

**FACULTY OF SCIENCES**  
**SYLLABUS FOR THE BATCH**  
**FROM THE YEAR 2023 TO YEAR 2024**

**ProgrammeCode: DBOT**

**Programme Name:**

**Diploma Course in Medicinal Plants and their Value Added Products**  
**(Semester I-II)**

**Examinations: 2023-2024**



**DEPARTMENT OF BOTANY**  
**KHALSA COLLEGE, AMRITSAR**

**(An Autonomous College)**

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(c) Please visit the University website time to time

S.No.	PROGRAMME OBJECTIVES
1.	To introduce with the importance of medicinal plants and their health benefits
2.	Identification of medicinal plants and their preservation techniques
3.	To understand the agroclimatic conditions of medicinal plants for their cultivation and methods of propagation of medicinal plants
4.	Importance of organic farming and role of earthworms in sustainable agriculture
5.	Transforming the traditional knowledge into skills to promote herbal industry
6.	To understand the marketing of medicinal plants, develop entrepreneurship, consumerism and methods of product pricing, branding and sale

S.No.	PROGRAMME SPECIFIC OUTCOMES (PSOS)
PSO-1	The students will understand the importance and utilization of medicinal plants
PSO-2	Understand the agroclimatic conditions to grow medicinal species and <i>invitro</i> propagation of medicinal plants
PSO-3	Understand post harvest care, storage and factors affecting cultivation practices of post harvesting technologies
PSO-4	Understand the culturing of earthworms and vermicompost production
PSO-5	Understand the formulation of medicinal plant parts into commercial formulations as tablets, soaps, herbal syrups, ointments and herbal oils
PSO-6	Learn entrepreneurship skills to establish value addition ventures and the methods of Branding and sale of products
PSO-7	Understand the <u>constraints</u> and problems in production and marketing of medicinal plants

**P.G. DEPARTMENT OF BOTANY, KHALSA COLLEGE AMRITSAR**  
**Diploma Course in "Medicinal Plants and their Value Added Products" (BOTDMP-1 year)**  
**Certificate Course in "Medicinal Plants and their Value Added Products"(BOTCMP-6 months)**

COURSE SCHEME											
SEMESTER - I											
Course Code	Course Name	Hours/Week	Credits			Total Credits	Max Marks				Page No.
			L	T	P		Th	P	IA	Total	
<b>Major Courses</b>											
BOTDMP-101T/ BOTCMP-1001T	Introduction to Medicinal Plants	4	3	1	0	4	75	-	25	100	3-4
BOTDMP-101P/ BOTCMP-1001P	Practical I (Based on BOTDMP-101T/ BOTCMP-1001T)	4	0	0	2	2	-	37	13	50	5
BOTDMP-102T/ BOTCMP-1002T	Medicinal Plants Cultivation	4	3	1	0	4	75	-	25	100	6-7
BOTDMP-102P/ BOTCMP-1002P	Practical II (Based on BOTDMP-102T/ BOTCMP-1002T)	4	0	0	2	2	-	37	13	50	8
<b>Total</b>		<b>16</b>				<b>12</b>				<b>300</b>	

\*For practical one credit means two hours of practical/per week; IA = Internal assessment

COURSE SCHEME											
SEMESTER - II											
Course Code	Course Name	Hours/Week	Credits			Total Credits	Max Marks				Page No.
			L	T	P		Th	P	IA	Total	
<b>Major Courses</b>											
BOT DMP-201T	Medicinal Plant Product Formulations	4	3	1	0	4	75	-	25	100	9-10
BOT DMP-201P	Practical I (Based on BOT DMP-201T)	4	0	0	2	2	-	37	13	50	11
BOT DMP-202T	Marketing of Medicinal Plant Products	4	3	1	0	4	75	-	25	100	12-13
BOTDMP-202P	Practical II (Based on BOTDMP-202T)	4	0	0	2	2	-	37	13	50	14
<b>Total</b>		<b>16</b>				<b>12</b>				<b>300</b>	

\*For practical one credit means two hours of practical/per week; IA = Internal assessment

Diploma Course in "Medicinal Plants and their Value Added Products" (BOTDMP-1 year)  
Certificate Course in "Medicinal Plants and their Value Added Products"  
(BOTCMP-6 months)

