every trainee should score a minimum of 60% in aggregate and 40% in eachNOS
6. The marks are allocated PC wise; however, every NOS will carry a weightage in the total marks allocated tothe specific QP.

Syllabus

Understand Bee Biology and Behaviour

Code: AGR/N5301

Learning hours: 20 h

Marks: 45

Credit: 5

Description	This unit is about dealing with understanding bee biology and behaviour of different species of bees.
Scope	<p>This unit/ task covers the following:</p> <ul style="list-style-type: none"> • identify the different types of bees • understand life cycle of the different types of bees • understand different communication methods used by bees • understand the pollination process and construct a flowering calendar
Performance Criteria(PC) with reference to the Scope	
Element	Performance Criteria (PC) [Total marks = theory + Skill practical]
Identify the different species of bees	<p>To be competent, the individual must be able to:</p> <p>PC1. Identify different species of bees [3 = 1+2]</p> <p>PC2. Identify sub-species of bees [3 = 1+2]</p> <p>PC3. Identify different races of bees [3 = 0+3]</p> <p>PC4. Ascertain life span of different bees [3 = 3+0]</p> <p>PC5. Ascertain different roles played by different types of honey bee [3 = 3+0]</p>
Life cycle of the different bee castes	<p>To be competent, the individual must be able to:</p> <p>PC6. Ascertain different development stages of life cycle of the different types of bees [3 = 1+2]</p> <p>PC7. Identify time needed to complete each stage [3 = 0+3]</p> <p>PC8. Identify raw produce generated by bees during life cycle [3 = 0+3]</p>
Communication in bees	<p>To be competent, the individual must be able to:</p> <p>PC9. Identify different communication methods as drumming feet, flapping wings etc.</p>

	<p>[3 = 0+3]</p> <p>PC10. Ascertain communication style to locate food source [3 = 3+0]</p> <p>PC11. Ascertain communication style to locate new home to which bees intend to swarm. [3 = 3+0]</p>
Pollination	<p>To be competent, the individual must be able to:</p> <p>PC12. Ascertain mixing of the male and female parts of flower [3 = 3+0]</p> <p>PC13. Identify reproduction of flowering plants [3 = 0+3]</p> <p>PC14. List down bee forage plants [3 = 2+1]</p> <p>PC15. Construct a flowering calendar for their local areas [3 = 3+0]</p>
	<p>Total = [45 marks = 23 theory + 22 Skill practical]</p>
<p>Knowledge and Understanding (K)</p>	
A. Characteristics of bees	<p>Individual on the job needs to know and understand:</p> <p>KA 1. Different species/sub-species of bees</p> <p>KA 2. Life span and roles of different species of bees</p> <p>KA 3. Different life stages of species of bees</p> <p>KA 4. Raw produce generated by them at different life stages</p> <p>KA 5. Different communication styles of different bees</p>
B. Communication	<p>The individual on the job needs to know and understand:</p> <p>KB1. Different communication methods such as drumming feet, flapping wings etc.</p> <p>KB2. Communication styles for food location and new homes to bees</p>
C. Climatic Conditions	<p>The individual on the job needs to know and understand:</p> <p>KC 1. Climatic requirements of the different bees species</p> <p>KC 2. Different climatic requirements during the different life stages of the different bees species</p>
D. Pollination	<p>The individual on the job needs to know and understand:</p> <p>KD 1. Mixing of male and female parts of flower</p> <p>KD 2. Reproduction of flowering plants</p> <p>KD 3. Promotion and conservation techniques for bees</p> <p>KD 4. Use of different promotion and conservation techniques of bees</p>

Skills (S)

