Curriculum for MD/MS Ayurveda
(PRESCRIBED BY NCISM)

अभ्यासात्प्राप्यते दृष्टिः कर्मसिद्धिप्रकाशिनी।

Semester III-VI
Dravyaguna Vijnana
(Ayurveda Pharmacology)
(SUBJECT CODE : AYPG-DG)

(Applicable from 2024-25 batch, from the academic year 2025-26 onwards until further notification by NCISM)

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आयुषे सर्वलोकानाम्

Competency

Copability

SKILLS

Skill
Training

BOARD OF AYURVEDA
NATIONAL COMMISSION FOR INDIAN SYSTEM OF MEDICINE
NEW DELHI-110026

PREFACE

Dravyaguna, a key pillar among the Trisutras of Ayurveda, focuses on understanding the properties, actions, and uses of medicinal substances, especially herbs. This subject has deep roots in the classical texts and is enriched by references found even in the Vedas. The postgraduate syllabus of Dravyaguna is designed to give detailed knowledge of Aushadha Dravya, covering their Rasapanchaka, Karma, Prayojya Anga, and relevance in different clinical conditions. The aim is to help students study medicinal plants thoroughly—from identification and classification to therapeutic application—keeping in view their classical importance and current healthcare needs.

This curriculum includes topics that link Ayurveda with modern science. Students are introduced to concepts from botany, pharmacognosy, analytical chemistry, pharmacology, omics technologies, and bioinformatics to understand the deeper mechanisms of drug action. Practical learning through experimental pharmacology, identification of adulterants and substitutes, pharmacovigilance, quality control, and research on proprietary medicines has been included to give students hands-on experience. Modules on network pharmacology, nutraceuticals, novel dosage forms, and integration of traditional and modern approaches further prepare them to handle current-day challenges.

The syllabus also encourages learning about medicinal plant conservation, cultivation, trade, and regulation. With exposure to patent laws, TKDL, AYUSH policies, and opportunities for entrepreneurship, students are encouraged to explore independent paths in research, industry, or clinical practice. By the end of the program, students will have a strong understanding of classical knowledge, modern tools, and practical skills to contribute meaningfully to the field of Dravyaguna and Ayurveda in both national and global contexts.

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We want that education by which **character** is formed, **strength of mind** is increased, the **intellect** is expanded, and by which one can **stand on one's own feet.**

-*Swami Vivekananda*

NCISM

(NATIONAL COMMISSION FOR INDIAN SYSTEM OF MEDICINE)
Curriculum MD/ MS Ayurveda
Dravyaguna Vijnana (AYPG-DG)
Summary & Credit Framework
Semester III-VI

Module Number & Name	Credits	Notional Learning Hours	Maximum Marks of assessment of modules (Formative Assessment)
Semester No : 3			
Paper No : 1 (Pharmacognostical Applications in Dravyaguna)			
M1 Classical to contemporary aspects of Aushadha Dravya Part 1	2	60	50
M2 Classical to contemporary aspects of Aushadha Dravya Part 2	2	60	50
Paper No : 2 (Applied Pharmacology in Dravyaguna)			
M9 Pharmacology & Karma of Nadi and Twacha with contemporary correlation.	3	90	75
M10 Karmas of the Prajanana Sansthana	1	30	25
Paper No : 3 (Industrial Applications in Dravyaguna)			
M17 Drug and Patient Safety	2	60	50
M18 Sandigdha (Controversy) & Anukta Dravya in perspective of identification	2	60	50
Paper No : 4 (Regulatory Frameworks in Dravyaguna)			
M25 Evolution of Dravyaguna and Scope of AI applications.	3	90	75
M26 Quality Control of selected Formulation ingredients from Sharangadhara, AFI and API.	1	30	25
Total	**16**	**480**	**400**
Semester No : 4			

Paper No : 1 (Pharmacognostical Applications in Dravyaguna)			
M3 Nomenclature and basonym, synonyms, homonyms-based identification of classical drugs.	2	60	50
M4 Botanical Identification of plants used in current practice	2	60	50
Paper No : 2 (Applied Pharmacology in Dravyaguna)			
M11 Classical to contemporary aspects of Aushadha Dravya Part 3	2	60	50
M12 Classical to contemporary aspects of Aushadha Dravya Part 4	2	60	50
Paper No : 3 (Industrial Applications in Dravyaguna)			
M19 Leads to Drug discovery & new drug development	3	90	75
M20 Novelty and Principles in compounding dosage forms	1	30	25
Paper No : 4 (Regulatory Frameworks in Dravyaguna)			
M27 Plant Extracts	2	60	50
M28 Poshaka Aushadhi -Integrating traditional wisdom with modern Nutraceutical concepts.	2	60	50
Total	**16**	**480**	**400**
Semester No : 5			
Paper No : 1 (Pharmacognostical Applications in Dravyaguna)			
M5 Identification, source & availability of plant-based Raw Drugs.	2	60	50
M6 Vrikshayurveda, Cultivation, Conservation and, Tissue Culture of medicinal plants.	2	60	50
Paper No : 2 (Applied Pharmacology in Dravyaguna)			
M13 Karmas of the Pachana samsthana, Yakrit and Pliha.	2	60	50
M14 Karmas related to Sarvadehika, Mutrvaha samsthana and Dhatu karma.	2	60	50
Paper No : 3 (Industrial Applications in Dravyaguna)			
M21 Classical to contemporary aspects of Aushadha Dravya Part 5	2	60	50
M22 Classical to contemporary aspects of Aushadha Dravya Part 6	2	60	50
Paper No : 4 (Regulatory Frameworks in Dravyaguna)			
M29 Regulatory Framework and Policies for ASU Drugs: Safety, Quality, and Compliance.	2	60	50

M30 Regulatory framework for biodiversity for conservation, Traditional Knowledge and Integration of traditional & contemporary medicine.	2	60	50
Total	**16**	**480**	**400**

Semester No : 6

Paper No : 1 (Pharmacognostical Applications in Dravyaguna)

M7 Pharmacognosy & Quality Standards of Ayurvedic Medicinal Plants.	2	60	50
M8 Applied aspects of Bheshaja Pariksha, Prashasta Bheshaja and Bheshaja Prayoga	2	60	50

Paper No : 2 (Applied Pharmacology in Dravyaguna)

M15 Karmas of the Raktavaha Sansthana,Rasavahsansthana, Shwasansansthana	2	60	50
M16 Experimental models for evaluation of various pharmacological actions.	2	60	50

Paper No : 3 (Industrial Applications in Dravyaguna)

M23 Study of plant-based dietary components and Animal-origin Drugs.	2	60	50
M24 Pharmacotherapeutics of Herbal Cosmetic dravya - Varnya , Keshya, Twachya	2	60	50

Paper No : 4 (Regulatory Frameworks in Dravyaguna)

M31 Classical to contemporary aspects of Aushadha Dravya Part 7	2	60	50
M32 Classical to contemporary aspects of Aushadha Dravya Part 8	2	60	50
Total	**16**	**480**	**400**
Grand Total	**64**	**1920**	**1600**

Credit frame work

AYPG-DG consists of 32 modules totaling 64 credits, which correspond to 1920 Notional Learning Hours. Each credit comprises 30 hours of learner engagement, distributed across teaching, practical, and experiential learning in the ratio of 1:2:3. Accordingly, one credit includes 5 hours of teaching, 10 hours of practical training, 13 hours of experiential learning, and 2 hours allocated for modular assessment, which carries 25 marks.