**PROGRAMME: DBOT**  
**COURSE CODE: BOTDMP-101T/BOTCMP-1001T**  
**COURSE TITLE: INTRODUCTION TO MEDICINAL PLANTS**  
**SEMESTER -I**

**Credit L-T-P.3-1-0**

**Credit Hours (Per Week):4**

**Maximum Marks : 100**

**Theory : 75Marks**

**Internal Assessment : 25 Marks**

**Instructions for Paper Setters:**

The question paper will be divided into 2 sections. Section A: (Total weightage 15 marks). This section will have 10 compulsory very short answer type questions. Each question will carry 1.5 marks. Questions are to cover the whole of syllabus. Section B: (Total weightage 60 marks). This section will have eight questions, two questions from each unit. The student will have to attempt four questions, one from each unit. Each question will carry 15 marks and its answers should not exceed 6 pages. The questions should not have more than two subparts.

**Course Objectives:**

CO-1	To inculcate the importance of medicinal plants and their cultivation.
CO-2	To understand the agroclimatic conditions of important medicinal plants.

**UNIT-I**

Medicinal Plants: Introduction, Importance. Plant parts used; Fruits, Leaves, Stem and its modifications (underground and aerial), Roots.

**UNIT-II**

Plant Identifications and Herbarium techniques, Elementary knowledge of Binomial nomenclature, Outline of Bentham & Hooker classification

**UNIT-III**

Traditional knowledge and utility of some medicinal plants (Neem, Curry Patta, Giloy, Kachnar, Kavargandal, Ashwagandha, Arjun, Harad, Bahera, Amla, Amaltas, Bohr, Tulsi, Sadabahar and Pudina).

#### UNIT-IV

Concept of IUCN, Red List criteria, threat categories; concept of endemism, threatened endemic medicinal plants.

Conservation, *In-situ* conservation strategies (National Parks, Sanctuaries, Biosphere reserve sacred grooves), *Ex-situ* conservation (Botanical Gardens, Ethno-medicinal herbal gardens & Seed banks).

#### Suggested Readings:

1. Gokhale, S.S., Kokate, C.K. and A.P. Purohit (1994). Pharmacognosy, NiraliPrakashan.Pune.
2. Kokate, C.K., Purohit, A.P. and S.S. Gohkale (2002). Pharmacognosy. In: Terpenoids, 21st Edition, NiraliPrakashan, Pune.
3. Tyagi, D.K., (2005) Pharma Forestry: Field Guide to Medicinal Plants. Atlantic Publishers and Distributors, New Delhi.
4. Singh & Jain (1985) Taxonomy of Angiosperms. Rastogi Publications, Meerut.
5. Trivedi P C. 2006. Medicinal plants: Ethnobotanical approach, Agrobios, India.
6. Purohit and Vyas, 2008. Medicinal plant cultivation: A scientific approach, 2nd edition Agrobios, India

#### Course Outcomes:

CO-1	On completion of this course the students will be able to understand the importance of medicinal plants.
CO-2	Agroclimatic requirements to grow medicinal species and <i>invito</i> propagation of important plants.
CO-3	Selection of medicinal parts of plants through Practical exercises and field visit.
CO-4	Post harvest care, storage and other requirements.

**Diploma Course in "Medicinal Plants and their Value Added Products" (BOTDMP-1 year)**

**Certificate Course in "Medicinal Plants and their Value Added Products"  
(BOTCMP-6 months)**

**PROGRAMME: DBOT  
COURSE CODE: BOTDMP-101P/BOTCMP-1001P  
COURSE TITLE: INTRODUCTION TO MEDICINAL PLANTS**

**Credit L-T-P.0-0-2**

**Credit Hours (Per Week): 4**

**Practical : 37 Marks**

**Internal Assessment: 13 Marks**

**Total : 50 Marks**

**Instructions for the paper setter:** Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same may be submitted for the record to COE Office, Khalsa College Amritsar.

**Course Objectives:**

CO-1	Identification of important medicinal plants.
CO-2	To understand the technique of herbarium sheets preparation.

**Practicals:**

1. Identification of important medicinal plants.
2. Morphology of the common medicinal plants.
3. Preparation of herbarium sheets of medicinal plants

**Course Outcomes:**

CO-1	On completion of this course the students will be able to understand the importance of medicinal plants.
CO-2	Selection of medicinal parts of plants through Practical exercises and field visit.

