सूक्ष्म, लघु एवं मध्यम उद्यम मंत्रालय
DEVELOPMENT COMMISSIONER
MINISTRY OF MICRO, SMALL & MEDIUM ENTERPRISES
MSME TECHNOLOGY CENTRE

MODEL CURRICULUM

Qualification Name:

TECHNICIAN -AROMA PROCESS

Qualification Code:

Version: 2.0

NSQF Level: 4.5

Model Curriculum Version: 2.0

Submitted By:
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NOS / MODULE TEMPLATE

NOS /Module: COMMERCIAL CULTIVATION OF AROMATIC CROPS

NOS /Module Code: MSME/APA/01

Outcomes:

After completion of course Student should be able to:

- Explain the distribution, classification, and importance of aromatic crops.
- Identification, collection of samples, and preparation of herbarium.
- Understand about the selection & preparation of land for cultivation of aromatic crops.
- Understand about the, Identification, nursery making, fertilizer use, irrigation, weeding & harvesting of aromatic crops.
- Understand the concept of intercropping and Identification of suitable intercropping system and profitability in aromatic crops.
- Explain post-harvest techniques of aromatic crops and various storage conditions for herbage &essential oil.

Theory Hours: 60 **Practical Hours: 150** **Theory Marks: - 100** **Practical Marks: 100**

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	TH hours	PR hours	TH Marks	PR Marks
UNIT-I	Basic of Aromatic crops	After completion of unit Student should be able to • Explain the distribution, classification of aromatic crops. • Understand different agro zones • of India. • Understand the importance of cultivation of aromatic crops in India. • Identify, the different species of • Aromatic crops. • Collection of samples & preparation of herbarium.	Classification & taxonomy of aromatic crops, Agro-climatic zones & suitability of crops and Important aroma bearing crops. Aromatic Plants: Lemongrass, Citronella, Palmarosa, Basil, Mint, Vetiver, Monarda, Patchouli, Nagarmotha, Sandalwood Aromatic Flowers /Plants: Rose, Jasmine, Marigold, Kewra, Chamomile. Preparation of land for cultivation and Preparation of Nursery.	20	50	30	20
UNIT-II	Agro practices of aromatic crops	After completion of unit Student should be able to • Understand about the selectionof land for cultivation of aromatic crops. • Prepare the land for Nursery & main field. • Understand about the, nursery making, fertilizer use, irrigation, weeding & harvesting of	Land preparation & Nursery raising techniques, Agro-practice of common aromatic crops, Importance of cultivation of aromatic crops Cultivation practices	20	50	30	40

		aromatic crops. • Identify the maturation/harvesting time. • Understand the good cultivation practice for aromatic crops. • Analyze the herbage yield, in aromatic crops. • Estimation of economics of aromatic crops. • Estimation of essential oil content in respect of time in various aromatic crops.					
UNIT-III	Intercropping and post harvesting management in aromatic crops	After completion of unit Student should be able to • Understand the concept of intercropping in aromatic crops. • Identify suitable intercropping system with high profitability. • Explain post-harvest techniques of aromatic crops. • Explain the various storage condition for herbage & essential oil. • Estimation of effect of temperature on yield & quality of herbage.	Intercropping of aromatic crops Crop rotation in aromatic crops Post-harvest Transplantation, Harvesting, slippreparation	20	50	40	40

NOS /Module: Production of Fragrant raw material & its value addition level-1

NOS /Module Code: MSME/APA/02

Outcomes:

After completion of course Student should be able to:

1. Selection and identification of fragrant raw materials.
2. Understand the methodology of essential oils extraction and manufacturing of Attar s
3. Understand the fundamentals of installation, maintenance, operation and safety precaution of plant and machinery & its accessories
4. Determination of essential oil content in different aromatic crops.
5. Identification and Separation of fragrant materials

Theory Hours: 60 **Practical Hours: 150** **Theory Marks: 100** **Practical Marks: 100**

