
Apiculture



Course curricula
for
Modular
Employable
Skills (MES)



Director General of Employment and Training
Ministry of Labour and Employment
Government of India

1 - Skill Development based on Modular Employable Skills (MES)

1. a Background

Numbers of forums have emphasized the need for the skill development, especially for the less educated, poor and out of school youth. The skill level and educational attainment of the work force determines the productivity, income levels as well as the adaptability of the working class in changing environment. Large percentage of population in India is living below poverty line, the main reason being the lower percentage of skilled persons in the workforce.

The skill development at present is taking place mostly in the informal way, i.e. persons acquire skill at the work-place when they help their parents, relatives and employers etc. Such persons do not have a formal certificate and thus earn lower wages and are exploited by employers. They have come through informal system due to socio-economic circumstances of the family and the compulsions of earning a livelihood rather than attending a formal course. While their productivity is low, their contribution to the national GDP cannot be ignored. If the country can create a system of certification which not only recognizes their skills but also provides education and training in a mode that suits their economic compulsions, it will not only benefit the workforce to earn a decent living but also contribute to the national economy by better productivity of this workforce.

Another related problem is the large number of students drop outs (About 63% of the school students drop out at different stages before reaching Class-X).

The third problem is that the industries are facing shortage of skilled people to operate the machines and produce the materials, and the skills available are not adequate considering the changing requirement of the technology.

1. b. Frame work for Skill Development based on ‘Modular Employable Skills (MES)’

Very few opportunities for skill development are available for the above referred groups (out of school youth and existing workers especially in the informal sector). Most of the existing Skill Development programmes are long term in nature. Poor and less educated persons cannot afford long term training programme due to higher entry qualifications, opportunity cost etc. Therefore, new frames work for Skill Development for the Informal Sector has been evolved by the DGET to address to the above mentioned problems. The **key features of the new frame work for skill development** are:

- Demand driven short term training courses based on modular employable skills decided in consultation with Industry.
- Flexible delivery mechanism (part time, weekends, full time)
- Different levels of programme (Foundation level as well as skill up gradation) to meet demands of various target groups.

- Central Government will facilitate and promote training while Vocational Training (VT) Providers under the Government and Private Sector will provide training
- Optimum utilization of existing infrastructure to make training cost effective.
- Testing of skills of trainees by independent assessing bodies who would not be involved in conduct of the training programme, to ensure that it is done impartially.
- Testing and certification of prior learning (skills of persons acquired informally)

The Short Term courses would be based on ‘Modular Employable Skills (MES)’.

The **concept for the MES** is:

- Identification of ‘minimum skills set’ which is sufficient to get an employment in the labour market.
- It allows skills up-gradation, multiskilling, multi entry and exit, vertical mobility and life long learning opportunities in a flexible manner.
- It also allows recognition of prior learning (certification of skills acquired informally) effectively.
- The modules in a Sector when grouped together could lead to a qualification equivalent to National Trade Certificate or higher.
- Courses could be available from level 1 to level 4 in different vocations depending upon the need of the employer organizations.
- MES would benefit different target groups like :
 - ✓ Workers seeking certification of their skills acquired informally
 - ✓ workers seeking skill upgradation
 - ✓ early school drop-outs and unemployed
 - ✓ previously child labour and their family

1. c. Age of participants

The minimum age limit for persons to take part in the scheme is 14 years but there is no upper age limit.

1. d. Curriculum Development Process

Following procedure is used for developing course curricula

- Identification of Employable Skills set in a Sector based on division of work in the labour market.
- Development of training modules corresponding to skills set identified so as to provide training for specific & fit for purpose
- Organization of modules in to a Course Matrix indicating vertical and horizontal mobility. The course matrix depicts pictorially relation among various modules, pre requisites for higher level modules and how one can progress from one level to another.
- Development of detailed curriculum and vetting by a trade committee and by the NCVT (Close involvement of Employers Organizations, State Governments,

experts, vocational training providers and other stake holders is ensured at each stages).

1. e. Development of Core Competencies

Possession of proper attitudes is one of the most important attribute of a competent person. Without proper attitudes, the performance of a person gets adversely affected. Hence, systematic efforts will be made to develop attitudes during the training programme.