Important Note: The User Manual MD/MS Ayurveda is a valuable resource that provides comprehensive details about the curriculum file. It will help you understand and implement the curriculum. Please read the User Manual before reading this curriculum file. The curriculum file has been thoroughly reviewed and verified for accuracy. However, if you find any discrepancies, please note that the contents related to the MSE should be considered authentic. Each paper has 16 credits and each semester covers 16 credits across 4 papers. In case of difficulty and questions regarding the curriculum, write to syllabus24ayu@ncismindia.org.

Credit Analysis Overview

Sem/Paper	Paper No 1	Paper No 2	Paper No 3	Paper No 4	Credits
Semester 3	M-1 | 2 Crs M-2 | 2 Crs	M-9 | 3 Crs M-10 | 1 Crs	M-17 | 2 Crs M-18 | 2 Crs	M-25 | 3 Crs M-26 | 1 Crs	**16**
Semester 4	M-3 | 2 Crs M-4 | 2 Crs	M-11 | 2 Crs M-12 | 2 Crs	M-19 | 3 Crs M-20 | 1 Crs	M-27 | 2 Crs M-28 | 2 Crs	**16**
Semester 5	M-5 | 2 Crs M-6 | 2 Crs	M-13 | 2 Crs M-14 | 2 Crs	M-21 | 2 Crs M-22 | 2 Crs	M-29 | 2 Crs M-30 | 2 Crs	**16**
Semester 6	M-7 | 2 Crs M-8 | 2 Crs	M-15 | 2 Crs M-16 | 2 Crs	M-23 | 2 Crs M-24 | 2 Crs	M-31 | 2 Crs M-32 | 2 Crs	**16**
Credits	**16**	**16**	**16**	**16**	**64**

Semester VI University examination					
Theory			Practical*		
Paper	Marks	Total	Practical Heads	Marks	Total
Paper -1	100	400	Long case or procedure/Major practical as applicable	100	400
			Short case or procedure/Minor practical	50	
Paper -2	100		Spotters	50	
			Assessing teaching ability	20	
Paper -3	100		Assessing presentation skills	20	
			Viva (4 examiners: 20 marks/each examiner)	80	
Paper -4	100		Dissertation Viva	40	
			Logbook (Activity record)	20	
			Practical/Clinical Record	20	

* Details in 6H table

Course Code and Name of Course

Course code	Name of Course
AYPG-DG	Dravyaguna Vijnana (Ayurveda Pharmacology)

Table 1 : Course learning outcomes and mapped Program learning outcomes

CO No	A1 Course learning Outcomes (CO) AYPG-DG At the end of the course AYPG-DG, the students should be able to-	B1 Course learning Outcomes mapped with program learning outcomes.
CO 1	Analyze and interpret the fundamental principles and mechanisms of Ayurvedic pharmacology and contemporary science, and apply them in clinical practice.	PO1,PO3,PO7,PO8
C02	Identify, classify, and evaluate medicinal plants and conduct their pharmacognostic study as per Ayurveda and contemporary science.	PO1,PO2,PO3,PO7
CO3	Develop critical thinking to differentiate anukta, controversial, adulterant, and substitute dravyas, and apply this understanding in clinical practice.	PO1,PO3,PO7,PO8
CO4	Appraise techniques for the development of quality-standardized plant-based drugs and their formulations, and validate their safety and efficacy using advanced analytical tools.	PO1,PO2,PO5,PO7
CO5	Acquire and assess knowledge of various formulations and their therapeutic utility in clinical practice.	PO1,PO3,PO7
CO6	Demonstrate techniques of ethnomedicinal research and implement strategies for medicinal plant conservation, following professional ethics aligned with global healthcare needs.	PO4,PO5,PO6,PO8
CO7	Analyze the global trade and commerce of medicinal plants, evaluate regulatory frameworks, and assess their impact on sustainable practices.	PO5,PO6,PO8
CO8	Examine and interpret the significance and application of IPR in traditional and invention-based knowledge systems.	PO3,PO5,PO8
CO9	Explore, retrieve, and utilize information from various databases, ancient texts, and contemporary literature related to medicinal plants.	PO1,PO5,PO7

Table 2 : Course contents (Modules- Credits and Notional Learning Hours)

Paper No : 1 (Pharmacognostical Applications in Dravyaguna)						
Semester No : 3						
2A Module Number	2B Modules & units	2C Number of Credits	Notional Learning hours			
			2D Lectures	2E Practical Training	2F Experiential Learning including Modular Assessment	2G Total
1	**M-1 Classical to contemporary aspects of Aushadha Dravya Part 1** **Module deals with the study of Aushadha Dravya (Based on available references) - Prayojya Anga, Rasapanchaka, Doshakarma, Agryakarma, Karma, Important Pharmacological Actions, Rogaghnata, Amayika prayoga in Vyadhi about various Srotas and Vyadhi Avastha, Yoga, Proprietary Medicines, Phyto constituents, Research Updates, Basonym and Synonyms with Etymological derivation, Botanical Name & Family, Regional Name, Gana Vargeekarana, Habitat and Morphological Description, Varieties, Grahya and Agrahya laxana, Adulterants, Substitutes, Toxic effects Shodhana and Anti dote (if any), Contraindication, Trade and Commerce, Any other Relevant information of the Drug and Classical references.** **• M1U1 Dravya related to Medhya,Madakari,Sanjnasthapana,Nidrajanana, Vedanasthapana,Akshepajanana and Akshepashamana Karmas** Medhya 1. Mandukparni (*Centella asiatica* L.)	2	10	20	30	60