<p>A. Core Skills/ Generic Skills</p>	<p><u>Writing skills</u></p> <p>SA1. The individual on the job needs to know and understand how to collect data, maintain the documents and reports.</p>
<p>A. Core Skills/ Generic Skills</p>	<p><u>Reading skills</u></p> <p>The individual on the job needs to know and understand how to:</p> <p>SA2. Get awareness at the bee-keeper’s level about the role of honeybees in pollination and biodiversity conservation through reading.</p> <hr/> <p><u>Oral Communication (Listening & Speaking Skills)</u></p> <p>The individual on the job needs to know and understand how to:</p> <p>SA3. Maintain effective working relationships with bee-keeping experts/trainers</p> <p>SA4. Communicate clearly and effectively with others like bee-keepers, concerned officer/stakeholders</p> <p>SA5. Comprehend information shared by senior people and experts</p>
<p>B. Professional Skills</p>	<p><u>Decision Making</u></p> <p>The individual on the job needs to know and understand how to:</p> <p>SB1. Observe things accordingly to understand bee biology and behaviour</p> <p>SB2. Make decisions pertaining to the concerned area of work</p> <p>SB3. Identify problems that may arise in carrying out tasks and take preventative action</p> <p>SB4. Take decision to achieve monetary gain</p> <hr/> <p><u>Plan and Organize</u></p> <p>The individual on the job needs to know and understand: how to</p> <p>SB5. Proper planning for understating bee biology and behaviour</p> <p>SB6. Organize meetings / demonstrations with training providers and concerned departments whenever necessary</p> <hr/> <p><u>Customer Centricity</u></p> <p>The individual on the job needs to know and understand how to:</p> <p>SB7. Participate in bee-keeping exhibition/seminar/workshop</p> <p>SB8. Attend and make use of exposure visit</p>

	<p>SB9. Work with bee-keeping experts and trainers</p> <p>SB10. Maintain and manage good relationships with assisting workforce and otherco- bee-keeper's</p> <p>SB11. Build relationships and use human centric approach</p>
<p>B. Professional Skills</p>	<p><u>Problem Solving</u></p> <p>The individual on the job needs to know and understand how to:</p> <p>SB12. Think through the problem, evaluate the possible solution(s) and adopt an optimum /best possible solution(s)</p> <p>SB13. Identify problems immediately and take up solutions quickly to resolve delays</p>
	<p><u>Analytical Thinking</u></p> <p>The individual on the job needs to know and understand how to:</p> <p>SB14. Monitor and maintain the material and equipment required for various farm operations</p>
	<p><u>Critical Thinking</u></p> <p>The individual on the job needs to know and understand how to:</p> <p>SB15. Apply, analyze, and evaluate the information on crops which provide nectar and pollen for the honey bees when the nectar flow occur</p>

Handle beekeeping systems and beekeeping equipments

Code: AGR/N5302 Learning hours: 30 h

Marks: 30

Credit: 3

Description	This unit is about dealing with handling different bee-keeping systems and bee-keeping equipments in various beekeeping operations
Scope	<p>This unit/ task covers the following:</p> <ul style="list-style-type: none"> • This unit/ task covers the following: • Handle bee-keeping systems • Handle bee-keeping tools
Performance Criteria(PC) with reference to the Scope	
Element	Performance Criteria (PC) [Total marks = theory + Skill practical]
Handle beekeeping systems	<p>To be competent, the individual must be able to:</p> <p>PC1. Identify different bee-keeping systems ranging from the local/traditional systems to the modern systems [4 = 0+4]</p> <p>PC2. Ascertain importance of economic aspects of the different bee-keeping systems [5 = 3+2]</p> <p>PC3. Select the most appropriate bee-keeping system (best hive type) for their areas based on cost benefit analysis [8 = 3+5]</p>
Handle beekeeping tools	<p>To be competent, the individual must be able to:</p> <p>PC4. Identify and use of modern bee-keeping tools [4 = 0+4]</p> <p>PC5. Ascertain the working of the different bee-keeping tools [4 = 4+0]</p> <p>PC6. Ascertain importance of economic aspects of the different bee-keeping tools [5 = 5+0]</p>
	Total = [30 marks = 15 theory + 15 Skill practical]
Knowledge and Understanding (K)	