The trainees deal with men, materials and machines. They handle sophisticated tools and instruments. Positive attitudes have to be developed in the trainees by properly guiding them and setting up examples of good attitudes by demonstrated behaviours and by the environment provided during training.

Some important core competencies to be developed are:

1. Safety consciousness and safe working practices
2. Care of equipment and tools
3. Punctuality, discipline and honesty
4. Concern for quality
5. Respect for rules and regulations
6. Concern for health and hygiene
7. Cordial relationship and Cooperation with co-workers and team work
8. Positive attitude and behaviour
9. Responsibility and accountability
10. Learn continuously
11. Communication skills
12. Concern for environment and waste disposal

Following competencies should also be developed during level-II and higher courses:

1. Ability for planning, organizing and coordinating
2. Creative thinking, problem solving and decision making
3. Leadership
4. Ability to bear stress
5. Negotiation

1. f. 6. Duration of the Programmes

Time taken to gain the qualification will vary according to the pathway taken and will be kept very flexible for persons with different backgrounds and experience. Duration has been prescribed in hours in the curriculum of individual module, which are based on the content and requirements of a MES Module. However, some persons may take more time than the prescribed time. They should be provided reasonable time to complete the course.

1. g. Pathways to acquire Qualification:

Access to the qualification could be through:

- An approved training programme;
Or
- A combination of an approved training programme plus recognition of prior learning including credit transfer;
Or
- The recognition of prior learning that provides evidence of the achievement of the competencies for the qualification.

1. h. Methodology

The training methods to be used should be appropriate to the development of competencies. The focus of the programme is on “Performing” and not on “Knowing”. Lecturing will be restricted to the minimum necessary and emphasis to be given for ‘Hands on training’.

The training methods will be individual centered to make each person a competent one. Opportunities for individual work will be provided. The learning process will be continuously monitored and feedback will be provided on individual basis.

Demonstrations using different models, audio visual aids and equipment will be used intensively.

1. i. Instructional Media Packages

In order to maintain quality of training uniformly all over the country, Instructional Media Packages (IMPs) will be developed by the National Instructional Media Institute (NIMI), Chennai.

1. j. Assessment

DGE&T will appoint assessing bodies to assess the competencies of the trained persons. The assessing body will be an independent agency, which will not be involved in conducting the training programme. This, in turn, will ensure quality of training and credibility of the scheme. Keeping in view the target of providing training/testing of one million persons through out the country and to avoid monopoly, more than one assessing bodies will be appointed for a Sector or an area.

1. k. Certificate

Successful persons will be awarded certificates issued by National Council for Vocational Training (NCVT).

1.1. MES courses approved by NCVT

The NCVT released a list of 340 approved courses on 15th September 2008, i.e. on the Engineers day (128th birth day of Sir. M. Visweswariah). The courses were allotted 6 digit alpha numerical codes with the following formula

From Left side:

1st, 2nd and 3rd digits –Sector Codes (Alpha Codes)

4th digit – Level Code (1 for level 1, 2 for level 2, 3 for level 3 and so on. As the level increases, the position in the industry also increases)

5th and 6th digits – Course serial number (separate series for courses at same level with in each 2. Sector)

1.m Apiculture Sector

Honey production is frequently promoted as a pro-poor income generation activity as it is accessible to many members of a rural community, has low start-up costs and requires little land or labour. But while apiculture (beekeeping) presents an opportunity for many farmers, the potential to create a significant livelihood from selling honey often remains out of reach. Income generation is important for any agricultural activity. What farmers need is a remunerative income (not minimum income) for their produce, and honeybee rearing fits the slot too well. It has been proven to increase a farmer's income by 50-60 per cent under favourable conditions.