2. Brahmi (*Bacopa monneiri* (L) Pennel)

3. Shankhapushpi (*Convolvulus pluricaulis* Chois.)

4. Jyotishmati (*Celastrus paniculatus* Willd.)

5. Kushmanda (*Benincasa hispida* Thumb.)

Madakari

6. Ahiphena (*Papaver somniferum* L.)

7. Bhanga (*Cannabis sativa* L.)

Sanjnasthapana

8. Vacha (*Acorus calamus* L.)

9. Jatamansi (*Nardostachys jatamansi* DC.)

Nidrajanana

10. Sarpagandha (*Rauwolfia serpentina* Benth.)

Vedanasthapana

11. Rasna (*Pluchea lanceolata* Ol & H.)

12. Kadamba (*Anthocephalus cadamba* Roxb.)

13. Padmaka (*Prunus cerasoides* L.)

14. Vetasa (*Salix caprea* L.)

15. Jalavetasa (*Salix tetrasperma* Roxb.)

16. Parasika Yavani (*Hyoscymus niger* L.)

17. Guggulu (*Commiphora mukul* Hok ex.)

18. Eranda (*Ricinus communis* L.)

19. Gandhaprasarini (*Paederia foetida* L.)

20. Tagara (*Valeriana wallichi* DC.)

21. Nirgundi (*Vitex negundo* L.)

22. Palandu (*Allium cepa* L.)

23. Rasona (*Allium sativum* L.)

24. Devadaru (*Cedrus deodara* Roxb.)

25. Medasaka (*Litsea chinensis* Lour.)

26. Muchukanda (*Pterocarpus acerifolium* (L.) Willd.)

Akshepajanana

27. Kupilu (*Strychnos nux-vomica* L.)

Akshepashamana

28. Bhurjapatra (*Betula utilis* D.Don)

• M1U2 Dravya related to Netra-Chakshushya,Rasya, Twacha-Swedjanana, -Swedopaga and Swedapanayana karmas
Netra-Chakshushya

1. Chakshushya (*Cassia absus* (L) H. Irwin)

2. Kataka (*Strychnos potatorum* L.)

Karnya

3. Sudarshana (*Crinum asiaticum* L.)

4. Paribhadra (*Erythrina indica* Lam.)

Rasya

5. Meshashringi (*Gymnema sylvestre* R. Br.)

Twacha -Swedjanana

6. Vatsanabha (*Aconitum ferox* Wall.)

Swedopaga

7. Shobhanjana (*Moringa oleifera* L.)

Swedapanayana

8. Ushira (*Vetiveria zizanoides* L.)

| 2 | **M-2 Classical to contemporary aspects of Aushadha Dravya Part 2**

Module deals with the study of Aushadha Dravya (Based on available references) - Prayojya Anga, Rasapanchaka, Doshakarma, Agryakarma, Karma, Important Pharmacological Actions, Rogaghnata, Amayika prayoga in Vyadhi about various Srotas and Vyadhi Avastha, Yoga, Proprietary Medicines, Phyto constituents, Research Updates, Basonym and Synonyms with Etymological derivation, Botanical Name & Family, Regional Name, Gana Vargeekarana, Habitat and Morphological Description, Varieties, Grahya and Agrahya laxana, Adulterants, Substitutes, Toxic effects Shodhana and Anti dote (if any), Contraindication, Trade and Commerce, Any other Relevant information of the Drug and Classical references.

• M2U1 Dravya related to Keshya, Varnya,Vranropana,Snehopaga,Kandughna,Kusthagnha and Udardaprashamana Karmas
Keshya | 2 | 10 | 20 | 30 | 60 |

1. Narikela (*Cocos nucifera* L.) 2. Bhrungaraja (*Eclipta alba* Hask.) 3. Nilini (*Indigofera tinctoria* L.) Varnya 4. Kumkuma (*Crocus sativus* L.) 5. Ketaka (*Pandanus odoratissimus* L.) Vranropana 6. Mamsarohini (*Soymida febrifuga* Juss.) Snehopaga 7. Draksha (*Vitis vinifera* L.) 8. Shleshmataka (*Cordia dichotoma* G. Forst) Kandughna 9. Karanja (*Pongamia pinnata Pierre*.) 10. Nimba (*Azadirachta indica* Juss.)						

11. Sarshapa (*Brassica campestris* L.)

12. Jayanti (*Sesbania sesban* (L) Merr,)

13. Aranyajeeraka (*Centratherum anthelminticum* Kuntze)

Kusthagnha

14. Khadira (*Acacia catechu* Willd.)

15. Haridra (*Curcuma longa* L.)

16. Amragandhi Haridra (*Curcuma amada* Roxb.)

17. Aaragwadha (*Cassia fistula* L.)

18. Tuvaraka (*Hydnocarpus laurifolia* Demot.)

19. Bakuchi (*Psoralea corylifolia* L.)

20. Jati (*Jasminum grandiflorum* L.)

21. Madayantika (*Lawsonia inermis* L.)

22. Kakodumbara (*Ficus hispida* L.)

23. Saireyaka (*Barleria prionitis* L.)

24. Chakramada (*Cassia tora* L.)

25. Karaveera (*Nerium indicum* Mill.)

Udardaprashamana

26. Tinduka (*Diospyrus malabarica* Roxb.)

• **M2U2 Dravya related to Hridya and Raktabharashamaka Karmas**
Hridya

1. Arjuna (*Terminalia arjuna* Wight & A.)

2. Karpura (*Cinnamomum camphora* Nees.)

3. Vanapalandu (*Urginea indica* Kunth.)

4. Tambula (*Piper betle* L,)

5. Taruni (*Rosa centifolia* L.)

Raktabharashamaka

6. Rudraksha (*Elaecarpus angustifolius* Blume)

• **M2U3 Dravya related to Shothahara,Gandamalanashaka Karma**
Shothahara

1. Agnimantha (*Premna integrifolia* L.)

2. Patala ((*Stereospermum suaveolens* DC.)

	3. Gambhari (*Gmelina arborea* L.)				
	4. Manakanda (*Colocasia indica* Lour.)				
	5. Himsra (*Capparis sepiaria* L.)				
	6. Adhahpushpi (*Trichodesma indicum* (L) Sm.)				
	7. Shakhotaka (*Streblus asper* Lour.)				
	Gandamalanashaka				
	8. Kanchanara (*Bauhinia variegata* L.)				
	9. Kandira (*Rananculus scleratus* L.)				
		4	20	40	60	120

Semester No : 4

2A Module Number	2B Modules & units	2C Number of Credits	Notional Learning hours			
			2D Lectures	2E Practical Training	2F Experiential Learning including Modular Assessment	2G Total
3	**M-3 Nomenclature and basonym, synonyms, homonyms-based**	2	10	20	30	60

identification of classical drugs.

Importance of the principles and significance of nomenclature, use of synonyms, basonyms, and homonyms in Ayurvedic pharmacology and their importance in classical drug identification.

  • **M3U1 Vedic taxonomy & lexicons**
Contributions of Vedic taxonomy & lexicons (Kosa) series for classical drugs in terms of terminology.

