Dr. Rafiq Zakaria Campus
Maulana Azad Educational Trust's
Y. B. CHAVAN COLLEGE OF PHARMACY
(B. Pharm, M. Pharm & Research Centre)
ISO 21001:2018 & ISO 14001:2015 CERTIFIED | NIRF-2022 ALL INDIA RANK 65TH
NAAC ACCREDITATION "A" GRADE WITH 3.23 CGPA SCORE

COURSE MODULE

Program Title	B. Pharmacy
Department	Pharmacognosy
Course Title	Herbal Drug Technology

NAME OF INSTITUTION:	Y. B. CHAVAN COLLEGE OF PHARMACY, AURANGABAD
AFFILIATED UNIVERSITY	DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD
DEPARTMENT:	**PHARMACOGNOSY**
PROGRAM TITLE	B. PHARM.

4.1. Program Outcomes (PO):

- **PO 01: Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

- **PO 02: Planning Abilities:** Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

- **PO 03: Problem analysis:** Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

- **PO 04: Modern tool usage:** Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

- **PO 05: Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

- **PO 06: Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

- **PO 07: Pharmaceutical Ethics:** Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

- **PO 08: Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

- **PO 09: The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

- **PO 10: Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

- **PO 11:Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

COURSE SPECIFICATION :

5.1.Course Identification and General Information

a. Course Title:	**Herbal Drug Technology**	
b. Course Number/Code	**603T**	
c. Credit Hours	Theory	Practical
	45(3 Hrs/Week	60 (4Hrs. / Week)
d. Study level/semester at which this course is offered	SIXTH	
e. Pre-requisite	Pharmacognosy and Phytochemistry I and Pharmacognosy and Phytochemistry II	
f. Co-requisite	Pharmaceutics I, Pharm Jurisprudence, IPR	
g. Program in which the course is offered	B Pharm	
h. Language of teaching the course	English	
i. Prepared by	Dr. Subur W khan	
j. Approved by HOD		

5.2. Course Description:

This course gives the student the knowledge of basic understanding of herbal drug industry, the quality of raw material, guidelines for quality of herbal drugs, herbal cosmetics, natural sweeteners, nutraceutical etc. The subject also emphasizes on Good Manufacturing Practices (GMP), patenting and regulatory issues of herbal drugs

5.3. Course Objectives:

1. To study all aspects and guidelines for cultivation of herbal drugs
2. Introduce themselves to area of Nutraceuticals with examples
3. To study the formulation aspects in herbal cosmetics and role of natural excipients therein
4. To study and understand role and guidelines prescribed by different regulatory authorities for evaluation of herbal drugs
5. Take an overview to know other regulatory aspects in the area of herbal drugs

6.0.Course Outcomes (COs) : (Min. 4 and Max. 6)

(Use Bloom's Taxonomy words)

CO Code -603 T	Course outcome
603 T -1	Student will know how to obtain raw material for preparing herbal formulations
603 T -2	Students will be able to implement good cultivation practices and tools therein in production of medicinal plants
603 T -3	Students will be able to apply principles of different traditional practices in modern practices as well as in formulation
603 T -4	Students will know about modern areas of herbal development like Nutraceuticals and their applications
603 T -5	Students will know and able to apply knowledge of natural excipients in the preparation of herbal formulations and herbal cosmetics.
603 T -6	Students will know main aspects as well as regulatory aspects of herbal industry

6.1. Knowledge and Understanding

(Alignment of POs to COs)

CO Code					Program Outcome (PO)						
603T											
	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
603T 1	**3**	**2**	**2**	**3**	**-**	**-**	**1**	**-**	**1**	**2**	**1**
603T 2	**3**	**2**	**2**	**3**	**-**	**1**	**1**	**-**	**1**	**3**	**1**
603T 3	**3**	**-**	**2**	**3**	**-**	**-**	**1**	**-**	**-**	**-**	**1**
603T 4	**3**	**-**	**1**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**1**
603T 5	**3**	**1**	**1**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**1**
603T 6	**3**	**-**	**2**	**1**	**-**	**1**	**1**	**-**	**3**	**1**	**1**

6.2.Teaching and Assessment Methods for achieving learning outcome:

