Department of Botany
Syllabus of Advanced Diploma Courses (PG)

Preamble:

The Certificate Course in Processing and Packaging Herbal Technology under autonomy will be effective from the academic year 2018 – 2019. It has been prepared keeping in view the unique requirements of the plant based industries and society. The emphasis of the contents is to provide students the latest information of application of botany with the aim of disseminating skills of entrepreneurship. The course content also lists new practical exercises so the students gets a hands on experience of the latest techniques that are currently in use. The course will also inspire students towards becoming an entrepreneur and enable students to get employed in plant based industries.

Program Objectives of the Course:

1. To instill in the students the importance of studying traditional knowledge with respect to the usage of plants.
2. To equip the students with practical knowledge of processing and packaging of herbal products.
3. To acquaint the students with the plant based herbal industry at the national and international level.
4. To impart the basic skills of entrepreneurship in the students.

Program Outcomes:

1. The students shall learn the techniques of packaging of herbal products.
2. The students will learn the marketing essentials and strategies for herbal products .
3. The students will learn the entrepreneurial skill for setting up an industry.
4. The students will learn to test the quality of different types of herbal products.

I Year Advanced Diploma Programme

1. Title: Processing and Packaging Herbal Products
2. Year of Implementation: 2023-24
3. Duration: One Year
4. Pattern: Semester
5. Medium of Instruction: English
6. Contact hours: 7 hours/week
8. Structure of Course:

Syllabus Structure (PG)

Year	Semester	Course No.	Course Code	Contact Hours	Credits (1Credit=15 H)	Total Marks
1	I	CT I	AD BT 101	30	2	75
		CL I	ADB L101	60	2	150
	II	CT II	AD BT 201	30	2	75
		CL II	ADB L202	60	2	150
	Annual	CP I	AD BP101	60	2	150
			Total	**240**	**10**	**600**
2	III	CT III	AD B T 303	30	2	75
		CL III	AD B L303	60	2	150
	IV	CT IV	AD BT 404	30	2	75
		CL IV	AD BL404	60	2	150
	Annual	CP II	AD B P202	60	2	150
			Industrial and or Incubation and or Research and or Field Training	60	2	-
			Total	**270**	**12**	**600**
			Total	**510**	**22**	**1200**

AD: Advanced Diploma, B: Departmental Code (C: Chemistry, MI: Microbiology, CSE: Computer Science (Entire), etc)

C: Course, T: Theory, L: Lab (Practical), P: Project

Total No. of Papers: 10 (Theory: 04, Practical: 04, Project: 02) Theory and Practical: Semester**,**

Project: Annual

Semester I

AD BT 101**: Essentials of Herbal Technology I**

(Contact Hrs: 30 Credits: 2)

Learning Objectives: Students will be able to

1. To acquaint the students with traditional knowledge of usage of plants.
2. To make the students appreciate the importance of plants in day to day life.

Unit I: Introduction to Herbal Products and Ethno Botany (15)

Introduction to Ayurveda, Scope and importance of Herbal Products, Introduction to ethnobotany, Plants in symbolism, ritual, and religion, Plants in material culture, fibers, plant structure related to uses, Plants in nutrition and dietary patterns, Fermented foods, Major Secondary Metabolites in Plants, Human uses of plant secondary metabolites / Foods as medicines, Traditional Resource management, Ayurvedic pharmacopeia.

Unit II: Quantitative ethnobotany (15)

Concept, significance, sampling methods, survey methods, interviews

Learning Outcomes: After completion of the unit, Student is able to

1. The student will learn to relate with the importance of ethnobotany and traditional knowledge.

2. The student will learn techniques to study ethnobotany.

Reference Books:

Unit I

1. MaheshwariJK,KunkelG, BhandariMM,Duke J (1993) Ethnobotany in India. Scientific Publishers. Jodhpur, Rajashtan.
2. DeshmukhLP (2013) Medicinal Plants of India. Oxford Book Co., New Delhi
3. Bogers RJ, Craker LE, Lange D(2006) Medicinal and Aromatic Plants: Agricultural, Commercial, Ecological, Legal, Pharmacological and social aspects. Springer

Unit II

4. Hoffmann F, Manning M (2009) Herbal Medicine and Botanical Medical Aids. Viva Books. New Delhi.
5. Drury CH (2006) Ayurvedic Useful Plants in India. Asiatic Publishing House, New Delhi.
6. Ambasta SP (1986) Useful Plants of India. CSIR, Delhi.

ADB L101: **(Practical):**

(Contact Hrs: 60 Credits: 02)

Learning Objectives: Students will be able to

1. The students will learn to relate with the importance of ethnobotany and traditional knowledge.

2.The students will learn about the basics of the instrumentations involved innprocessing of herbal technology.

3. The students will learn techniques to study ethnobotany.

4. The students will learn the significance of herbal cosmetics

List of Practical's (15)

1-2. Study of medicinal plants. (Any five)

3-4. Study of plants with high nutritional value. (Any five)

5-8. Study of different procedures of processing herbal products. (Any two)

9-12. Study of major ethnomedicinal plants and practices followed in India.

Learning Outcomes:

After completion of the unit, Student is able to

1-2. The student shall learn to identify medicinal plants based on morphology and also the plant parts used.

3-4.The student shall learn to identify nutritional plants based on morphology, biochemical tests and also the plant parts used.