  • **M3U2 Basonym, Synonyms and Homonyms of drugs**
Importance of basonym, synonyms, homonyms of drugs in relation to identification, and their importance and characterization, properties, action and therapeutic uses.

  • **M3U3 Etymological derivation of Basonyms and Synonyms**
Etymological derivation of basonym, synonyms of drugs with examples.

4	**M-4 Botanical Identification of plants used in current practice**	2	10	20	30	60

The botanical identification of plants commonly used in Ayurvedic practice on their botanical characteristics, classification, and nomenclature.

  • **M4U1 Taxonomy & Plant Nomenclature.**
Knowledge of general taxonomy & Plant Nomenclature.

  • **M4U2 Key identifying characters of Plants**
Key identifying characters of Family and species of medicinal plants Used in Ayurveda.

• **M4U3 International Code of Botanical Nomenclature for Cultivated Plants , World Flora online & DNA bar coding.** International Code of Botanical Nomenclature (ICBN) and the International Code of Nomenclature for Cultivated Plants (ICNCP), World Flora online & DNA bar coding.					
	4	**20**	**40**	**60**	**120**

Semester No : 5

2A Modu le Nu mber	2B Modules & units	2C Num ber of Credi ts	Notional Learning hours			
			2D Lectures	2E Practical Training	2F Experiential Learning including Modular Assessment	2G Total
5	**M-5 Identification, source & availability of plant-based Raw Drugs.** **Highlights the main macroscopic features used to identify and distinguish between roots, rhizomes, underground parts. stem, stem bark, heart wood, leaves, flowers, fruits, seeds, whole herbs, unorganised drugs and insect galls.** • **M5U1 Root, rhizome and underground parts** Root, rhizome and underground parts • **M5U2 Stem, stem bark and heart wood** Stem, stem bark and heart wood	2	10	20	30	60

2A	2B	2C	Notional Learning hours				

	• **M5U3 Leaves, flowers, fruits, seeds** Leaves, flowers, fruits, seeds • **M5U4 Whole herb,unorganised drugs and insect galls.** Whole herb,unorganised drugs and insect galls.						
6	**M-6 Vrikshayurveda, Cultivation, Conservation and, Tissue Culture of medicinal plants.** **Overview scope and techniques of Vrikshayurveda's, plant cultivation methods, Tissue culture techniques, importance of collection practices and conservation of medicinal plants** • **M6U1 Principles of Vrikshayurveda** Application of principles explained in Vrikshayurveda. • **M6U2 Cultivation, Conservation and Collection of useful parts of plants** Cultivation & Conservation of medicinal plants, Collection of useful parts of plants • **M6U3 Tissue culture techniques.** Tissue culture techniques.	2	10	20	30		60
		4	**20**	**40**	**60**		**120**
Semester No : 6							
2A **Module Number**	**2B** **Modules & units**	**2C** **Number of Credi**	**Notional Learning hours**				

		ts	2D Lectures	2E Practical Training	2F Experiential Learning including Modular Assessment	2G Total
7	**M-7 Pharmacognosy & Quality Standards of Ayurvedic Medicinal Plants.**	2	10	20	30	60

Deals with identification, authentication, and characterization of medicinal, quality control measures, including purity, efficacy, and safety.

• M7U1 Alternative parts and substitute plant drugs
Knowledge about classical references of alternative parts and substitute plant drugs mentioned in classical texts.

• M7U2 Morphological, macroscopic and microscopic characteristics of adulterant/alternate / substitute plant drugs.
Study of morphological, macroscopic and microscopic characteristics of adulterant/alternate / substitute plant drugs.

• M7U3 Solvent system, estimation procedures of assay/ analytical methods of chemical constituents (major) and leading biological marker in relation to safety, efficacy and quality.
Standard, solvent system, estimation procedures of assay/ analytical methods of chemical constituents (major) and leading biological marker in relation to safety, efficacy and quality.

• M7U4 Analytical methods
Analytical methods- Thin Layer Chromatography (TLC), High Performance Thin

8	**M-8 Applied aspects of Bheshaja Pariksha, Prashasta Bheshaja and Bheshaja Prayoga** **Bheshaja pariksha involves the examination of Ayurvedic drugs to determine their quality, authenticity, and potency. Prashasta Bheshaja refers to Ayurvedic drugs that meet certain standards of quality, purity, and potency. Bheshaja Prayoga involves the practical application of Ayurvedic drugs in the treatment of diseases.** **• M8U1 Bheshaja Parikshavidhi.** Bheshaja Parikshavidhi. **• M8U2 Prashasthabheshaja** Prashsthabheshaja **• M8U3 Bheshaja Marga and Sevanakala** Bheshaja Marga and Sevanakala **• M8U4 Matra, Anupana** Matra, Anupana	2	10	20	30	60
		4	**20**	**40**	**60**	**120**
		16	**80**	**160**	**240**	**480**

Layer Chromatography (HPTLC), High Performance Liquid Chromatography (HPLC) and Gas Liquid Chromatography (GLC).

Paper No : 2 (Applied Pharmacology in Dravyaguna)

2A Module Number	2B Modules & units	2C Number of Credits	2D Lectures	2E Practical Training	2F Experiential Learning including Modular Assessment	2G Total
	Semester No : 3					
				Notional Learning hours		
9	**M-9 Pharmacology & Karma of Nadi and Twacha with contemporary correlation.** **Module deals with the integrative approach in terms of understanding classical Karma (pharmacological actions) mentioned under Nadivaha Sansthana (Nervous system) with contemporary medical science.** **• M9U1 Basic Prinicples of Pharmacology and Drug action in convetntional medicine** Basic Principles of Pharmacology and Drug action in conventntional medicine **• M9U2 Karmas of Nadi Samsthana (Nervous system).** 1. Medhya (memory enhancement) 2. Madkari (narcotics) 3. Sangya sthapan 4. Nindrajana	3	15	30	45	90

5. Nindrahara

6. Vednasthapana (analgesics)

7. Apasmarahara (Antiepileptics)

8. Akshepshamana (anti convulsants)

9. Sanjnahara (Anaesthetics)

• **M9U3 Karma related to Twacha**
1. Swedana & Swedopaga (Diaphoretics)