Diploma Course in "Medicinal Plants and their Value Added Products" (BOTDMP-1 year)  
Certificate Course in "Medicinal Plants and their Value Added Products"(BOTCMP-6 months)

**PROGRAMME: DBOT**  
**COURSE CODE: BOTDMP-102T/BOTCMP-1002T**  
**COURSE TITLE: MEDICINAL PLANTS CULTIVATION**  
**SEMESTER-I**

**Credit L-T-P.3-1-0**

**Credit Hours (Per Week):4**

**Maximum Marks : 100**

**Theory : 75Marks**

**Internal Assessment : 25 Marks**

**Instructions for Paper Setters:**

The question paper will be divided into 2 sections. Section A: (Total weightage 15 marks). This section will have 10 compulsory very short answer type questions. Each question will carry 1.5 marks. Questions are to cover the whole of syllabus. Section B: (Total weightage 60 marks). This section will have eight questions, two questions from each unit. The student will have to attempt four questions, one from each unit. Each question will carry 15 marks and its answers should not exceed 6 pages. The questions should not have more than two subparts.

**Course Objectives:**

CO-1	To understand the importance of organic farming.
CO-2	To understand the role of earthworms in sustainable agriculture.

**UNIT - I**

Cultivation methods: Basics of Cultivation, Propagation, Agroclimatic Requirements, Transplanting, Crop Protection, Harvesting, Storage and after care.

**UNIT - II**

Factors affecting the cultivation of crude drugs: Exogenous and endogenous factors, mineral and nutrients supplements, Soil and Soil fertility, Pest and Pest control, Plant Growth Regulators, Genetic manipulators, Diseases management of medicinal and aromatic plants

**UNIT - III**

Systemic method of Cultivation and post harvest technology of medicinal plant, cultivated in India (i) Senna (ii) Opium (iii) Ashwgandha (iv) Lemon Grass (v) Ispaghula (vi)Turmeric (vii) Ginger.

**UNIT - IV**

Vermicompost: Nutritional Composition of Vermicompost for plants and comparison with traditional fertilizers. Physico-chemical analysis of vermicompost.Physical Parameters of Vermicompost.Role in medicinal plant cultivation.Vermiwash collection, composition &

use. Case Studies.

**Suggested Readings:**

1. Farooqi, A.A., and B.S. Sreeramu (2004). Cultivation of Medicinal and Aromatic Crops. University Press (India) Pvt. Ltd., Hyderabad.
2. Atal, C.K. and B.M. Kapur (1982). Cultivation and utilization of medicinal plants. Publishers RRL-CSIR, Jammu-Tawi, India,
3. Atal, C.K. and B.M. Kapur (1997). Cultivation and utilization of Aromatic plants. Publishers RRL-CSIR, Jammu-Tawi, India.
4. Singh, K., GorakhNath and R. C. Shukla (2014). A Textbook of Vermicompost: Vermiwash and Biopesticides, Publisher: Biotech Books.

**Course Outcomes:**

CO-1	Agroclimatic conditions and methods of medicinal plant cultivation.
CO-2	Factors affecting cultivation practices of post harvesting technologies.
CO-3	Earthworms farming and Vermicompost production.
CO-4	Small and large scale production techniques



Diploma Course in "Medicinal Plants and their Value Added Products" (BOTDMP-1 year)  
Certificate Course in "Medicinal Plants and their Value Added Products"(BOTCMP-6 months)

**PROGRAMME: DBOT**  
**COURSE CODE: BOTDMP-102PBOTCMP-1002P**  
**COURSE TITLE: MEDICINAL PLANTS CULTIVATION**

**CREDIT L-T-P. 0-0-2**

**Credit Hours (Per Week): 4**  
**Practical : 37 Marks**  
**Internal Assessment : 13 Marks**  
**Total : 50 Marks**

**Instructions for the paper setter:** Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same may be submitted for the record to COE Office, Khalsa College Amritsar.

**Course Objectives:**

CO-1	To understand the importance of organic farming.
CO-2	To understand the methods of propagation of medicinal plants.
CO-3	To understand the role of earthworms in sustainable agriculture.

