

APICULTURE AND AQUACULTURE

ISCED UNIT CODE: 0831 541 33A

TVET CDACC UNIT CODE: HE/CU/AHP/CC/23/6/MA

Relationship to Occupational Standards

This unit addresses the Unit of Competency: Apply knowledge of apiculture and aquaculture.

UNIT DURATION: 60 Hours

Unit Description

This unit specifies the competencies required by an animal health and production technologist to apply knowledge of apiculture and aquaculture. It involves selecting and establishing an apiary site, preparing hive equipment, monitoring and managing swarming, rearing queen bees, performing apiary maintenance, conducting bee feeding, preparing and maintaining bee records, carrying out harvesting, grading, processing, packaging, and marketing, selecting and establishing fish pond, monitoring and managing fish health, conducting fish feeding and rearing fingerlings.

Summary of Learning Outcomes

By the end of this unit, the learner should be able to:

S/No	Learning Outcomes	Duration (Hours)
1.	Select and establish an apiary site	5
2.	Prepare hive equipment	5
3.	Monitor and manage swarming	5
4.	Rear queen bee	5
5.	Perform apiary maintenance	5
6.	Conduct bee feeding	5
7.	Prepare and maintain bee record	5
8.	Carry out harvesting, grading, processing, packaging and marketing	5
9.	Select and establish fish pond	5
10.	Monitor and manage fish health	5

11.	Conduct fish feeding	5
12.	Rear fingerlings	5
Total		60

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcomes	Content	Suggested Assessment Methods
1. Select and establish Apiary site	1.1. Apiary site selection 1.2. PPE's for apiary management 1.2.1. Gloves 1.2.2. Gumboots 1.2.3. Apron 1.2.4. Bee suit. 1.2.5. Gloves 1.2.6. Apiary set up 1.3. Types of hive 1.3.1. Log hive 1.3.2. KTBH 1.3.3. Lagstroth hive 1.4. Bee species 1.4.1. <i>Apis mellifera yemenitica</i> 1.4.2. <i>Apis mellifera scutellate</i> 1.4.3. <i>Apis mellifera littorea</i> 1.4.4. <i>Apis mellifera monticolla</i> 1.4.5. Hybrid species (of A.m. <i>littorea</i> and <i>monticolla</i>)	<ul style="list-style-type: none"> • Practical • Project • Portfolio of evidence • Third party report • Written assessment • Oral questioning
2. Prepare hive equipment	2.1. Bee colony management 2.2. Hive management tools 2.2.1. Hammer 2.2.2. Pliers 2.2.3. Cutting tools	<ul style="list-style-type: none"> • Practical • Project • Portfolio of evidence • Third party report • Written assessment

	<p>2.2.4. Uncapping knife</p> <p>2.2.5. Comb cutter</p> <p>2.3. Hive equipment</p> <p>2.3.1. Bee brush</p> <p>2.3.2. Catcher box</p> <p>2.3.3. Bee propolis trap collector</p> <p>2.3.4. Honey warmer</p> <p>2.3.5. Clearer board</p> <p>2.3.6. Double sieve</p> <p>2.3.7. Refractometer</p> <p>2.3.8. Uncapping tray</p> <p>2.3.9. Wax melter</p> <p>2.3.10. Dip tank/ vat</p> <p>2.3.11. Roller/ mold</p> <p>2.3.12. Hives (log, top bar, box, pot, Langstroth)</p> <p>2.4. Hive equipment preparation</p>	<ul style="list-style-type: none"> • Oral questioning
3. Monitor and manage swarming	<p>3.1. Colony management</p> <p>3.2. Swarm prevention</p> <p>3.3. Swarm capturing</p>	<ul style="list-style-type: none"> • Practical • Project • Portfolio of evidence • Third party report • Written assessment • Oral questioning
4. Rear queen bee	<p>4.1. Rearing of queen</p> <p>4.2. Parent colony selection</p> <p>4.3. Methods of queen rearing</p> <p>4.4. Queen rearing equipment</p> <p>4.5. Queen rearing program</p> <p>4.6. Queen transportation</p>	<ul style="list-style-type: none"> • Practical • Project • Portfolio of evidence • Third party report • Written assessment • Oral questioning
5. Perform apiary maintenance	<p>5.1. Apiary maintenance</p> <p>5.1.1. During the dearth period</p> <p>5.1.2. During pre-season</p> <p>5.1.3. During main season</p>	<ul style="list-style-type: none"> • Practical • Project • Portfolio of evidence • Third party report