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	TH hours	PR hours	TH Marks	PR Marks
UNIT-I	Methodology involved in Extraction of essential oil.	At the end of this Unit thestudent should be able to: • Selection and identificationof fragrant raw materials. • Understand the methodology of essentialoils extraction and manufacturing of Attars	Selection of raw materials. Principles & Methodology of water, water steam & steam distillation techniques Methodology & Determination of oil content by Clevenger apparatus/pilot plant/FDU Attar Manufacturing	20	50	30	20
UNIT-II	Methodology involved in operation of plants and its accessories.	At the end of this Unit thestudent should be able to: • Understand the fundamentals of installation,maintenance, operation andsafety precaution of plant and machinery & its accessories	Principle/operation/maintenance of accessories like Steam generator, cooling tower, softener plants & etc. Design, Installation, Maintenance, Safety precaution for Distillation/ Extraction Units.	20	50	30	40
UNIT-III	Determination of Essential oil from different aromatic corps	After completion of unit Student should be able to • Identification andSeparation of fragrant materials • Determination of essential oil content in different aromatic crops.	Separation of fragrant materials Determination of essential oil content in-Grassy Aromaticcrops such as -Lemon grass, Mint, citronella Palmarosa & Basil Determination of essential oil content in Aromatic Flower such as Marigold, rose, Chamomile etc. Determination of essential oil content in Aromatic Root & Spices - Cardamom, Coriander, Clove, Turmeric, Roots: Vetiver, Nagarmotha etc.	20	50	40	40

COURSES / MODULE TEMPLATE

NOS /Module: Quality Assessment of fragrant raw materials Level-I

NOS /Module Code: MSME/APA/03

Outcomes:

After completion of course Student should be able to

- Understand how to Prepare the sample and Preparation of different solutions for testing of various fragrantmaterials
- Understand the Dehydration techniques of various essential oil.
- Understand basic chemistry of various fragrant raw materials.
- Understand and identified the chemical components of various Essential oils.
- Understand physical and chemical properties of aromatic compounds.
- Understand IUPAC Name, Structural Formula and Molecular Formula of aromatic compound.

THEORY HOURS: 60 PRACTICAL HOURS: 120 THEORY MARKS: 100 PRACTICAL MARKS: 100

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	TH hours	PR hours	TH Marks	PR Marks
UNIT-I	Basic of Essential oil Chemistry	After completion of unit Studentshould be able to • Understand basic chemistry offragrant raw materials. • Understand and identified the components of various Essentialoils. • Understand the different rules ofdifferent fragrant raw materials.	• Introduction of organic chemistry of fragrant raw material, Isoprene rule, special isoprene rule, Terpenoid Chemistry, Aliphatic compounds and Heterocyclic compounds Phenolic compound	20	50	30	20
UNIT-II	Structure & Nomenclature of Common aromatic compound.	After completion of unit Student should be able to • Understand physical and chemical properties of aromaticcompounds. • Understand IUPAC Name of aromatic compound. • Structural and Molecular Formula	IUPAC Name, Structural Formula , Molecular Formula	20	50	30	40
UNIT-III	Selection and Preparation of raw material for testing	After completion of unit Studentshould be able to • Prepare the sample of variousfragrant materials • Preparation of different solutionfor testing and dehydration techniques of essential oil.	Sampling of the fragrant raw materials Preparation of different solutions for testing purpose Dehydration of essential oil.	20	50	30	40

COURSES / MODULE TEMPLATE

NOS /Module: Fragrance & Flavour creation and its application-level-I

NOS /Module Code: MSME/APA/04

Outcomes:

After completion of course Student should be able to

THEORY HOURS: 60 PRACTICAL HOURS: 120 THEORY MARKS: 100 PRACTICAL MARKS: 100

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	TH hours	PR hours	TH Marks	PR Marks
Unit-I		At the end of this Unit the student should be able to: •	Global Scenario of Essential oil fragrance & Flavour. Olfaction, classification and differentiation of Odour and taste. Odour quality evaluation of fragrance & Flavour. Memorization of Odour and taste Basics of creation of fragrance & Flavour & its application Terminology of technical terms used in fragrance, Flavour, and essential oil industry	60	120	100	100
Unit-II		At the end of this Unit the student should be able to:					
Unit-III		At the end of this Unit the student should be able to: •					
Unit-IV		At the end of this Unit the student should be able to: •					

COURSES / MODULE TEMPLATE

NOS /Module: Agro aroma-based Products

NOS /Module Code: MSME/APA/05

Outcomes:

After completion of course Student should be able to

- Understand the Selection, identification, familiarization, and formulation of different Agro aroma-basedproducts.
- Understand about the basic principles & methods of production of agro aroma-based products.
- Explain the machinery used in making of agro aroma-based products.
- Understand the packaging materials used for Agarbatti, Dhoopbatti, Hawansamagri & rose water.
- Estimation of economics of Agarbatti, Dhoopbatti, Hawansamagri & rose water.
- Understand the storage of finished products.
- Explain the efficiency and technology used for making of Agarbatti, Dhoopbatti, Hawansamagri & rosewater.