**Practicals:**

1. Methods of propagation of medicinal plants.
2. Establishment of vermicomposting unit Pit & Bed method
3. Establishment of vermiwash unit
4. Vermicompost production, harvesting and packaging.

**Course Outcomes:**

CO-1	Methods of medicinal plant cultivation.
CO-3	Earthworms farming and Vermicompost production.
CO-4	Small and large scale production of vermicompost techniques

Diploma Course in "Medicinal Plants and their Value Added Products" (BOTDMP-1 year)

**PROGRAMME: DBOT**  
**COURSE CODE: BOTDMP-201T**  
**COURSE TITLE: MEDICINAL PLANT PRODUCT'S FORMULATIONS**  
**SEMESTER-II**

Credit L-T-P.3-1-0

Credit Hours (Per Week):4

Maximum Marks : 100

Theory : 75Marks

Internal Assessment : 25 Marks

**Instructions for Paper Setters:**

The question paper will be divided into 2 sections. Section A: (Total weightage 15 marks). This section will have 10 compulsory very short answer type questions. Each question will carry 1.5 marks. Questions are to cover the whole of syllabus. Section B: (Total weightage 60 marks). This section will have eight questions, two questions from each unit. The student will have to attempt four questions, one from each unit. Each question will carry 15 marks and its answers should not exceed 6 pages. The questions should not have more than two subparts.

**Course Objectives:**

CO-1	Transform the knowledge into skills for promotion of herbal industry.
CO-2	To understand the sensitivity and selectivity with respect to disease.

**UNIT-I**

History, Definition and scope of Medicinal Plants; Systems of Indian Medicines, Ayurveda, Yunani, Unani, Siddha, Homeopathy.

**UNIT-II**

Organoleptic study of the medicinal plants and Plant based drugs: **Root:** Ashwgandha, Mulethi, Ginger, Dasmula**Stem:** Giloy, **Bark:** Arjun, Dalchinni, **Leaves:** Neem, Ashwgandha**Flower:** Saffron, Chamomile, Chrysanthemum, Clove **Fruits:** Amla, Bahera, Harar**Seed:** Dhania, Jeera, Kalimirch, Kalonji, ajwain, Castor

**UNIT-III**

Preparation of crude and commercial formulations, infusion, decoction, lotion, washers, tablets, soaps, insect repellents, suppositories, tincture, making herbal syrups, poultice, ointments, herbal oils and herbal formulations.

#### UNIT-IV

Analytical Pharmacognosy, drug adulteration and detection. Biological testing of herbal drug. Phytochemical investigations with reference to secondary metabolites of locally available medicinal plants. GMP - Good Manufacturing Practices

#### Suggested Readings:

1. Gokhale, S.S., Kokate, C.K. and A.P. Purohit (1994). Pharmacognosy, NiraliPrakashan.Pune.
2. Acharya V. R. (2008) Herbs that Heal – Diamond Pocket Books, New Delhi.
3. Kokate, C.K. (2014) *Practical Pharmacognosy*. 5th Edition, VallabhPrakashan, Delhi.
4. Harborne, J.B. (1998) *Textbook of Phytochemical Methods. A Guide to Modern Techniques of Plant Analysis*. 5th Edition, Chapman and Hall Ltd, London
5. Kumar, N.C. (1993). *An Introduction to Medical botany and Pharmacognosy*. Emkay. Publications, New Delhi.

#### Course Outcome:

On completion of this course the students will be able to

CO-1	To formulate the medicinal plant parts into commercial formulations as tablets, soaps, herbal syrups, ointments and herbal oils
CO-2	Developing entrepreneurship activities to establish value addition ventures.

Diploma Course in "Medicinal Plants and their Value Added Products" (BOTDMP-1 year)

**PROGRAMME: DBOT**  
**COURSE CODE: BOTDMP-201P**  
**COURSE TITLE: MEDICINAL PLANT PRODUCT'S FORMULATIONS**

Credit L-T-P.0-0-2

**Credit Hours (Per Week): 4**

**Practical : 37 Marks**

**Internal Assessment : 13 Marks**

**Total : 50 Marks**

**Instructions for the paper setter:** Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same may be submitted for the record to COE Office, Khalsa College Amritsar.