2. Swedapanyana (Antidiaphoretics)

3. Romshatana (Depilatories)

4. Keshya (Hair tonics)

5. Vranhara (anti ulcer) -

6. Snehan and Snehopag (emollients)

7. Rukshana

8. Varnya (Complexion enhancer)

9. Kandughna (Antipruritic)

10. Kusthghna

11. Udardprashmana (Anti urticarial)

2A Module Number	2B Modules & units	2C Number of Credits	2D Lectures	2E Practical Training	2F Experiential Learning	2G Total
	12. Rakshoghana (Antiseptics / Disinfectant)					
10	**M-10 Karmas of the Prajanana Sansthana** **Module deals with the integrative approach in terms of understanding classical Karma (pharmacological actions) mentioned under Prajanan Sansthan (Reproductive System) with contemporary medical science.** **• M10U1 Karmas of the Prajanan Sansthan** 1. Prajasthapana (Fetoprotection) 2. Vajikarana (Aphrodisiac) 3. Shukrajanana (Spermatogenic) 4. Garbhashaya uttejaka (Uterine Stimulants) 5. Garbhashaya sankochahara (Uterine relaxants) 6. Garbhanirodhaka (Contraception) 7. Artavajanaka (Emmanogogue) 8. Artavarodhaka (Anti-emmanogogue)	1	5	10	15	30
		4	**20**	**40**	**60**	**120**

Semester No : 4

2A Module Number	2B Modules & units	2C Number of Credits	Notional Learning hours			
			2D Lectures	2E Practical Training	2F Experiential Learning including	2G Total

					Modular Assessment	
11	**M-11 Classical to contemporary aspects of Aushadha Dravya Part 3**	2	10	20	30	60

Module deals with the study of Aushadha Dravya (Based on available references) - Prayojya Anga, Rasapanchaka, Doshakarma, Agryakarma, Karma, Important Pharmacological Actions, Rogaghnata, Amayika prayoga in Vyadhi about various Srotas and Vyadhi Avastha, Yoga, Proprietary Medicines, Phyto constituents, Research Updates, Basonym and Synonyms with Etymological derivation, Botanical Name & Family, Regional Name, Gana Vargeekarana, Habitat and Morphological Description, Varieties, Grahya and Agrahya laxana, Adulterants, Substitutes, Toxic effects Shodhana and Anti dote (if any), Contraindication, Trade and Commerce, Any other Relevant information of the Drug and Classical references.

• M11U1 Dravya related to Sleshmahara (Chedana),Kasahara,Shwasahara and Kanthya karma
Sleshmahara (Chedana)

1. Vibhitaka (*Terminalia belerica* Roxb.)

2. Vasa (*Adhatoda vasica* Nees.)

3. Talisa Patra (*Abbies webbiana* Lindle)

4. Lavanga (*Syzigium aromaticum* M.P.)

5. Twak (*Cinnamomum zeylanica Blume.)*

6. Yastimadhu (*Glycyrrhiza glabra* L.)

7. Gojihwa (*Onosma bracteatum* Wall.)

8. Bola (*Commiphora myrrh* Nees.)

9. Banafsha (*Viola odorata* L.)

Kasahara

1. Pippali (*Piper longum* L.)
2. Bruhati (*Solanum indicum* L.)
3. Kantakari (*Solanum xanthocarpum* S & W.)
4. Karkatshringi (*Pistacia integerrima* Stewart.)
5. Kasamarda (*Cassia occidentalis* L.)
6. Agastya (*Sesbania grandiflora* Poiret.)

Shwasahara

1. Shati (*Hedychium spicatum* Buch.)
2. Karchura (*Curcuma zedoria* Roscoe)
3. Pushkaramoola (*Inula racemosa* hook. F)
4. Bharangi (*Rotheca serratum* L.)
5. Dugdhika (*Euphorbia hirta* L.)
6. Somavalli (*Sarcostemma acidum* Roxb.)

Kanthya

1. Kulinjana (*Alpinia galanga* Willd.)

2. Tailaparna (*Eucalyptus globulus Labill.*)

• M11U2 Dravya related to Prajasthapana, Garbharodhaka, Garbhashayasankochaka, Artavajanana, Artavasangrahaniya, Stanyajanana, Stanyasangrahaniya and Stanyashodhana karma
Prajasthapana

1. Durva (*Cynodon dactylon* Person,)

2. Kamala (*Nelumbo nucifera* Gaertn)

3. Kumuda (*Nymphea alba* L.)

4. Kasheruka (*Scirpus grossus* L.)

5. Shringataka (*Trapa bispinosa* Roxb.)

6. Putranjeevaka (*Putranjiva roxburghi* Roxb.)

Garbharodhaka

7. Japa (*Hibiscus rosa-sinensis* L.)

Garbhashayasankochaka

8. Ishvari (*Aristolochia indica* L.)

9. Kalajaji (*Nigella sativa* L.)

10. Karpasa (*Gossypium herbaceum* L.)

11. Langali (*Gloriosa superba* L.)

12. Kebuka (*Costus speciousus* L.)

13. Haramala (*Peganum haramala* L.)

14. Sadama (*Ruta graveolens* L.)

Artavajanana

15. Pishacha karpasa (*Abroma angusta* L.f.)

16. Vansha (*Bambusa bambos* (L.) Voss)

17. Shana (*Crotolaria juncea* L.)

Artavasangrahaniya

18. Lodhra (*Symplocos racemosa* Roxb.)

19. Ashoka (*Saraca asoca* L.)

20. Patranga (*Caesalpinia sappan* L.)

Stanyajanana

21. Nala (*Arundo donax* L.)

22. Rohisha (*Cymbopogan martinii* Wats)

Stanyasangrahaniya

23. Mallika (*Jasminum officinale* L.)

Stanyashodhana

24. Patha (*Cissampelos pareira* L.)

12	**M-12 Classical to contemporary aspects of Aushadha Dravya Part 4**	2	10	20	30	60
	Module deals with the study of Aushadha Dravya (Based on available references) - Prayojya Anga, Rasapanchaka, Doshakarma, Agryakarma, Karma, Important Pharmacological Actions, Rogaghnata, Amayika prayoga in Vyadhi about various Srotas and Vyadhi Avastha, Yoga, Proprietary Medicines, Phyto constituents, Research Updates, Basonym and Synonyms with Etymological derivation, Botanical Name & Family, Regional Name, Gana Vargeekarana, Habitat and Morphological Description, Varieties, Grahya and Agrahya laxana, Adulterants, Substitutes, Toxic effects Shodhana and Anti dote (if any), Contraindication, Trade and Commerce, Any other Relevant information of the Drug and Classical references.					
	• M12U1 Dravya related to Shukrajanan,Shukrashodhana and Shukrastambhana karma Shukrajanana					

1. Mushali (*Chlorophytum borivilianum* Santapau)

2. Talamuli (*Curculigo orcheoides* Garten)

3. Shatavari (*Asparagus racemosus* Willd.)

4. Makhanna (*Euryale ferox* Salisb.)

5. Kokilaksha (*Asterecantha longifolia* Ness.)

6. Munjataka (*Orchis latifolia* L.)

7. Kapikachhu (*Mucuna pruriens* DC.)

8. Utangana (*Blepharis edulis* Forssk.)

Shukrashodhana

9. Kushtha (*Saussuria lappa* C.B. Clarke)

10. Katphala (*Myrica nagi* Thumb.)

Shukrastambhana

11. Akarakarabha (*Anacyclus pyrethrum* DC.)

• M12U2 Dravya related to Mutravirechaniya, Mutrasangrahniya, Ashmaribhedana and Madhumehahara karma
Mutravirechaniya