Honey bees are one of the important primitive social insects as well as a rich source of honey. Honey has been traditionally used in various diet preparations, medicines, cosmetics, ointments, candles and house-hold bee-wax items, besides Ayurvedic drug preparations. The propolis of the bee hive is used in lip balms and tonics, whereas royal jelly is used to strengthen the human body, for improving appetite, preventing aging of skin, leukaemia and for the treatment of other cancers. On an estimate, about 80% of honey is used directly in medicines and 10% is used in Ayurvedic and pharmaceutical production. Honey bees during foraging for pollen and nectar from flowers of different plant species enhance agricultural productivity to the tune of 30–80% annually through cross-pollination. Five species of honey bees are found all over the world, namely *Apis florea*, *A. cerana*, *A. dorsata*, *A. mellifera* and *Trigona iridipennis*. However, *A. cerana* and *A. mellifera* are reared in hives in India. India produces about 70,000 tonnes of honey every year of which 25–27,000 tonnes is being exported to more than 42 countries, including the European Union, Middle East and the United States (2002–03). The major honey-producing states are Punjab, Haryana, Uttar Pradesh, Bihar and West Bengal. In South India the hilly areas of Western Ghats viz Nilgiris, Coorg, Hassan, Shimoga, South Canara, North Canara, Goa and Konkan areas are the major producers of honey.

The role of Apiculture is very important for the upliftment of economy and for providing employment mainly to rural population settled in hilly and forest areas. Therefore a Sectoral Skill panel was formed under the leadership of Sri S. J. Amalan, Director, Education and Training

1. n. The members of the Sectoral Skill Panel for Apiculture Sector:

Details of the members of Sectoral Skill Panel

Name	Address	Email and Phone
Mr. S. J. Amalan	Director, Apex Hi-Tech Institute, Bangalore and Regional Director D.G.E.T, Ministry of Labour and Employment, Karnataka, Andhra Pradesh and Orissa.	sjamalan@yahoo.co.in 080-23378335 +(91) 0 9880361079
Mr. L. Nagaraja Murthy	Former Director of Vocational Education, Government of Karnataka	nagarajamurthyl@gmail.com +(91) 0 9448633189
Mr. B. Purushothama	Consultant – QMS and Textiles B-17, Jayanthi Apartments, 13 th cross, 4 th Main, Malleswaram, Bangalore 560003	purushothama1949@yahoo.co.in +(91) 0 9448864028 080-23461512
Mr. S. H. Shantha Veeriah	Asst. Director of agriculture (Retd) & Bee keeping trainer, Chandana Madhuvana Graamina Abhivridhhi Sangha (Regd), Metikurke, Hiriyur Taluk, Chitradurga Dist, Karnatakata	chandanamadhuvana@gmail.com 9449726068
Mr. V.Santhosh,	Bee Keeper,#25, 6th cross Srirampura, Bangalore-5600021.	santhosh_honey@yahoo.co.in .
Mr B.R Umakanth.	Rtd.Additional Director, Industries and commerce Dept. Govt. of Karnataka.	brumakant@yshoo.co.in
Dr.B.S. Sohi	Rtd Professor, 4310A, Govt. College Road, Civil Lines, Ludhiana. 141001 (Punjab).	Phone: 01612400926.
Dr.Shankaranarayana Bhat.	Prof & Head Department of Entomology, University of Agricultural Sciences, GKVK, Bangalore.	nshankarbhat@gmail.com . +919480423686.
Sri. Suresh Desai	Ph.D Candidate, Dept of Entomology, Faculty of	beesuresh@gmail.com Ph001-204-275-8346

	Agriculture and Food Sciences. University of Manitoba, Winnipeg, Manitoba, Canada. R3T2N2.	
--	--	--

list of MES identified in Apiculture Sector

Section	Code	Description	Entry Qualification	Duration Hours
Apiculture	APC – 101	Bee Keeping Assistant	5 th Std	200
Apiculture	APC - 102	Colony Multiplication Assistant	5 th Std	200
Apiculture	APC – 103	Honey Collector	5 th Std	200
Apiculture	APC – 104	Bee Wax Collector	5 th Std	200
Apiculture	APC – 105	Bee Pests Controller	5 th Std	200
Apiculture	APC – 201	Beehive Manufacturer	5 th Std + WOO 201 + APC 101	160