	<p>5.1.4. During post season</p> <p>5.2. Disease management</p> <p>5.2.1. Bee paralysis virus</p> <p>5.2.2. Sacbrood virus</p> <p>5.2.3. Deformed wing virus</p> <p>5.2.4. Slow bee paralysis virus</p> <p>5.2.5. Tobacco ringspot virus</p> <p>5.2.6. Colony collapse disorder</p> <p>5.2.7. Stonebrood</p> <p>5.2.8. Chalk brood</p> <p>5.2.9. Nosema</p> <p>5.3. Pest management</p> <p>5.3.1. Small hive beetles SHB</p> <p>5.3.2. tracheal mite</p> <p>5.3.3. wax moths</p> <p>5.3.4. Mice</p> <p>5.3.5. Toad/Fogs</p> <p>5.3.6. Spider</p> <p>5.3.7. Ants</p> <p>5.3.8. Humans</p> <p>5.3.9. Varroa mites</p> <p>5.3.10. Lizard</p> <p>5.3.11. Birds</p> <p>5.3.12. Honey badger</p> <p>5.3.13. Wax moth</p> <p>5.3.14. Pirate wasp</p> <p>5.3.15. Bee louse</p>	<ul style="list-style-type: none"> • Written assessment • Oral questioning
<p>6. Conduct bee feeding</p>	<p>6.1. Bee feeding</p> <p>6.2. Feed ration preparation</p> <p>6.3. Feeding method selection</p>	<ul style="list-style-type: none"> • Practical • Project • Portfolio of evidence • Third party report • Written assessment

		<ul style="list-style-type: none"> • Oral questioning
7. Carry out harvesting, grading, processing, packaging and marketing	<p>7.1. Hive products harvesting</p> <p>7.1.1. Honey harvesting</p> <p>7.1.2. Propolis harvesting</p> <p>7.1.3. Bee wax harvesting</p> <p>7.1.4. Bee venom</p> <p>7.2. Bee products post-harvest</p> <p>7.2.1. Processing</p> <p>7.2.2. Packaging</p> <p>7.2.3. Marketing</p>	<ul style="list-style-type: none"> • Practical • Project • Portfolio of evidence • Third party report • Written assessment • Oral questioning
8. Prepare and maintain bee record	<p>8.1. Bee records</p> <p>8.2. Inventory of apiary and equipment</p> <p>8.3. Work schedule preparation</p>	<ul style="list-style-type: none"> • Practical • Project • Portfolio of evidence • Third party report • Written assessment • Oral questioning
9. Select and establish fish pond	<p>9.1. Fish management tools</p> <p>9.1.1. Digging tools</p> <p>9.1.2. Levelling tool</p> <p>9.1.3. Desilting tool</p> <p>9.1.4. Net and traps</p> <p>9.1.5. Screens on water control</p> <p>9.1.6. Harvesting bag net</p> <p>9.1.7. Analysis kit</p> <p>9.2. Fish management equipment</p> <p>9.2.1. Pond liner</p> <p>9.2.2. Pond filter</p> <p>9.2.3. Pond plant</p> <p>9.2.4. Pond pump and fish elevator</p> <p>9.2.5. Fish grader</p> <p>9.3. Fish pond site selection</p> <p>9.3.1. Pond size</p>	<ul style="list-style-type: none"> • Practical • Project • Portfolio of evidence • Third party report • Written assessment • Oral questioning