**Course Objectives:**

CO-1	Transform the knowledge into skills for promotion of herbal industry.
CO-2	To understand the sensitivity and selectivity with respect to disease.

**Practicals:**

1. Analysis of crude powder drug of locally available medicinal plants.
2. Study of organoleptic parameters of the plants prescribed in the syllabus.
3. Preparation of herbal formulations.

**Course Outcomes:**

On completion of this course the students will be able to

CO-1	Understand the medicinal plant parts into commercial formulations as tablets, soaps, herbal syrups, ointments and herbal oils
CO-2	Understand the entrepreneurship activities to establish value addition ventures.

Diploma Course in "Medicinal Plants and their Value Added Products" (BOTDMP-1 year)

**PROGRAMME: DBOT**  
**COURSE CODE: BOTDMP-202T**  
**COURSE TITLE: MARKETING OF MEDICINAL PLANT PRODUCTS**  
**SEMESTER-II**

Credit L-T-P.3-1-0

Credit Hours (Per Week):4

Maximum Marks : 100

Theory : 75Marks

Internal Assessment : 25Marks

**Instructions for Paper Setters:**

The question paper will be divided into 2 sections. Section A: (Total weightage 15 marks). This section will have 10 compulsory very short answer type questions. Each question will carry 1.5 marks. Questions are to cover the whole of syllabus. Section B: (Total weightage 60 marks). This section will have eight questions, two questions from each unit. The student will have to attempt four questions, one from each unit. Each question will carry 15 marks and its answers should not exceed 6 pages. The questions should not have more than two subparts.

**Course Objectives:**

CO-1	To understand the demand and present scenario on marketing of medicinal plants.
CO-2	To develop potential entrepreneurship qualities.

**UNIT-I**

Definition, Core concepts and scope of Pharmaceutical/Herbal Markets, market segmentation.

**UNIT-II**

Classifications of goods & services, Product life cycle, Description of the formulations. New product development, Product branding, Packaging and labeling decisions. Product management of pharmaceutical/herbal market.

**UNIT-III**

Pricing methods in pharmaceutical/herbal industry, Rural Marketing, Industrial Marketing and International Marketing

### UNIT-IV

Consumerism, Determinants of promotional mix, personal selling, advertising, sales promotion, journals, sampling, retailing, medical exhibitions, online promotional techniques for OTC (Over-the-counter) Products

#### Suggested Readings:

1. Kotler, P and Keller, K (2020) Marketing Management, Prentice Hall of India, New Delhi.
2. Walker, B and Larreche (2002) Marketing Strategy- Planning and Implementation, Tata MC GrawHill, New Delhi.
3. Grewal, D and Michael, L (2011) Marketing, Tata MC Graw Hill, New Delhi
4. Kumar, A and Menakshi N (2011) Marketing Management, Vikas Publishing, India.
5. Saxena, R (2009) Marketing Management; Tata MC Graw-Hill, New Delhi, (India Edition).

#### Course Outcomes

CO-1	To understand the Methods of Branding and sale of products.
CO-2	To impart knowledge on the current status and export potential of medicinal plants.
CO-3	Develop an understanding on <u>constraints</u> and problems in production and marketing of medicinal plants.
CO-4	Market survey and visits and consumer response.

**Diploma Course in "Medicinal Plants and their Value Added Products"**

**(BOTDMP-1 year)**

**PROGRAMME: DBOT**

**COURSE CODE: BOTDMP-202P**

**COURSE TITLE: MARKETING OF MEDICINAL PLANT PRODUCTS**

**Credit L-T-P.0-0-2**

**Credit Hours (Per Week): 4**

**Practical : 37 Marks**

**Internal Assessment : 13 Marks**

**Total : 50 Marks**

**Instructions for the paper setter:** Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same may be submitted for the record to COE Office, Khalsa College Amritsar.

**Course Objectives**

CO-1	To understand the consumerism and consumer response
CO-2	To develop the methods of product pricing, branding and sale.

**Practicals:**

1. Market survey and visits.
2. Study of Consumerism and consumer response.
3. Methods of product packaging and labeling.
4. Methods of product pricing, branding and sale.

**Course Outcomes:**

CO-1	Understand the Methods of Branding and sale of products.
CO-2	Understand the market survey and visits and consumer response.