A. Characteristics of different beekeeping systems	<p>Individual on the job needs to know and understand:</p> <p>KA 1. Different traditional and modern bee-keeping systems</p> <p>KA 2. Investment and expenditure involved</p> <p>KA 3. Different environment required for different bee-keeping systems</p> <p>KA 4. Bees and beehive conservation in bee-keeping systems</p> <p>KA 5. Honey yield in bee-keeping systems</p> <p>KA 6. Ease of management of bee-keeping systems</p> <p>KA 7. Cost benefit analysis of bee-keeping systems</p>
B. Characteristics of different beekeeping tools	<p>The individual on the job needs to know and understand:</p> <p>KB1. Identification of different bee-keeping tools</p> <p>KB2. Operation and use of bee-keeping tools in different bee-keeping operations</p> <p>KB3. Materials used in bee-keeping tools</p> <p>KB4. Advantages of using appropriate bee-keeping tools</p> <p>KB5. Cost benefit analysis of bee-keeping tools</p>
Skills (S)	
A. Core Skills/ Generic Skills	<p><u>Writing skills</u></p> <p>SA1. The individual on the job needs to know and understand how to use the terms of the different equipments and tools in the written documents and reports and their usage pattern.</p>
	<p><u>Reading skills</u></p> <p>The individual on the job needs to know and understand how to:</p> <p>SA2. Get awareness at the bee-keeper's level about the role of honeybees in pollination and biodiversity conservation through reading</p>
	<p><u>Oral Communication (Listening & Speaking Skills)</u></p> <p>The individual on the job needs to know and understand how to:</p> <p>SA3. Maintain effective working relationships with bee-keeping experts/trainers</p> <p>SA4. Communicate clearly and effectively with others like bee-keepers, concerned officer/stakeholders</p> <p>SA5. Comprehend information shared by senior people and experts</p>

B. Professional Skills	<p><u>Decision Making</u></p> <p>The individual on the job needs to know and understand how to:</p> <p>SB1. Make decisions to use appropriate bee-keeping methods and bee-keeping systems pertaining to local climatic conditions</p> <p>SB2. Identify problems that may arise in carrying out tasks and take preventive action</p>
	<p><u>Plan and Organize</u></p> <p>The individual on the job needs to know and understand: how to</p> <p>SB3. Proper planning for adopting various bee-keeping systems and tools</p> <p>SB4. Organize meetings / demonstrations with training providers and concerned departments whenever necessary</p>
B. Professional Skills	<p><u>Customer Centricity</u></p> <p>The individual on the job needs to know and understand how to:</p> <p>SB5. Participate in bee-keeping exhibition/seminar/workshop to understand handling of bee-keeping tools and choosing appropriate bee-keeping systems depending on local conditions</p> <p>SB6. Attend and make use of exposure visit</p> <p>SB7. Work with bee-keeping experts and trainers</p> <p>SB8. Build relationships and use human centric approach</p>
B. Professional Skills	<p><u>Problem Solving</u></p> <p>The individual on the job needs to know and understand how to:</p> <p>SB9. Think through the problem, evaluate the possible solution(s) and adopt an optimum /best possible solution(s)</p> <p>SB10. Identify problems immediately and take up solutions quickly to resolve delays</p>
	<p><u>Analytical Thinking</u></p> <p>The individual on the job needs to know and understand how to:</p> <p>SB11. Analyse cost, quality and time of different bee-keeping systems before implement appropriate one</p> <p>SB12. Analyse of different bee-keeping tools to carry out different bee-keeping activities</p>
	<p><u>Critical Thinking</u></p>

The individual on the job needs to know and understand how to:

SB13. Take up his own working & learning to use suitable bee-keeping systems/tools whenever required

Beehive Management

Code: AGR/N5303 Learning hours: 35 h Total marks: 60 Credit: 6

Description	This unit is about dealing with beekeeper who is responsible for overall beehive management which includes site selection, installation of beehive, colony management and inspection and record keeping
Scope	<p>This unit/ task covers the following:</p> <ul style="list-style-type: none"> • Site selection of beehive • Installation of beehive • Colony management (During honey flow and dearth period) • Colony inspection • Record keeping
Performance Criteria(PC) with reference to the Scope	
Element	Performance Criteria (PC) [Total marks = theory + Skill practical]
Site selection of beehive	<p>To be competent, the individual must be able to:</p> <p>PC1. Select appropriate location for beehives that consist of diverse vegetation that provides plenty of pollen and nectar [2 = 1+1]</p> <p>PC2. Know and fix appropriate radius of apiary location from food sources [2 = 0+2]</p> <p>PC3. Ensure sourcing of good water in the immediate area since bees need as much water as pollen and nectar [1 = 0+1]</p>
Installation of beehive	<p>To be competent, the individual must be able to:</p> <p>PC4. Ensure hanging of hives using strong greased galvanized wires to protect the bees [1 = 0+1]</p> <p>PC5. Ensure hanging of hives in or under well shaded trees [1 = 0+1]</p>