5-8. The student shall learn and practically do the various processes involved in processing of herbal products like Decoction, Maceration, Percolation, Infusion, Distillation, Soxhlet extraction, Microwave assisted extraction, Sonication, Dehydration.

9-12. The student shall learn the working and handling of the various instruments involved in processing of herbal products.

Reference Books:

Unit I

1. MaheshwariJK,KunkelG, BhandariMM,Duke J (1993) Ethnobotany in India. Scientific Publishers. Jodhpur, Rajashtan.
2. DeshmukhLP (2013) Medicinal Plants of India. Oxford Book Co., New Delhi
3. Bogers RJ, Craker LE, Lange D(2006) Medicinal and Aromatic Plants: Agricultural, Commercial, Ecological, Legal, Pharmacological and social aspects. Springer

Unit II

1. Hoffmann F, Manning M (2009) Herbal Medicine and Botanical Medical Aids. Viva Books. New Delhi.
2. Drury CH (2006) Ayurvedic Useful Plants in India. Asiatic Publishing House, New Delhi.
3. Ambasta SP (1986) Useful Plants of India. CSIR, Delhi.

Semester II

ADBT 201**: Essentials of Herbal Technology II**

(Contact Hrs: 30 Credits: 2)

Learning Objectives: Students will be able to

1. To inculcate the skill of application of knowledge for benefit to society.
2. To inculcate entrepreneurial skills in students.

Unit I: Instrumentation for processing of herbal products (12 L)

Study of instruments used in manufacture of herbal products: Macerator, Percolators, Orbital shaker, Distillation unit, Rotary Evaporator, Lyophilizer, Soxhlet apparatus, Sonicator; Basic principles and General methods for extraction of phyto-constituents from plant materials: Decoction, Maceration, Percolation, Infusion, Distillation, Soxhlet extraction, Microwave assisted extraction. (15)

Unit II: Herbal Cosmetics and Nutraceutical (12 L)

Herbal Cosmetics: Significance, Study of Skin and hair, Daily routine for hair and skin care, preparation of herbal products for skin and hair.

Herbal Nutraceuticals: Concept, significance, advantages over chemically synthesized Nutraceutical, Types of herbal Nutraceutical, Food as remedies, Anti-nutritional factors present in foods. (15)

Learning Outcomes: After completion of the unit, Student is able to

1.The student will learn to relate with the importance of ethnobotany and traditional knowledge.

2. The student will learn techniques to study ethnobotany

Reference Books:

Unit I

1. Pal DC, JainSK(1998) Tribal medicine.NayaPrakash Publication, New Delhi
2. NadkarniKM(2002) Indian MateriaMedica Vol. I and II. Popular Prakashan, Mumbai
3. Wallis TE (1985) Textbook of Pharmacognosy. CBS Publishers and Distributers, New Delhi

Unit II

4. Roseline A (2011) Pharmacognosy. MJP Publishers, New Delhi.
5. Chowdhary V (2014) Fundamentals of Food Processing, Packaging, Labeling and Marketing. Anmol Publications, Pune

ADB L202: **(Practical):**

(Contact Hrs: 60 Credits: 02)

Learning Objectives: Students will be able to

1-The students will learn to relate with the importance of ethnobotany and traditional knowledge.

2- The students will learn the techniques to study ethnobotany.

3- The students will learn about the basics of theinstrumentation involved in processing of herbal technology.

4- The students will learn the significance of herbal cosmetics andnutraceuticals.

List of Practical's (15)

1-2. Preparation of Herbal ubtan and soap

3-4. Preparation of Herbal serum.

5-6. Preparation of Face packs.

7-8. Preparation of Rose Water.

9-11. Preparation of Herbal Oils.

12-13. Preparation of Wheat grass juice.

14-15. Preparation of *Aloe* juice.

21. Preparation of Awala jam.

22. Preparation of Gulkand

23-24. Preparation of Chyawanprash

Learning Outcomes: After completion of the unit, Student is able to

1- The student shall learn to identify medicinal plants based on morphology and also the plant parts used..

2- The students shall learn to identify nutritional plant based on morphology,biochemical tests and also the plant parts used.

3- The students shall learn and practically do the various processes involved in processing of herbalproducts like Decoction, Maceration,Percolation., Infusion,Distillation, Soxhlet extraction,Microwave assisted extraction, Sonication,Dehydration.

4- The students shall learn the working and handling of the various instruments involved in processing of herbal products.

Reference Books:

Unit I

1. Pal DC, JainSK(1998) Tribal medicine.NayaPrakash Publication, New Delhi
2. NadkarniKM(2002) Indian MateriaMedica Vol. I and II. Popular Prakashan, Mumbai
3. Wallis TE (1985) Textbook of Pharmacognosy. CBS Publishers and Distributers, New Delhi

Unit II

4. Roseline A (2011) Pharmacognosy. MJP Publishers, New Delhi.
5. Chowdhary V (2014) Fundamentals of Food Processing, Packaging, Labeling and Marketing. Anmol Publications, Pune

AD BP101 (Project):

(Contact Hrs. 30/60, Credits: 1/2)

BOS Sub-Committee

1. Mrs. Shinde Inamdar S.A. Chairman
2. Mrs. Shinde R.A. Member

Expert Committee

1 Mr. Chavan Y. P.- Dirtector, Dynamic Remedies -Name of Industrial Expert

2 Dr. Walimbe S.S - Aryangle College , Satara - Name of Academic Expert