LEVEL – 1

1. Module Name:	Bee Keeping Assistant	
2. Sector:	Apiculture	
3. Code:	APC - 101	
4. Entry Qualification	Minimum 5 th Standard and 14 years of age	
5. Terminal Competency:	The trained person will be competent in carrying out Bee Keeping Operations	
6. Duration:	200 Hours	
7. Preface:	Honey collected by bee is useful to human being in a number of ways, especially in maintaining the health. Honey is used in number of medicines. Its demand is increasing with people becoming health conscious. Therefore it is very essential to systematically maintain the bees.	
8. Job Profile	The trained person would be able to work in large bee farms or work independently as a bee keeper	
9. Course content		
	Practical	Under pinning knowledge (Theory)
	<ul style="list-style-type: none"> ➤ Practice of constructional details and use of beekeeping equipment such as Bee Box, Nucleus Box, Bee Veil, Hive Tool, Honey Extractor, Hive Stand and other accessories. ➤ Identification of bee flora and their flowering calendar ➤ Searching techniques for floral colonies. ➤ Practicing hiving of natural colonies and catching swarms ➤ Practicing division of bee colonies ➤ Practicing the identification of honey bee caster ➤ Practicing of the inspection of bee colonies ➤ Installation of CF (Comb Foundation) Sheet ➤ Providing artificial food to the bee colonies with different methods ➤ Practicing extraction of honey ➤ Practicing extraction of bee wax ➤ Extraction of pollen and propolis ➤ Practicing uniting of weak colonies ➤ Practicing migration of colonies to overcome scarcity of food and helping pollination ➤ Identification of pests, diseases, 	<ul style="list-style-type: none"> ➤ Systematic and Morphology of honey bees ➤ Honey bee species ➤ Colony organization of honey bees ➤ Seasonal activities and social behaviour of honey bees ➤ Food of the honeybees, bee flora and honey flow period ➤ Seasonal management of honey bee colonies ➤ Honeybees and pesticides ➤ Bee keeping and ancillary industries ➤ Marketing of bee products and cost analysis ➤ Hive products and their production

<p>predators and enemies of honeybees</p> <ul style="list-style-type: none"> ➤ Methods of controlling pests and diseases ➤ Practice of packing and marketing of honey ➤ Working out the economics of bee keeping ➤ Prevention of swarming and absconding ➤ Importance of bee colonies in crop pollination 	
10. Requirements of Equipments for about 20 trainees	
<ol style="list-style-type: none"> 1. Beekeeping equipments 2. Bee Box, 3. Nucleus Box, 4. Bee Veil, 5. Hive Tool, 6. Honey Extractor, 7. Hive Stand 	

LEVEL – 1

1. Module Name:	Bee colony Multiplication Assistant	
2. Sector:	Apiculture	
3. Code:	APC - 102	
4. Entry Qualification	Minimum 5 th Standard and 14 years of age	
5. Terminal Competency:	The trained person will be competent in carrying out Beekeeping operations	
6. Duration:	200 Hours	
7. Preface:	Honey collected by bee is useful to human being in a number of ways, especially in maintaining the health. Honey is used in number of medicines. Therefore, it is very essential to systematically maintain the bees.	
8. Job Profile	The trained person would be able to work in large bee farms or work independently as a bee keeper	
9. Course content		
	Practical	Underpinning knowledge (Theory)
	<ul style="list-style-type: none"> ➤ Identification of strong colonies ➤ Identification of quality Queen ➤ Preparing Queen builder colony ➤ Practicing Queen cup preparation ➤ Attaching Queen cups to the division frames ➤ Practicising use of grafting equipment ➤ Identification of larvae aged below 48 hours ➤ Practicising placement of Royal Jelly before grafting the larvae ➤ Practicising grafting worker larvae into the queen cup ➤ Observing development of Queen larvae in the Queen cup ➤ Observing sealing of Queen cell ➤ Confirming Queen emergence at appropriate day ➤ Confirming Queen mating after 4 days of its emergence ➤ Confirming egg laying by Queen ➤ Preparing nucleus colony ➤ Disposal of new colony ➤ Cost analysis for multiplication of beecolony 	<ul style="list-style-type: none"> ➤ Queen life cycle ➤ Worker life cycle ➤ Royal Jelly production for Queen rearing ➤ Worker's behavior in a Queen-less colony ➤ Worker's behavior when they find artificial Queen Cup ➤ Worker's behavior while they starts feeding the larvae in the Queen Cup with Royal Jelly ➤ Economics of setting up a beehive
10. Requirements of Equipments for about 20 trainees		
	<ol style="list-style-type: none"> 1. Bee keeping equipments 2. Bee Box, 3. Nucleus Box, 	

<ol style="list-style-type: none">4. Grafting equipment5. Bee Veil,6. Hive Tool,7. Honey Extractor,8. Hive Stand	
--	--