	<p>PC6. Suspend hives from wires so that predators cannot push them over [2 = 2+0]</p> <p>PC7. Remember hanging of hives in such a way that allows ease of harvesting [1 = 0+1]</p> <p>PC8. Use trees and solid poles to hang the hive [1 = 1+0]</p> <p>PC9. Hives should be hung at waist height above the ground [1 = 0+1]</p> <p>PC10. Keep the hives clean and pest free [4 = 0+4]</p> <p>PC11. Ensure placing of hives on sturdy stands [1 = 0+1]</p> <p>PC12. Place hives in a way so that they can be approached from behind [1 = 1+0]</p> <p>PC13. Place hives on stands makes them accessible and easy to harvest and manage [1 = 1+0]</p> <p>PC14. Reduce drifting and disease transmission [2 = 1+1]</p> <p>PC15. Remove small stones or debris in the apiary [1 = 1+0]</p>
<p>Colony management (During Honey Flow Period & Dearth Period)</p>	<p>To be competent, the individual must be able to:</p> <p>PC16. Attract bees to the hives [3 = 0+3]</p> <p>PC17. Feeding the colonies during dearth period [4 = 4+0]</p> <p>PC18. Preservation of comb during dearth period [4 = 4+0]</p> <p>PC19. Queen rearing [6 = 4+2]</p> <p>PC20. Divide the colonies in order to populate a new hive [4 = 4+0]</p> <p>PC21. Uniting of smaller colonies to enlarge a colony [4 = 4+0]</p> <p>PC22. Improve their yield of honey or to survive the dearth [4 = 4+0]</p> <p>PC23. Populate the hive includes swarming and transferring of bees [4 = 4+0]</p> <p>PC24. Ascertain use of tools used in dividing, uniting and populating the bees [3 = 0+3]</p>
<p>Colony inspection</p>	<p>To be competent, the individual must be able to:</p> <p>PC25. Identify the climatic conditions before proceeding to the beehive for inspection [1 = 0+1]</p> <p>PC26. Ascertain use of various equipments used for inspection like smokers, bee suits, gloves [3 = 0+3]</p> <p>PC27. Perform colony inspection from outside to get idea of the colony status without opening the hive [2 = 2+0]</p> <p>PC28. Ensure incoming and outgoing bees and pollen carrying foragers at the hive entrance [1 = 0+1]</p>

	<p>PC29. Make sure that colony is strong and healthy [1 = 0+1]</p> <p>PC30. Check colony is diseased, abnormal and poisoned [3 = 1+2]</p> <p>PC31. Gather necessary tools before starting inside colony inspection [2 = 0+2]</p> <p>PC32. Use necessary tools to perform inside colony inspection [2 = 2+0]</p> <p>PC33. Perform colony inspection from inside to confirm the colony status, strengths and any abnormalities [3 = 2+1]</p> <p>PC34. Make necessary observation regarding condition of the bees, food stores, presence of pests and disease, symptoms of swarming and absconding [3 = 0+3]</p> <p>PC35. Check need to provide more frames with comb foundation [2 = 2+0]</p> <p>PC36. Ensure cleanliness and hygiene [3 = 0+3]</p> <p>PC37. Remove unnecessary, deformed, or additional combs built by the bees [2 = 0+2]</p>
Record keeping	<p>To be competent, the individual must be able to:</p> <p>PC38. Records should be kept to know what was done last time and what to do next time [2 = 0+2]</p> <p>PC39. Keep records what equipment to use and when to use effectively and Efficiently [2 = 0+2]</p>
Total = [90 marks = 45 theory + 45 Skill practical]	
Knowledge and Understanding (K)	
A. Site selection and installation of beehive	<p>Individual on the job needs to know and understand:</p> <p>KA 1. Suitable site selection considering food and water sources for honeybees</p> <p>KA 2. Suitable climatic conditions for beehive placing location(free from extreme hot or cold weather conditions)</p> <p>KA 3. Tools, methods and other materials required for installation of beehives</p> <p>KA 4. Proper installation beehives</p>
B. Colony management	<p>The individual on the job needs to know and understand:</p> <p>KB1. Division of establish colony</p> <p>KB2. Unite of bee colony</p> <p>KB3. Feeding the bees</p> <p>KB4. Swarming, absconding and transferring of honey bees</p> <p>KB5. Various tools and equipments used in colony management</p>
C.	<p>The individual on the job needs to know and understand:</p>