Teaching Strategies(methods)/Tools used	Methods of Assessment
Lectures (Constructivist learning) **Collaborative learning (Discussion)** **Project based Learning** **Blended learning** **Inquiry based learning** **Flash cards** **Video** **Equipment models**	**Formative Assessment** **Case study** **Class test** **Multiple choice questions** **Assignments** **Seminar** **Viva Voce** **Synopsis** **Tutorials** **Summative Assessment**

6.3.Tools for the Teaching and learning

Theory subjects	Practical Subjects
• **PowerPoints presentation** • **Videos** • **Flash Card** • **Models** • **Software** • **Charts** • **Smart Boards** • **White boards** • **Online Platform**	• **White boards** • **Glassware** • **Chemicals** • **Instruments** • **Equipment** • **Software** • **Models** • **Plants/Crude Drugs** • **Animal**

6.4.COURSE CONTENT

6.1. Theoretical Aspect:

Order	Topic list/units	Subtopics list	Number of Weeks	Contact Hours
1	**Unit I**	**UNIT-I 6** **Herbs as raw materials** Definition of herb, herbal medicine, herbal medicinal product, herbal drug preparation Source of Herbs Selection, identification and authentication of herbal materials Processing of herbal raw material **Biodynamic Agriculture** Good agricultural practices in cultivation of medicinal plants including Organic farming. Pest and Pest management in medicinal plants: Biopesticides/Bioinsecticides.	**2**	**06**
2	**Unit II**	**UNIT-II 05 Hours** a) Basic principles involved in Ayurveda, Siddha, Unani and Homeopathy b) Preparation and standardization of Ayurvedic formulations viz Aristas and Asawas, Ghutika, Churna, Lehya and Bhasma.	**2**	**05**
3	**Unit III**	**Nutraceuticals** General aspects, Market, growth, scope and types of products available in the market. Health benefits and role of Nutraceuticals in ailments like Diabetes, CVS diseases, Cancer, Irritable bowel syndrome and various Gastro intestinal diseases. Study of following herbs as health food: Alfaalfa, Chicory, Ginger, Fenugreek, Garlic, Honey, Amla, Ginseng, Ashwagandha, Spirulina **Herbal-Drug and Herb-Food Interactions:** General introduction to interaction and classification. Study of following drugs and their possible side effects a interactions: Hypercium, kava-kava, Ginkobiloba, Ginseng, Garlic, Pepper & Ephedra.	**2**	**07**
4	**Unit IV**	**Herbal Cosmetics** Sources and description of raw materials of herbal origin used via, fixed oils, waxes, gums colours, perfumes, protective agents, bleaching agents, antioxidants in products such as skin care, hair care and oral hygiene products. **Herbal excipients:** Herbal Excipients – Significance of substances of natural origin as excipients – colorants, sweeteners, binders, diluents, viscosity builders, disintegrants, flavors & perfumes.	**2.5**	**10**

		Herbal formulations : Conventional herbal formulations like syrups, mixtures and tablets and Novel dosage forms like phytosomes		
5	**Unit V**	**Evaluation of Drugs** WHO & ICH guidelines for the assessment of herbal drugs Stability testing of herbal drugs. **Patenting and Regulatory requirements of natural products:** a) Definition of the terms: Patent, IPR, Farmers right, Breeder's right, Bioprospecting and Biopiracy b) Patenting aspects of Traditional Knowledge and Natural Products. Case study of Curcuma & Neem. **Regulatory Issues** - Regulations in India (ASU DTAB, ASU DCC), Regulation of manufacture of ASU drugs - Schedule Z of Drugs & Cosmetics Act for ASU drugs.	**2.5**	**10**
6	**UNIT- VI**	**General Introduction to Herbal Industry** Herbal drugs industry: Present scope and future prospects. A brief account of plant based industries and institutions involved in work on medicinal and aromatic plants in India. **Schedule T – Good Manufacturing Practice of Indian systems of medicine** Components of GMP (Schedule-T) and its objectives Infrastructural requirements, working space, storage area, machinery and equipments, standard operating procedures, health and hygiene, documentation and records.	**2**	**07**
	TOTAL			**45**