	<p>9.4. Equipment selection</p> <p>9.4.1. Pond set up</p> <p>9.5. Fish species selection</p> <p>9.5.1. Nile perch</p> <p>9.5.2. Common carp</p> <p>9.5.3. Nile tilapia</p> <p>9.5.4. Black bass</p> <p>9.5.5. Omena</p> <p>9.6. Stocking rate</p> <p>9.7. Water quality</p> <p>9.7.1. Water temperature</p> <p>9.7.2. Oxygen</p> <p>9.7.3. P.H.</p> <p>9.8. Fingerlings sourcing and transportation</p>	
10. Monitor and manage fish health	<p>10.1. Fish feeding</p> <p>10.2. Reproduction behavior of fish</p> <p>10.3. Diseases and parasites management</p> <p>10.3.1. Viral esocid</p> <p>10.3.2. Lymphosarcoma</p> <p>10.3.3. Lymph virus</p> <p>10.3.4. Common mouth rot, tail rot</p> <p>10.3.5. Colunaris</p> <p>10.3.6. Swim bladder infection</p> <p>10.3.7. Environmental dropsy</p> <p>10.4. Drugs used in fish management</p> <p>10.4.1. Oxytetracycline</p> <p>10.4.2. Ciprofloxacin</p> <p>10.4.3. Enrofloxacin</p> <p>10.4.4. Erythromycin</p> <p>10.4.5. Sulphadiazine</p> <p>10.4.6. Trimethoprim</p>	<ul style="list-style-type: none"> • Practical • Project • Portfolio of evidence • Third party report • Written assessment • Oral questioning
11. Conduct	11.1. Feeding method	<ul style="list-style-type: none"> • Practical

fish feeding	11.2. Feed ration preparation 11.3. Fish feeding	<ul style="list-style-type: none"> • Project • Portfolio of evidence • Third party report • Written assessment • Oral questioning
12. Rear fingerlings	12.1. Introduction to fingerlings 12.2. Method of rearing fingerlings 12.3. Fish species selection 12.4. Fresh water species <ul style="list-style-type: none"> 12.4.1. Nile perch 12.4.2. Common carp 12.4.3. Nile tilapia 12.4.4. Black bass 12.4.5. Omena 12.5. Fingerlings transportation 12.6. Feeding regime of fingerlings 12.7. Fingerlings harvesting and processing 12.8. Environmental protection regulations <ul style="list-style-type: none"> 12.8.1. Public health Act 12.8.2. EMCA 1999 12.8.3. OSH Act 	<ul style="list-style-type: none"> • Practical • Project • Portfolio of evidence • Third party report • Written assessment • Oral questioning

Suggested Methods of delivery

- Practical
- Projects
- Demonstrations
- Group discussion
- Direct instructions

Recommended Resources for 25 Trainees

S/No.	Category/Item	Description/ Specification	Quantity	Recommended Ratio
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				(Item: Trainee)
1.	Learning materials			
2.	Projector		1	1:25
3.	Whiteboard/Smart board		1	1:25
4.	Desktop/computer		1	1:25
5.	Lecture/Theory room		1	1:25
6.	Apiary	With different types of bee hives	1	1:25
7.	Library		1	1:25
8.	E-Library		1	1:25
9.	Bee venom collector		1	1:25
10.	Honey extractor		1	1:25
11.	Bee suit		5	1:5
12.	Propolis trap collector		5	1:5
13.	Hive tool		5	1:5
14.	Smoker		5	1:5
15.	Bee brush		5	1:5
16.	Digging tool		5	1:5
17.	Leveling tool		5	1:5
18.	Desilting tool		5	1:5
19.	Nets and traps		5	1:5
20.	Screens on water control		5	1:5
21.	Harvesting bag nets		5	1:5
22.	Analysis kit		1	1:25
23.	Pond liner		5	1:5
24.	Pond filter		5	1:5
25.	Pond plant		5	1:5
26.	Pond pump and fish elevator		1	1:25

27.	Fish grader		1	1:25
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