Colony inspection	<p>KC 1. Suitable climatic condition for colony inspection (inside and outside inspection)</p> <p>KC 2. Various tools and equipments used in inside and outside colony inspection like smoker, protective clothing, head-veil, overfills, gloves and shoes, hive tool, bee brush</p> <p>KC 3. Diseases in beehives</p> <p>KC 4. Colony status, strength and any abnormalities</p> <p>KC 5. Cleanliness and hygiene</p>
D. Safety methods	<p>The individual on the job needs to know and understand:</p> <p>KD1. Precaution measures to be taken on pesticide application</p> <p>KD2. Bee-keeping should not be practiced in areas where genetically modified crops are grown to avoid risk of contamination</p> <p>KD3. Positioning of beehives</p> <p>KD4. Use of different beekeeping equipments used in colony management and inspection</p>
Skills (S)	
A. Core Skills/ Generic Skills	<p><u>Writing skills</u></p> <p>SA1. The individual on the job needs to know and understand how to collect data, maintain the documents and reports of site selection, installation of beehive, colony management and inspection and record keeping</p>
A. Core Skills/ Generic Skills	<p><u>Reading skills</u></p> <p>The individual on the job needs to know and understand how to:</p> <p>SA2. Get updated on protecting hives from intense sun, wind and domestic animals etc at the site</p> <p>SA3. Get updated on precautions to take in the areas where intensive application of chemical pesticides is done</p> <p>SA4. Get updated on latest materials used in beehives for their protection from natural calamities</p> <p>SA5. Keep abreast with the knowledge of measurable parameters of beehives</p>
	<p><u>Oral Communication (Listening & Speaking Skills)</u></p> <p>The individual on the job needs to know and understand how to:</p>

	<p>SA5. Maintain effective working relationships</p> <p>SA6. Communicate clearly and effectively with others like beekeepers, concerned officer/stakeholders</p> <p>SA7. Comprehends information shared by senior people and experts</p>
B. Professional Skills	<p><u>Decision Making</u></p> <p>The individual on the job needs to know and understand how to:</p> <p>SB1. Make decisions pertaining to the site selection and installation of beehives</p> <p>SB2. Make decisions pertaining to the colony management, outside and inside colony inspection</p> <p>SB3. Identify problems that may arise in carrying out tasks and take preventative action</p> <p>SB4. Take decision to achieve monetary gain</p>
	<p><u>Plan and Organize</u></p> <p>The individual on the job needs to know and understand: how to</p> <p>SB5. Plan and organize for site selection and beehive installation</p> <p>SB6. Plan and organize for colony management and colony inspection</p> <p>SB7. Plan and organize for making effective use of tools and equipments to carry out various activities</p> <p>SB8. Organize meetings / demonstrations with training providers and concerned departments whenever necessary</p>
	<p><u>Customer Centricity</u></p> <p>The individual on the job needs to know and understand how to:</p> <p>SB9. Participate in bee-keeping exhibition/seminar/workshop</p> <p>SB10. Attend and make use of exposure visit</p> <p>SB11. Work with bee-keeping experts and trainers</p> <p>SB12. Build relationships and use human centric approach</p> <p>SB13. Maintain and manage good relationships with assisting workforce and other co-bee-keeper's</p>
B. Professional Skills	<p><u>Problem Solving</u></p>

The individual on the job needs to know and understand how to:

SB14. Think through the problem, evaluate the possible solution(s) and adopt an optimum /best possible solution(s)

SB15. Identify problems immediately and take up solutions quickly to resolve delays

Analytical Thinking

The individual on the job needs to know and understand how to:

SB16. Monitor and maintain the knowledge required for beehive management

Critical Thinking

The individual on the job needs to know and understand how to:

SB17. Take up his own working and learning

SB18. Apply, analyze, and evaluate the information gathered from observation, experience, reasoning, or communication, as a guide to thought and action