LEVEL – 1

1. Module Name:	Honey Collector	
2. Sector:	Apiculture	
3. Code:	APC - 103	
4. Entry Qualification	Minimum 5 th Standard and 14 years of age	
5. Terminal Competency:	The trained person will be competent in collecting honey in a bee farm	
6. Duration:	200 Hours	
7. Preface:	Honey collected by bee is useful to human being in a number of ways, especially in maintaining the health. Honey is used in number of medicines. Therefore it is very essential to systematically maintain the bees.	
8. Job Profile	The trained person would be able to work in large bee farms or work independently as a collector of honey	
9. Course content		
	Practical	Under pinning knowledge (Theory)
	<ul style="list-style-type: none"> ➤ Practicing use of smokers to ward of bees from the colony ➤ Practicing the use of honey extractor, uncapping knife, extraction tray, funnel, sieve, storage drums ➤ Practicing cleaning, wiping of the equipment ➤ Practicing safety and hygiene while extracting honey ➤ Practicing the method of removing bees from honey combs ➤ Practicing extraction without interference of bees on the extracted honey ➤ Practicing honey extraction from Apisdorsata and Apis-florea bee colonies ➤ Practicing use of safety outfit and veil ➤ Practicing using ladders etc., to climb up to the wild bee colony ➤ Practicing draining out honey from the cut combs. ➤ Practicing filtering, processing and storing honey ➤ 	<ul style="list-style-type: none"> ➤ Nutritional and medicinal values of honey ➤ Need and method of testing the purity of honey ➤ Understanding bee behavior ➤ Understanding response of bees to the smoke ➤ Knowledge about the stinging process of honeybees ➤ Remedies and prevention against bee stinging and bee venom ➤ Marketing honey ➤ Economics of setting up a beehive
10. Requirements of Equipments for about 20 trainees		
	1. Safety equipments like mask, veil, caps and gloves	

<ol style="list-style-type: none">2. First aid kit3. Honey extractor,4. Uncapping knife,5. Honey extraction tray,6. Funnel,7. Sieves8. Honey storage drums9. Smokers10. Ladders and rope	
--	--

LEVEL – 1

1. Module Name:	Bee Wax Collector	
2. Sector:	Apiculture	
3. Code:	APC 104	
4. Entry Qualification	Minimum 5 th Standard and 14 years of age	
5. Terminal Competency:	The trained person will be competent in collecting bee wax and process them in a bee farm	
6. Duration:	200 Hours	
7. Preface:	Bee Wax collected by is useful to human being in a number of ways, especially as a medicine and also as a lubricating product in industries.	
8. Job Profile	The trained person would be able to work in large bee farms or work independently as a collector of bee wax and processor.	
9. Course content		
	Practical	Under pinning knowledge (Theory)
	<ul style="list-style-type: none"> ➤ Practicing collection of black combs, cell scrapings after extraction of honey ➤ Practicing extraction of wax from the bee womb by boiling water method. ➤ Practicing extraction of wax by pressing method ➤ Practicing bleaching of wax to obtain clean pure wax ➤ Practicing use of bees for preparation of CF sheets ➤ Practicing use of bees wax for Queen cup preparation ➤ Storing of bees wax 	<ul style="list-style-type: none"> ➤ Study of abandoned honey combs of dorsata and flowering ➤ Physical and chemical properties of bees wax ➤ Importance and methods of testing bees wax for its purity ➤ Different uses of Bees wax ➤ Knowledge of marketing the bee wax
10. Requirements of Equipments for about 20 trainees		
	<ol style="list-style-type: none"> 1. Safety equipments like mask, veil, caps and gloves 2. First aid kit 3. Scrapping Knife 4. Wax collecting tray, 5. Wax moulding jig 6. Bleaching equipment 7. Wax storage drums 	