1. Punarnava (*Boerhavia diffusa* Linn.)

2. Gokshura (*Tribulus terrestris* Linn.)

3. Kusha (*Desmostachya bipinnata* Stap.)

4. Kasha (*Saccharum spontaneum* L.)

5. Shara (*Saccharum munja* L.)

6. Ikshu (*Saccharum officinarum* L.)

7. Bhumyamalaki (*Phyllanthus urinaria* L.)

8. Kankola (*Piper cubeba* L.)

9. Hapusha (*Juniperus communis* L.)

10. Ananas (*Ananas comosus* (L.) Merr)

11. Vandaka (*Dendrophthoe falcata* Ettingish)

12. Trapusha (*Cucumis sativus* L.)

Mutrasangrahniya

13. Jambu (*Eugenia jambolana* L.)

14. Amra (*Mangifera indica* L.)

15. Vata (*Ficus benghalensis* L.)

16. Udumbara (*Ficus racemosa* L.)

17. Ashwatha (*Ficus religiosa* L.)

18. Plaksha (*Ficus lacor* Buch. Hum)

19. Shala (*Shorea robusta* Gaertn)

20. Sarja (*Vateria indica* L.)

21. Dhawa (*Terminalia anogessiana* Gere & Boatwr)

22. Tinisha (*Ogenia dalbergioides* Benth.)

23. Ashmantaka (*Ficus rumphii* Blume)

24. Vikankata (*Flacourtia indica* L.Herit)

25. Kapeetana (*Albizia lebbeck* (L.) Benth)

Ashmaribhedana

26. Pashanabheda (*Berginia ligulata* Wall.)

27. Varuna (*Crataeva nurvala* Roxb.)

28. Kulatha (*Dolichos biflorus* L.)

29. Veerataru (*Dichrostachys cinerea* Wight)

30. Gorakshaganja (*Aerva lanata* Kuntze)

Madhumehahara

31. Beejaka (*Pterocarpus marsupium* L.)

32. Karavellaka (*Momordica charantia* L.)

33. Saptachakra (*Salacia chinensis* L.)

34. Bimbi (*Coccinia grandis* Voigt.)

		4	20	40	60	120

Semester No : 5

2A Module Number	2B Modules & units	2C Number of Credits	Notional Learning hours			
			2D Lectures	2E Practical Training	2F Experiential Learning including Modular Assessment	2G Total
13	**M-13 Karmas of the Pachana samsthana, Yakrit and Pliha.** **Module deals with the integrative approach in terms of understanding classical Karma (pharmacological actions) mentioned under Pachana Sansthana (Digestive System), and Yakrut (Liver) & Pleeha (Spleen) with contemporary medical sciences.**	2	10	20	30	60

• M13U1 Karmas of the Yakrit and Pliha 1. Yakrudrogahara (Hepatoprotective & Hepatocurative) 2. Plihavriddhihara **• M13U2 Karmas of the Pachansansthana** 1. Deepana (Appetizer) 2. Pachana (Digestion) 3. Triptighna (Antisatiative) 4. Vamaka (Emetic) 5. Chardighna (Antiemetic) 6. Anulomana (Carminative) 7. Sramsana (Laxative) 8. Bhedana (Choleretics / Purgative) 9. Rechana (Hydrogogue purgatives) 10. Grahi (Antidiarrhoeal – Absorptive) 11. Stambhana (Purisha Stambhana – Antidiarrhoeal) 12. Kirmighna (Anthelmintic, Antifungal, Antiviral & Antibiotics) 13. Amlapittahara (Anatcids)					

14	**M-14 Karmas related to Sarvadehika, Mutrvaha samsthana and Dhatu karma.**	2	10	20	30	60

Module deals with the integrative approach in terms of understanding classical Karma (pharmacological actions) mentioned under Karmas related to Sarvadehika Mutrvahsansthana, & Dhatu karmas with contemporary medical sciences.

  • **M14U1 Sarvadehika Karmas**

     1. Jawarghna (Antipyretic)
     2. Vishamajvaraghna (Antimalarial)

  • **M14U2 Karmas of Mutrvahsansthana**
1. Mutrvirechanya (Diuretics)

2. Mutrvirajnya

3. Ashmaribhedana

4. Mutrsangrahaniya (Antidiuretics)

  • **M14U3 Dhatu karmas, Srotas**
Dhatukarma

1. Brimhana (Bulk promotive)

2. Langhana

3. Medohara (Antihyperlipidemic)

	4. Madhumehahara (Anti Diabetic) Karma related to Srotas 1. Abhishyandi 2. Pramathi				
		4	20	40	60	120

Semester No : 6

2A Module Number	2B Modules & units	2C Number of Credits	Notional Learning hours			
			2D Lectures	2E Practical Training	2F Experiential Learning including Modular Assessment	2G Total
15	**M-15 Karmas of the Raktavaha Sansthana,Rasavahsansthana, Shwasansansthana** **Module deals with the integrative approach in termsof understanding classical Karma (pharmacologicalactions) mentioned under Raktavaha(Cardiovascular) , Rasavaha and Shwasana Sansthana (Respiratory system) with contemporarymedical science** • **M15U1 Karmas of the Raktavaha Sansthana** 1. Hirdya (Cardiotonic / Antianginal)	2	10	20	30	60

2. Raktbharashamaka (Antihypertensive)
3. Raktavardhaka (Haematenics)
4. Raktastambhaka / Shonita Sanghatakara(Coagulants)
5. Raktasanghatahara (Anticoagulants)

 • **M15U2 Karmas of Rasavahsansthana**
1. Shothahara (Antiinflammatory / NSAIDs)
2. Gandmalanashaka (Thyroid inhibitors)

 • **M15U3 Karmas of Shwasansansthana**
1. Shwasahara (Bronchodilators / Inhalants)
2. Kashara (Antitussive / Expectorants)
3. Hikkanigrahana (Antihiccough)
4. Kanthya & Swraya (Voice promoting)
5. Shoshahara (Antitubercular)

16	**M-16 Experimental models for evaluation of various pharmacological actions.**	2	10	20	30	60
	This module provides training in experimental pharmacology focussing on design, conduct and analysis of pharmacological experiments. The students will explore principles pharmacology to understand actions of Ayurvedic drugs.					
	• **M16U1 Toxicological Studies for Drug Risk and Safety** Toxicological Studies for Drug Risk and Safety					
	• Animal toxicology					
	• **M16U2 Genotoxicity, teratogenicity, carcinogenicity**					

Understanding the need and scope of genotoxicity, teratogenicity, carcinogenicity

• M16U3 Diuretics, Adaptogens & CNS activities & Anti oxidant Activity
Diuretics, Adaptogens & CNS activities & Anti oxidant Activity

• M16U4 Anti ulcer, Cardio protective & Hepatoprotective Activity.
Anti ulcer, Cardio protective & Hepatoprotective Activity.