Manage insects, diseases and nuisances in beehive

Code: AGR/N5304 Learning hours: 30 h Total marks: 60 Credit: 6

Description	This unit is about dealing with beekeeper who is responsible for management of pests, diseases and other nuisances
Scope	<p>This unit/ task covers the following:</p> <ul style="list-style-type: none"> • Insect management • Management of diseases • Nuisances management
Performance Criteria(PC) with reference to the Scope	
Element	Performance Criteria (PC) [Total marks = theory + Skill practical]
Insect management	<p>To be competent, the individual must be able to:</p> <p>PC1. Identify common insects stored in combs like wax moth, Varro mite, ant and termites [8 = 6+2]</p> <p>PC2. Take preventive steps/methods to overcome insects [10 = 4+6]</p> <p>PC3. Use required tools, equipments and other materials [4 = 4+0]</p>
Management of diseases	<p>To be competent, the individual must be able to:</p> <p>PC4. Identify common diseases of bee like European foul brood, American foul brood, sac brood [8 = 2+6]</p> <p>PC5. Take preventive measures and methods to overcome bee diseases [10 = 5+5]</p> <p>PC6. Use required tools, equipments and other materials [4 = 4+0]</p>
Nuisances management	<p>To be competent, the individual must be able to:</p> <p>PC7. Identify nuisances in bee-keeping like disturbance from domestic animals, bush fires, chemical poisoning, honey badger and vandalism [6 = 0+6]</p> <p>PC8. Preventive practices and methods to overcome bee diseases [6 = 4+2]</p> <p>PC9. Use required tools, equipments and other materials [4 = 1+3]</p>

	Total = [60 marks = 30 theory + 30 Skill practical]
Knowledge and Understanding (K)	
A. Tools, equipments and other materials	<p>Individual on the job needs to know and understand:</p> <p>KA 1. Various tools and equipments used in insect management, diseases management and other nuisances management</p> <p>KA 2. Effective and efficient use of tool , equipments and other materials whenever required</p>
B. Insect, diseases and nuisances management	<p>The individual on the job needs to know and understand:</p> <p>KB1. Common insects like wax moth, Varro mite, ant and termites</p> <p>KB2. Common diseases of bees like European foul brood, American foul brood, sac brood</p> <p>KB3. Various factors creating disturbances</p> <p>KB4. Prevention practices and methods to overcome insects, diseases and nuisances</p>
Skills (S)	
A. Core Skills/ Generic Skills	<p><u>Writing skills</u></p> <p>SA1. The individual on the job needs to know and understand how to collect data, maintain the documents and reports pertaining to management of pests, diseases and other nuisances.</p>
A. Core Skills/ Generic Skills	<p><u>Reading skills</u></p> <p>The individual on the job needs to know and understand how to:</p> <p>SA2. Get updated to identify insects and diseases harming the bee colony</p> <p>SA3. Get updated to take and adopt corrective measures to overcome insects and diseases</p>
	<p><u>Oral Communication (Listening & Speaking Skills)</u></p> <p>The individual on the job needs to know and understand how to:</p> <p>SA3. Maintain effective working relationships</p> <p>SA4. Communicate clearly and effectively with others like beekeepers, concerned</p>

	<p>officer/stakeholders</p> <p>SA5. Comprehends information shared by senior people and experts</p>
B. Professional Skills	<p><u>Decision Making</u></p> <p>The individual on the job needs to know and understand how to:</p> <p>SB1. Make decisions pertaining to the disease, insect and other nuisances management</p> <p>SB2. Identify problems that may arise in carrying out tasks and take preventative action</p> <p>SB3. Take decision to achieve monetary gain</p>
	<p><u>Plan and Organize</u></p> <p>The individual on the job needs to know and understand: how to</p> <p>SB4. Proper planning of management of insects, diseases and nuisances of bees</p> <p>SB5. Organize meetings / demonstrations with training providers and concerned departments whenever necessary</p>
	<p><u>Customer Centricity</u></p> <p>The individual on the job needs to know and understand how to:</p> <p>SB6. Participate in bee-keeping exhibition/seminar/workshop</p> <p>SB7. Attend and make use of exposure visit</p> <p>SB8. Work with bee-keeping experts and trainers</p> <p>SB9. Build relationships and use human centric approach</p> <p>SB10. Maintain and manage good relationships with assisting workforce and other co-bee-keeper's</p>
B. Professional Skills	<p><u>Problem Solving</u></p> <p>The individual on the job needs to know and understand how to:</p> <p>SB11. Think through the problem, evaluate the possible solution(s) to overcome insects, diseases and nuisances in beehives</p> <p>SB12. Identify problems immediately and take up solutions quickly to resolve delays</p>