THEORY HOURS: -60 PRACTICAL HOURS: 180 THEORY MARKS: 100 PRACTICAL MARKS: 100

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	TH hours	PR hours	TH Marks	PR Marks
Unit-I	Fundamentals of Agro Aroma basedProduct	At the end of this Unit thestudent should be able to: • Explain the basic raw materials used for preparation of agro aroma-based products. • Identification & Characterization of raw materials. • Understand the quality ofraw materials. • Understand the formulations of agro aroma-based products.	Principles & methodology of production of Agro aroma-based products. Raw materials study & formulations of Agarbatti, Dhoopbatti, & Hawan Samgri. Sources of Raw material for manufacturing of Agarbatti, Dhoopbatti & Hawan Samgri	20	30	30	20
Unit-II	Production of Agro Aroma based product	At the end of this Unit thestudent should be able to: • Understand about the basic principles & methods of production of agro aroma- based products. Explain the machinery used in making of agroaroma-	Manufacturing techniques, operation & maintenance of Agarbatti, Dhoopbatti & Hawan Samgri. Raw materials &manufacturing of Rose water. Familiarization of raw material for manufacturing of Agarbatti, Dhoopbatti &	20	60	40	40

		based products. • Explain the technology ofmaking of agro aroma products. • Understand the operation &maintenance of machinery. • Demonstration of making ofproducts.	Hawan Samgri				
Unit-III	Economics, Storage & Packaging of Finished products.	At the end of this Unit the student should be able to: • Understand the packagingmaterials used for Agarbatti, Dhoopbatti, Hawansamagri & rose water. • Explain the technologyused for making of Agarbatti, Dhoopbatti, Hawansamagri & rose water. • Understand the efficacy of the products. • Understand the steps ofpackaging • Estimation of economics ofAgarbatti, Dhoopbatti, Hawansamagri & rose water. • Demonstration of manufacturing. • Understand the store of finished products.	Economics, Storage of Packaging of Agarbatti, Dhoopbatti, Hawansamagri, Rose water.	20	60	40	40

COURSES / MODULE TEMPLATE

NOS /Module: Employability Skill

NOS /Module Code: MSME/ ES/03

THEORY HOURS: 120 PRACTICAL HOURS: NA THEORY MARKS: 100 PRACTICAL MARKS:NA

Refer Standard Curriculum developed by NCVET. (120-hours-MC-Employability-Skills_v4-DGT_120)

COURSES / MODULE TEMPLATE

NOS /Module: Production of Fragrant Raw Materials & its value addition level-II

NOS /Module Code: MSME/APA/06

Outcomes:

After completion of course Student should be able to

- Explain the Principle & Techniques of Rectification, fractionation of fragrant raw material.
- Manufacturing the Value-added product with respective to the Essential oil.
- Explain the Principle and methodology involved in Solvent extraction
- Manufacturing of absolute from various concrete, resenoides, and oleoresin.
- Explain the Design, Installation, Commission, Maintenance, Safety precaution of related plant &machineries.

THEORY HOURS: 60 PRACTICAL HOURS: 180 THEORY MARKS: - 100 PRACTICAL MARKS: 100

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	TH hours	PR hours	TH Marks	PR Marks
Unit-I	Fundamentals	At the end of this Unit the student should be able to: • Explain the Principle & Techniques of Rectification, fractionation of fragrant raw material. • Explain the Principle & Techniques of Hydrogenation of fragrant materials. • Understand the Design, Installation, Commission, Maintenance, Safety precaution of related plant & machineries.	Principles & Techniques of Rectification of fragrant raw materials Principles & Techniques of Fractionation of fragrant raw materials. Principle & Techniquesof Hydrogenation of fragrant materials. Routine maintenance of fractionation Unit Routine maintenance of rectification Unit Design, Installation, Commission, Maintenance, Safety precaution of related plant & machineries.	20	40	20	20
Unit- II	Production of Value-added product from essential oil	At the end of this Unit the student should be able to: • Processing of VariousEssential oil. • Manufacturing the Value- added product with respective to the Essentialoil.	Processing and value addition of Palma Rosa oil Processing and value addition of Citronella oil Processing and value addition of Basil oil Processing and value addition of Lemongrass oil Processing and value addition of Mint oil	20	60	40	40