6.2.Practical Aspects

Order	Name of Experiment	Number of Weeks
1	To perform preliminary phytochemical screening of crude drugs.	**01**
2	Determination of Ash value	**01**
3	Determination of moisture content of crude drugs	**01**
4	Determination of Extractive values of crude drugs	**01**
5	Determination of the alcohol content of Asava and Arista	**01**
6	Preparation of herbal cosmetics	**01**
7	Preparation and standardization of herbal formulation	**01**
8	Determination of swelling index and foaming index	**01**
9	Monograph analysis of herbal drugs from recent	**01**

	Pharmacopoeias	
10	Analysis of fixed oils	**01**

7.0. ASSESSMENT MECHANISM :

Sr. No.	Assessment Mechanism	Week due	Marks	Proportion of Final Assessment
1	Assignments, Exercises & Home works	2nd week of every month	10	6%
2	Sessional (Internal Theory exam)	As per scheduled examination	15	10%
3	Continuous Practical Assessment (Sessional Practical exam)	Weekly during practicals	15	10%
4	Final exam (theory)	As per University at end of course	75	50%
5	Final exam(practical)		35	24%
Total			150	**100%**

8.0.STUDENT SUPPORT:

Office hours/week	Other procedures
Two hours minimum	

9.0.TEACHER'S AVAILABILITY FOR STUDENT SUPPORT:

Days	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Time	**12:00-1:00**	**10-11 am**	**12:00-1:00**	**10am-1 pm**	**10am- 1 pm**	**10am- 1 pm**

10.0. LEARNING RESOURCES:

Sr. No.	Title of Learning Material	Details
1	Text books	1. Textbook of Pharmacognosy by Trease & Evans. 2. Pharmacognosy by Kokate, Purohit and Gokhale 3. Herbal Drug Technology by Agrawal
2	Essential references (as per syllabus)	1. Textbook of Pharmacognosy by Trease & Evans. 2. Textbook of Pharmacognosy by Tyler, Brady & Robber. 3. Pharmacognosy by Kokate, Purohit and Gokhale 4. Herbal Drug Technology by Agrawal 5. Essential of Pharmacognosy by Dr.S.H.Ansari 6. Pharmacognosy & Phytochemistry by V.D.Rangari 7. Pharmacopoeal standards for Ayurvedic Formulation (Council of Research in Indian Medicine & Homeopathy) 8. Mukherjee, P.W. Quality Control of Herbal Drugs: An Approach to Evaluation of Botanicals. Business Horizons Publishers, New Delhi, India, 2002.
3	Reference material	Pharmacopoeas (IP, USP, BP, IHP, IAP)
4	E-materials and websites	-
5	Other learning material	-

11.0. FACILITIES REQUIRED:

Sr.No.	Particular of Facility Required
1	Lecture Rooms (capacity for 60 students)
2	Laboratory (capacity for 20 students)
3	Computing resources: PC with latest version and hardware/software and utilization of open source and licensed application software
4	Other resources: Appropriate laboratory tools, Chemicals, Glass ware, Apparatus, Instrumentation

12.0. COURSE IMPROVEMENT PROCESSES:

12.1. Strategies for obtaining student feedback on effectiveness of teaching:

Course delivery evaluation by students using: Questionnaire forms and online questionnaires

12.2. Other strategies for evaluation of teaching by the instructor or by the department:

Periodic review by Academic Planning & Monitoring Committee and departmental review committee, Observations and assistance of colleagues, External assessments by advisors/ examiners and auditors.

12.3. Process for improvement of teaching:

Use of ICT tools, teaching aids, Simultaneous practical orientation and theory classes (SPOT), Adoption of reflective teaching.

12.4. Describe the planning procedures for periodically reviewing of course effectiveness and planning for improvement:

Periodic review by departmental meeting , Review of course delivery and outcome through assessment and feedback from all stake holders.

12.5. Course development plans:

Provide inputs for course improvement and update to University Course development Committees (Board of Studies)

13.0. INFORMATION ABOUT FACULTY MEMBER RESPONSIBLE FOR THE COURSE:

Name	Dr. Subur W. Khan
Location	Cabin, Third floor, near staff room, PA lab
Contact Detail (e-mail &cell no.)	8055347943
Office Hours	10:00 AM to 5:00 PM

Name	Dr. Abubakar Bawazir salam
Location	Cabin, Third floor, near exam Dept.
Contact Detail (e-mail & Cell No.)	9823283334
Office Hours	10:00 AM to 5:00 PM