

SYLLABUS

FOR

Post Graduate Diploma

in

Aroma Technology

1st Semester

Paper – I

Chemistry of essential oils – I

- Chemistry of essential oils (Isoprene rule, special isoprene rule, terpenes, aliphatics compounds, benzenoids and heterocyclic compounds)
- Biosynthesis of essential oils

Paper – II

Chemistry of essential oil-II

- Physico-chemical analysis (specific gravity, optical rotation, solubility, refractive index, congealing point, acid value, saponification value, carbonyl value, alcohol and phenol value)

Gas liquid chromatography and GC-MS (Principle, instrumentation and application) for qualitative and quantitative assessment of essential oils.

Paper – III

Processing of aromatic plants

- General principles and practices employed in extraction of essential oils
- Quantitative determination of essential oils
- Techniques for production of aromatics extracts (concretes and absolutes), essential oils both conventional and green techniques (enfleurage, expression, hydro distillation, wet steam and dry steam distillation, head space, super critical fluid extraction, florasol extraction, solvent free microwave extraction etc.

Paper – IV

Value addition of essential oils

- Principles and practices employed in value addition of essential oils
 - Fractional distillation
 - Rectification
 - Chemical transformations

PRACTICALS

Processing of aromatic plants, and value addition

- Quantitative determination of essential oils by Clevenger method and field units.
- Preparation of concretes and absolutes (Soxhlet extraction)

Chemistry of essential oils

- Physico-chemical analysis (specific gravity, optical rotation, solubility, refractive index, congealing point, acid value, saponification value, carbonyl value, alcohol and phenol value)
- Gas liquid chromatography for qualitative and quantitative assessment of essential oils.

2nd SEMESTER

Paper - V

Cultivation and primary processing of aroma bearing plants – I

- **Aromatic plants**

Introduction

Area and production in India

Agro climatic zones and their suitability for cultivation of aromatic plants need for diversification in traditional agriculture, and forestry scope for cultivation in India.

Scope for cultivation in India

Advances in research on aromatic plants in India with special reference to the improved cultivars.

- **Essential oils**

History, origin, distribution, classification and application

Paper – VI

Cultivation and primary processing of aroma bearing plants – II

- **Production of raw material (cultivation)**

Cultivation practices, including improved ones, of various commercially important aromatic crops

Disease management

Good cultivation practices for sustainable quality production

Role of micro nutrients and organic farming

- **Primary processing of aromatic plants**

Post harvest management

Extraction of aromatic plants (only a preliminary treatment regarding techniques, equipments and maintenance of extraction unit is required)

Paper – VII

Fragrance and flavours creation – I

- Fragrance & flavor of past
- Evolution of perfumery
- Study of fragrant raw material of natural origin with respect to use in fragrance & flavor
- Study of fragrant raw material of synthetic origin with respect to use in fragrance & flavor
- Classification fragrant raw materials
 - (i) According to odor
 - (ii) According to volatility
- Importance of differentiation, memorization and recognition of odours.
- Classification of fragrances & flavors
- Basic requirement of creation of fragrance & flavor.

Paper – VIII

Fragrance and flavours creation - II

- Fundamentals of floral accords.
- Creation of fragrance
- Formulation of flavor
- Application of fragrance & flavor in different products
- Fundamentals of Aromatherapy
- Chemistry of carriers (Vegetable) oil
- Storage of fragrant raw materials
- Safety & regulatory aspects of fragrance & flavor.

PRACTICALS

Cultivation and primary processing of aroma bearing plants

- Demonstration of propagation techniques / cultivation techniques nursery raising, preparation of field, planting and harvesting, use of fertilizer and pesticides, and post harvest management

Processing of aromatic plants, and value addition

- Pilot scale demonstration of distillation techniques
- Pilot scale demonstration of techniques for production of concretes and absolutes
- Fractional distillation of some commercially important essential oils
- Chemical transformations for production of commercially important isolates
- Aroma analysis: Sensory (color, appearance and taste)

Fragrance and Flavor creation

- Nose Test
- Tongue Test
- Familiarization with fragrant raw materials Natural origin Synthetic origin
- Memorization of odors & taste of fragrant raw materials of natural origin Synthetics origin
 - i. With similarity & contrast in odor & taste
 - ii. With determination of top, middle & base note
- Floral accord building
- Floral Fragrance creation
- Flavor formulation

FIELD VISITS

Students will be sent to paper mills and other institutes for educational training during the first and second semester. The objective is to provide an opportunity to stay in industrial environment and to understand the industrial operations, instruments, pilot scale experiments and other details. Faculty members will be deputed to accompany the students.

The students will maintain a daily for recording their observations and technical data etc. At the end of visit each student will independently submit a detailed report giving industrial process flow sheets, equipment sketches and other relevant data of the industry visited.

Examinations Theory / Practicals

FIRST SEMESTER

Sl.	Paper	Name of the paper	Max. Marks
1.	Paper – I	Chemistry of essential oils - I	100
2.	Paper – II	Chemistry of essential oils –II	100
3.	Paper – III	Processing of aromatics plants	100
4.	Paper – IV	Value addition of essential oils	100
		Practical	100
		Total Marks	500

SECOND SEMESTER

Sl.	Paper	Name of the paper	Max. Marks
1.	Paper – I	Cultivation and primary processing of aroma bearing plants – I	100
2.	Paper – II	Cultivation and primary processing of aroma bearing plants - II	100
3.	Paper – III	Fragrance and flavours creation – I	100
4.	Paper – IV	Fragrance and flavours creation – II	100
		Practical	100
		Dissertation	150
		Viva	50
		Total Marks	1200