Analytical Thinking

The individual on the job needs to know and understand how to:

SB13. Monitor and maintain the material and equipment required for various farm operations

Critical Thinking

The individual on the job needs to know and understand how to:

SB14. Take up his own working and learning

Harvest, process and market the produce

Code: AGR/N5305

Learning hours: 35 h

Total marks: 75

Credit: 7

Description	This unit is about dealing with beekeeper who is responsible for harvesting, processing and marketing of products
Scope	This unit/ task covers the following: <ul style="list-style-type: none"> • Harvesting • Processing • Marketing of produce
Performance Criteria(PC) with reference to the Scope	
Element	Performance Criteria (PC) [Total marks = theory + Skill practical]
Harvesting	To be competent, the individual must be able to: PC1. Ascertain right time to harvest the honey and other raw products [7 = 4+3] PC2. Identify the right equipments used in harvesting like smoker, hive tool, nucleus top bar hive [8 = 6+2] PC3. Report any accidents, incidents or problems without delay to an appropriate Person [2 = 0+2] PC4. Take necessary actions to reduce further danger [4 = 4+0]
Processing	To be competent, the individual must be able to: PC5. Perform grading of raw products to ensure good quality and shelf-life of the products [10 = 5+5] PC6. Follow procedures, practices and methods of grading of raw produce [4 = 0+4] PC7. Perform extraction of honey adopting suitable methods of extraction [9 = 5+4] PC8. Follow procedures, practices and methods of extraction of raw produce [4 = 0+4] PC9. Procure required inputs for extraction of raw product [1 = 0+1]

	PC10. Ascertain proper storage and packaging of honey [10 = 5+5]
Marketing	To be competent, the individual must be able to: PC11. Identify the honey and bee related by-products traders [8 = 4+4] PC12. Ascertain good supply chain [8 = 4+4]
	Total = [75 marks = 37 theory + 38 Skill practical]
Knowledge and Understanding (K)	
A. Tools, Equipments and Other materials	Individual on the job needs to know and understand: KA 1. Know various tools and equipments used in harvesting and processing
B. Methods and practices	The individual on the job needs to know and understand: KB1. Know various methods and practices to be followed for harvesting, processing and marketing of raw produce
C. Safety methods	The individual on the job needs to know and understand: KC 1. Correct and safe way to use materials and equipment required KC 2. Safe disposal methods for waste KC 3. Maintain personal hygiene and clean working place
D. Marketing	The individual on the job needs to know and understand: KD1. Different sources of supply of raw produce KD2. Best and most cost-effective sources of supply KD3. Marketing and sales channels KD4. Sale network
Skills (S)	
A. Core Skills/ Generic Skills	<u>Writing skills</u> SA1. The individual on the job needs to know and understand how to collect data, maintain the documents and reports in relation to harvesting, processing and marketing of products.

A. Core Skills/ Generic Skills	<p><u>Reading skills</u></p> <p>The individual on the job needs to know and understand how to:</p> <p>SA1. Get updated on suitable practices and methods required for harvesting and processing</p> <p>SA2. Get updated on effective and efficient use of tools, equipments and other materials</p> <p>SA3. Keep abreast on best marketing practices through seeking consultation to other bee-keeper and experts</p>
	<p>Oral Communication (Listening & Speaking Skills)</p> <p>The individual on the job needs to know and understand how to:</p> <p>SA4. Maintain effective working relationships</p> <p>SA5. Communicate clearly and effectively with others like beekeepers, concerned officer/stakeholders</p> <p>SA6. Comprehends information shared by senior people and experts</p>
B. Professional Skills	<p><u>Decision Making</u></p> <p>The individual on the job needs to know and understand how to:</p> <p>SB1. Make decisions pertaining to the concerned area of work</p> <p>SB2. Identify problems that may arise in carrying out tasks and take preventive action</p> <p>SB3. Take decision to achieve monetary gain</p>
	<p><u>Plan and Organize</u></p> <p>The individual on the job needs to know and understand: how to</p> <p>SB4. Proper planning of harvesting, processing and marketing</p> <p>SB5. Organize meetings / demonstrations with training providers and concerned departments whenever necessary</p>