Unit-III	Fundamental of Solvent extraction techniques.	At the end of this Unit the student should be able to: • Explain the Principle and methodology involved in Solvent extraction • Manufacturing of Concrete from various Flower. • Manufacturing of oleoresin from various spices. • Manufacturing of absolute from various concrete, resenoides, and oleoresin. • Explain the Design, Installation, Commission, Maintenance, Safety precaution of related plant & machineries.	Principle and methodology involved in Solvent extraction Parts and Accessories of Solvent Extraction units. Manufacturing of oleoresin from clove. Manufacturing of oleoresin from cardamom Manufacturing of oleoresin from cumin Manufacturing of Concreate from Rose, Manufacturing of Concreate from Tuberose Manufacturing of Concreate from Jasmine. Manufacturing of absolute of Rose Manufacturing of absolute of Tuberose Manufacturing of absolute of jasmine. Manufacturing of Resinoides of Nagarmotha, Manufacturing of Resinoides of Sandalwood Manufacturing of Resinoides of Kapoor Kachri. Design, Installation, Maintenance, Commission, Safety precaution of related plant & machineries.	20	60	40	40

COURSES / MODULE TEMPLATE

NOS /Module: Quality Assessment of fragrant raw materials Level-II

NOS /Module Code: MSME/APA/07

Outcomes:

After completion of course Student should be able to

- Understand the physical analysis of various fragrant raw materials.
- Understand the Chemical analysis of various fragrant raw materials.
- Identified the components and adulteration present in essential oil.
- Operation and maintenance of Gas Liquid Chromatography (GLC)
- Operation and maintenance of Thin Layer Chromatography (TLC)

THEORY HOURS: -60 PRACTICAL HOURS:180 THEORY MARKS: 100 PRACTICAL MARKS: 100

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	TH Hours	PR hours	TH Marks	PR Marks
Unit-I	Physical analysis of fragrant raw material as per standard	At the end of this Unit the student should be able to: •Understand the physical analysis of various fragrant raw materials.	Specific gravity of Mint, Vetiver, Sandalwood, Nagarmotha, Marigold etc. Optical rotation of Mint, Vetiver, Sandalwood, Nagarmotha, Marigold etc. Solubility of Mint, Vetiver, Sandalwood, Nagarmotha, Marigoldetc. Refractive index of Mint, Vetiver, Sandalwood, Nagarmotha, Marigold etc. PH value of Mint, Vetiver, Sandalwood, Nagarmotha, Marigoldetc. Congealing point of Mint.	20	20	20	20
Unit-II	Chemical analysis of fragrant raw material as per standard	At the end of this Unit the student should be able to: • Understand the Chemical analysis of various fragrant raw materials.	Acid Value of fragrant raw materials Saponification value of fragrant raw Materials Ester Value of fragrant raw materials Ester value after acetylation of fragrant raw materials Carbonyl value of fragrant raw materials Alcohol & phenol value of fragrant raw materials	20	80	40	40
Unit-III	Basic Instrumental analysis of fragrant raw material	At the end of this Unit the student should be able to: • Analysis of fragrant raw material • Operation and maintenance of Gas Liquid Chromatography(GLC)	Principle and techniques of Gas Liquid Chromatography (GLC) Principle and techniques of Thin Layer Chromatography (TLC) Analysis of Essential oils By Thin Layer Chromatography (TLC) Analysis of Essential oils Like Mint,	20	80	40	40

		• Operation and maintenance of Thin Layer Chromatography(TLC) • Identified the components present inessential oil. • Identified the adulteration present infragrant raw material.	Lemongrass, Sandalwood, Nagarmotha, Citronella, Palmarosa etc. By Gas Liquid Chromatography (GLC)				