LEVEL – 1

1. Module Name:	Bee Pests Controller or Bee Pests Manager	
2. Sector:	Apiculture	
3. Code:	APC - 105	
4. Entry Qualification	Minimum 5 th Standard and 14 years of age	
5. Terminal Competency:	The trained person will be competent in protecting the bees from various diseases, insects, pests and predators	
6. Duration:	200 Hours	
7. Preface:	Bee are attacked by various insects, pests, diseases, and predators and hence, it is necessary to protect them.	
8. Job Profile	The trained person would be able to work in large bee farms or work independently as a protector of bee.	
9. Course content		
	Practical	Underpinning knowledge (Theory)
	<ul style="list-style-type: none"> ➤ Practicing identification of wax moth, yellow banded wasp and predators. ➤ Identification of brood disease and mites ➤ Protecting bee colony from wasps, ants and birds. ➤ Practicing remedies against wax moth, mites and brood diseases. ➤ Practicing prevention and control methods. ➤ Practicing strengthening of bee colonies against insects, pests and diseases ➤ Practicing artificial swarming to overcome diseases ➤ Practicing identification and prevention of robbing among bee colonies. ➤ Practicing protection of colonies from enemies like birds, monkeys 	<ul style="list-style-type: none"> ➤ Honeybee diseases, insects, pests, and predators. ➤ Study of life cycle of wax moth and mite pests. ➤ Study of chemicals used in treating brood diseases and mites ➤ Identification and control of brood diseases. ➤ Study of effect of pesticides on bee foraging and multiplication. ➤ Study of integrated pest management.
10. Requirements of Equipments for about 20 trainees		
	<ol style="list-style-type: none"> 1. Safety equipments like mask, veil, caps and gloves 2. First aid kit 3. Drawings, models or photos of various predators and enemies of bee 4. Medicine preparation tray 	

LEVEL – 2

1. Module Name:	Beehive Manufacturer	
2. Sector:	Apiculture	
3. Code:	APC - 206	
4. Entry Qualification	Minimum 5 th Standard + APC 101 and 14 years of age	
5. Terminal Competency:	The trained person with basic knowledge of carpentry will be competent in manufacturing beehives	
6. Duration:	160 Hours	
7. Preface:	Artificial beehives are essential part of beekeeping in the farms. They can be manufactured or purchased from a reliable source. Manufacturing requires that a person should be well trained in use of various specifications, tools and materials for constructing a beehive.	
8. Job Profile	The trained person would be able to work in large bee farms or work independently as a bee hive manufacturer	
9. Course content		
	Practical	Under pinning knowledge (Theory)
	<ul style="list-style-type: none"> ➤ Practice health, hygiene and safety norms during working ➤ Practicing care and maintenance and storage of tools, equipment and clothing ➤ Identification of different types of wood used in beehive manufacturing ➤ Practice drawing and measurements of all parts of the beehive such as ISI beehive, langsbth beehive, etc. ➤ Identification and utility of tools ➤ Practical handling of all tools and equipments. ➤ Practicing cutting, joining, nailing, pasting and other carpentry work ➤ Polishing manufactured beehives ➤ Practicing packing and forwarding techniques 	<ul style="list-style-type: none"> ➤ Knowledge on health, safety precautions and first aid ➤ Brief account of honey bee colonies and scope of scientific bee keeping ➤ History of natural and ancient bee hives. ➤ Study of different types of natural, ancient and modern beehives. ➤ Scope and development of different beehives for domesticated species of honey bees ➤ Wood selection for bee hive parts ➤ Types of existing beehives ➤ Selection and utility of different beehives ➤ Specification of different types of beehives used for modern / scientific bee culture. ➤ Study of available polishing and painting techniques of bee hives ➤ Scope of marketing of standard beehives ➤ An overview of proper waste disposal
10. Requirements of Equipments for about 20 trainees		
	<ol style="list-style-type: none"> 1. Wood – preferably seasoned and soft 2. Powered saw and trolley 3. Cutter 12” x 10” 	

<ol style="list-style-type: none">4. Planner 12" x 10"5. Four sides planer with groove6. Upper bar planer with cut7. Down bar planer with cut8. Side bar machine9. Side bar slope planer10. Three holes drill sliding11. Sliding cutter12. Hand finger joint machine13. Hammer 200gms, 250gms with handle14. Pliers 8" with curved tip15. Nails 1", 1 1/4", 2", 2 1/2"16. Black nails 1/2"17. Wire gauge (14 x 24mesh) for inner cover18. Tin sheet (34-36 gauge) for top cover19. Frame wire 30 -34 gauge20. Angle iron stand 16" x 20" x 9" (angle 3/4")21. Paint brush 4" and 2"22. Sand paper23. Primer24. Enamel Paint25. Ghee	
--	--