• M16U5 Anti diabetic, Anti hypertensive, Anti hyper lipidemic Activity.
Anti diabetic, Anti hypertensive, Anti hyper lipidemic Activity.

		4	20	40	60	120
		16	80	160	240	480

Paper No : 3 (Industrial Applications in Dravyaguna)

Semester No : 3

2A Module Number	2B Modules & units	2C Number of Credits	Notional Learning hours			
			2D Lectures	2E Practical Training	2F Experiential Learning including Modular Assessment	2G Total
17	**M-17 Drug and Patient Safety** **This module enables understanding the framework of Pharmacovigilance thereby building ADR reporting culture for patient safety. Identify drug**	2	10	20	30	60

incompatibility and patterns of prescription for understanding implications in efficacy in public health and safety.

• M17U1 Pharmacovigilance
Pharmacovigilance from Ayurveda and Contemporary Perspectives with measures for ensuring drug safety in Ayurveda

• M17U2 Samyoga Viruddha Siddhant in perspective of incompatibility
Samyoga Viruddha Siddhant in perspective of incompatibility

• M17U3 Pharmacoepidemiology
Pharmacoepidemiology

18	**M-18 Sandigdha (Controversy) & Anukta Dravya in perspective of identification** **The module deals with overview on reasons of controversy and extrapharmacopoeial drugs focusing on resolving the factors contributing in controversies which will encourage genuine drug usage in clinics and industry.** **• M18U1 Sandigdha** Sandigdha(Controversy) **• M18U2 Anukta dravya** Anukta dravya (Extrapharmacopial drugs)	2	10	20	30	60
		4	**20**	**40**	**60**	**120**

Semester No : 4

2A Module Number	2B Modules & units	2C Number of Credits	Notional Learning hours			
			2D Lectures	2E Practical Training	2F Experiential Learning including Modular Assessment	2G Total
19	**M-19 Leads to Drug discovery & new drug development** **This module enables to discovery of new leads by the exploration of herbs used by various ethnic groups and optimizes therapies through Omics with a Combination of techniques to understand molecular targets, understand drug disease molecular pathway for validating the mechanism of action of dravya, followed by Pharmacogenomics to guide the choice of drugs and aid in personalizing treatment, and also the development of new drugs through the phases of Clinical Pharmacology** **• M19U1 Ethnomedicinal studies in drug discovery** Understanding of ethnomedicinal studies in drug discovery **• M19U2 Omics** Understanding preclinical drug discovery with respect to omics Introduction to proteomics and metabolomics and its applications **• M19U3 Cheminformatics in drug discovery and drug design, Computer aided Drug design (CADD), network pharmacology** Use of cheminformatics in drug discovery and drug design, Computer aided Drug design (CADD), network pharmacology	3	15	30	45	90

	• M19U4 Pharmacogenomics and Ayurgenomics, Concept of Pharmacogenomics and Ayurgenomics, **• M19U5 Reverse Pharmacology, Clinical pharmacology and evidence based research** Knowledge of repurposing through Reverse Pharmacology, Clinical pharmacology and evidence based research					
20	**M-20 Novelty and Principles in compounding dosage forms** **This module enables understanding differences in traditional Ayurveda dosage forms and contemporary dosage forms and aids in developing convenient dosage forms with enhanced drug delivery to achieve optimal therapeutic concentration at the site of action with better stability.** **• M20U1 NDCT,2019** Overview of Phytopharmaceuticals with regulatory aspect for single drug. (NDCT,2019) **• M20U2 Novel drug delivery systems** Insights on novel drug delivery systems **• M20U3 Dosage forms** Ayurvedic Principles and dosage forms in classical texts and contemporary science	1	5	10	15	30
		4	**20**	**40**	**60**	**120**
Semester No : 5						

2A Module Number	2B Modules & units	2C Number of Credits	Notional Learning hours			
			2D Lectures	2E Practical Training	2F Experiential Learning including Modular Assessment	2G Total
21	**M-21 Classical to contemporary aspects of Aushadha Dravya Part 5**	2	10	20	30	60
	Module deals with the study of Aushadha Dravya (Based on available references) - Prayojya Anga, Rasapanchaka, Doshakarma, Agryakarma, Karma, Important Pharmacological Actions, Rogaghnata, Amayika prayoga in Vyadhi about various Srotas and Vyadhi Avastha, Yoga, Proprietary Medicines, Phyto constituents, Research Updates, Basonym and Synonyms with Etymological derivation, Botanical Name & Family, Regional Name, Gana Vargeekarana, Habitat and Morphological Description, Varieties, Grahya and Agrahya laxana, Adulterants, Substitutes, Toxic effects Shodhana and Anti dote (if any), Contraindication, Trade and Commerce, Any other Relevant information of the Drug and Classical references. • **M21U1 Dravya related to Jwaraghna,Vishamajwaraghna,Dahaprashamanaand Sheetaprashamana karma** Jwaraghna 1. Sahadevi (*Vernonia cinerea* L.) 2. Kiratatikta (*Swertia chirata* Buch-Ham)					

3. Haridru (*Adina cordifolia* Brandis)

4. Trayamana (*Gentiana kurr*o Royle)

5. Patola (*Tricosanthes dioica* Roxb.)

6. Murva (*Marsedenia tenacissima* Wigh)

7. Kashtadaru (*Monoon longifolium* Sonn.)

Vishamajwaraghna

8. Saptaparna (*Alstonia scholaris* R.Br.)

9. Nakhi (*Achatina fulica* Ferrusac.)

10. Kantaki karanja (*Caesalpinia crista* L.)

11. Dronapushpi (*Leucas cephalotes* Spreng.)

12. Tulasi (*Ocimum sanctum* L.)

Dahaprashamana

13. Chandana (*Santalum album* L.)

14. Utpala (*Nymphaea nouchali* Burm.f,)

15. Raktachandana (*Pterocarpus santalinus* L.)

16. Ela (*Elettaria cardamomum* Maton.)

17. Champaka (*Michelia champaka* L.)

18. Shaivala (*Ceratophyllumdemersum* L.)

19. Shaileya (*Parmelia perlatum* Choisy.)

Sheetaprashamana

20. Agaru (*Aquillaria agallocha* L.)

21. Bruhad Ela (*Amomum subulatum* Roxb.)

• **M21U2 Dravya related to Balya,Jeevaniya,Sandhaniya and Rasayana karma**
Balya

1. Bala (*Sida cordifolia* L.)

2. Atibala (*Abutilon indicum* G.Don)

3. Mahabala (*Sida rhomboidea* Roxb.
4. Vidari (*Peureria tuberosa* DC.)
5. Varahi (*Dioscorea bulbifera* L.)
6. Tavaksheera (*Curcuma angustifolia* Roxb.)