	<p><u>Customer Centricity</u></p> <p>The individual on the job needs to know and understand how to:</p> <p>SB6. Participate in bee-keeping exhibition/seminar/workshop</p> <p>SB7. Attend and make use of exposure visit</p> <p>SB8. Work with bee-keeping experts and trainers</p> <p>SB9. Build relationships and use human centric approach</p> <p>SB10. Maintain and manage good relationships with assisting workforce and other co-bee-keeper's</p>
B. Professional Skills	<p><u>Problem Solving</u></p> <p>The individual on the job needs to know and understand how to:</p> <p>SB11. Think through the problem, evaluate the possible solution(s) and adopt an optimum /best possible solution(s)</p> <p>SB12. Identify problems immediately and take up solutions quickly to resolve delays</p>
	<p><u>Analytical Thinking</u></p> <p>The individual on the job needs to know and understand how to:</p> <p>SB13. Monitor and maintain the knowledge required</p>
	<p><u>Critical Thinking</u></p> <p>The individual on the job needs to know and understand how to:</p> <p>SB14. Apply, analyse, and evaluate the information gathered from observation, experience, reasoning, or communication, as a guide to thought and action</p> <p>SB15. Take up his own working & learning</p>
	Total = [300 marks = 150 theory + 150 Skill practical]

Books Recommended

- [1] Alethea Morrison and Mars Vilaubi, 2013. Homegrown Honey Bees: An Absolute Beginner's Guide to Beekeeping Your First Year, from Hiving to Honey Harvest. Storey Publishing, LLC; 1 edition.
- [2] Alison Benjamin, and Brian McCallum, 2008. Keeping Bees and Making Honey. David & Charles, Newton Abbot.
- [3] Craig Hughes, 2010. Urban Beekeeping: A Guide to Keeping Bees in the City. e Good Life Press, Preston.

- [4] David Cramp, 2009. A Practical Manual of Beekeeping: How to Keep Bees and Develop Your Full Potential as an Apiarist. Spring Hill, London.
- [5] 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.
- [6] Dewey M. Caron. 2013. Honey Bee Biology and Beekeeping, Revised Edition. Wicwas Press, Kalamazoo.
- [7] Eva Crane, 1999. The World History of Beekeeping and Honey Hunting. Routledge, India.
- [8] 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 Coordinated project on honey bees and pollinators, ICAR, HAU, Hisar
- [9] Graham, J M (1992) The hive and the honey bee. Dadant and Sons, Hamilton, Illinois.
- [10] Gupta, J K. 2010.Spring management of honey bee colonies. In “OAPI012 Management of honey bee colonies; Seasonal and specific management (Block 2), Indira Gandhi National open university, school of Agriculture, New Delhi.
- [11] Hunt, G.J. 2000. Using honey bees in pollination Purdue University.
- [12] Kim Flottum, 2014. The Backyard Beekeeper: An Absolute Beginner's Guide to Keeping Bees in Your Yard and Garden. Quarry Books.
- [13] Kim Pezza, 2013. Backyard Farming: Keeping Honey Bees: From Hive Management to Honey Harvesting and More. Hatherleigh Press, U.S.5
- [14] Laidlaw, H.H. 1997. Contemporary queen rearing. Published by Dadant and Sons. R. A. Morse, Rearing queen honey bees. Wicwas press, NY.
- [15] Mishra R.C. (1995) Honey bees and their management in India. ICAR Publication, New Delhi.
- [16] Pradip V Jabde, 1993. Text Book of Applied Zoology: Vermiculture, Apiculture, Sericulture, Lac Culture, Agricultural Pests and their Controls. Discovery Publishing House, New Delhi.
- [17] Roger A. Morse, Kim Flottum, 1998. Honey Bee Pests, Predators and Diseases. WicwasPr; 3rd edition.
- [18] Singh, S. (1971) Beekeeping in India, ICAR publication.
- [19] Ted Hooper, 2010. Guide to Bees and Honey: The World's Best Selling Guide to Beekeeping. Northern Bee Books. Oxford.

WEB ADDRESS:

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

www.kvic.org.in

www.honeyflow.com

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

<http://ecoursesonline.iasri.res.in/course/view.php?id=166>

YOU TUBE VIDEOS LINKS:

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

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

<https://www.youtube.com/watch?v=RCfNGl4aO4Y>

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

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