Jeevaniya

7. Jeevanti (*Leptadenia reticulata* Retz.)

8. Mudgaparni (*Phaseolus trilobus* A.t.Hort)

9. Mashaparni (*Teramnus labialis* Spreng.)

Sandhaniya

10. Lajjalu (*Mimosa pudica* L.)

Rasayana

11. Haritaki (*Terminalia chebula* Retz.)

12. Amalaki (*Emblica officinalis* Gaertn.)

13. Guduchi (*Tinospora cordifolia* Miers.)

14. Ashwagandha (*Withania somnifera* Dunal.)

15. Vruddhadaru (*Argyreia speciosa* Sweet.)

16. Nagabala (*Grewia hirsuta* Vahl.)

17. Nagdamana (*Sansevieria roxburghiana* Schult.)

22	**M-22 Classical to contemporary aspects of Aushadha Dravya Part 6**	2	10	20	30	60
	Module deals with the study of Aushadha Dravya (Based on available references) - Prayojya Anga, Rasapanchaka, Doshakarma, Agryakarma, Karma, Important Pharmacological Actions, Rogaghnata, Amayika prayoga in Vyadhi about various Srotas and Vyadhi Avastha, Yoga, Proprietary Medicines,					

Phyto constituents, Research Updates, Basonym and Synonyms with Etymological derivation, Botanical Name & Family, Regional Name, Gana Vargeekarana, Habitat and Morphological Description, Varieties, Grahya and Agrahya laxana, Adulterants, Substitutes, Toxic effects Shodhana and Anti dote (if any), Contraindication, Trade and Commerce, Any other Relevant information of the Drug and Classical references.

• M22U1 Dravya related to Vishaghna, Upavisha, Angamardaprashamana, Bruhana, Lekhana, Raktastambhana, Raktaprasadaka, Asthisandhaniya,Shoshahara and Raktaarbudanashaka Karma
Vishaghna

1. Shirisha (*Albizzia lebbeck* Benth.)

2. Nirvisha (*Delphinium denudatum* Wall.)

3. Patalagarudi (*Cocculus hirsutis* Diels.)

4. Ankola (*Alangium salvifolium* Wang.)

Upavisha

5. Gunja (*Abrus precatorius* L.)

Angamardaprashamana

6. Shalaparni (*Desmodium gangeticum* DC.)

7. Prushniparni (*Uraria picta* Desr.)

8. Methika (*Trigonella foenum-graecum* L.)

Brumhana

9. Kharjura (*Phoenix sylvestris* Roxb.)

10. Madhuka (*Glycyrrhiza glabra* L.)

11. Chhatraka (*Agaricus campestris* L.)

Lekhana

12. Chirabilva (*Holoptelea integrifolia* Planch.)

13. Haimavati (*Iris germanica* L.)

Raktastambhana

14. Priyangu (*Callicarpa macrophylla* Vahl.)

15. Nagakeshara (*Mesua ferrea* L.)

16. Surapunnaga (*Ochrocarpus longifolius* Benth.)

17. Punnaga (*Calophyllum inophyllum* L.)

18. Parnabeeja (*Bryophyllum pinnatum* Lam.)

19. Ayapana (*Eupatorium triplinerve* Vahl.)

20. Jhandu (*Tagetes erecta* L.)						
21. Shaka (*Tectona grandis* L.)						
22. Kukundara (*Blumea lacera* DC.)						
23. Jalakumbhi (*Pistia stratiotes* L.)						
Raktaprasadaka						
24. Sariva (*Hemidesmus indicus* R.Br.)						
25. Manjistha (*Rubia cordifolia* L.)						
26. Chopachini (*Smilax china* L.)						
27. Mundi (*Sphaeranthes indicus* L.)						
28. Shimshapa (*Dalbergia sissoo* Roxb.)						
29. Suranjana (*Colchicum luteum* Baker.)						
Asthisandhaniya						
30. Asthishrinkhala (*Cissus quadrangularis* L.)						
Shoshahara						
31. Rudanti (*Cressa cretica* L.)						

Raktaarbudanashaka

32. Sadapushpa (*Catharanthes roseus* G.Don.)

33. Vanatrapushi (*Podophyllum hexandrum* Royle)

		4	20	40	60	120

Semester No : 6

2A Module Number	2B Modules & units	2C Number of Credits	Notional Learning hours			
			2D Lectures	2E Practical Training	2F Experiential Learning including Modular Assessment	2G Total
23	**M-23 Study of plant-based dietary components and Animal-origin Drugs.** **The module deals with specifying different classifications of dietary components of plant origin, with properties and their therapeutic uses. It also entails a description of the dravya of animal origin with their properties and therapeutic uses.** **• M23U1 Dhanya, Shaka, Ikshu, taila and Vari varga** Guna, Karma Prayoga of dravya mentioned in Dhanya, Shaka, Ikshu, taila and Vari varga	2	10	20	30	60

	• **M23U2 Dugdha,Dadhi, Takra, Navneet, ghrita, Madhu, Mutra,Mamsa** Guna, Karma Prayoga of dravya mentioned in Dugdha,Dadhi, Takra, Navneet, ghrita, Madhu, Mutra,Mamsa					
24	**M-24 Pharmacotherapeutics of Herbal Cosmetic dravya - Varnya , Keshya, Twachya** **This module helps to be acquainted with the principles and cosmetic dravyas documented in the classics, with contemporary knowledge and preparation method,s with instruments utilized in cosmetic,s keeping in view current local and global demands.** • **M24U1 Ayurvedic Herbal Cosmetics** Ayurvedic Herbal Cosmetics • **M24U2 Raw materials, essential oil, preservatives, additives used in preparation of Ayurveda Cosmetics** Raw materials, essential oil, preservatives, additives used in preparation of Ayurveda Cosmetics • **M24U3 Assays and equipment in cosmetics** Assays and equipment in cosmetics	2	10	20	30	60
		4	**20**	**40**	**60**	**120**
		16	**80**	**160**	**240**	**480**

Paper No : 4 (Regulatory Frameworks in Dravyaguna)

2A Module Number	2B Modules & units	2C Number of Credits	Notional Learning hours			
			2D Lectures	2E Practical Training	2F Experiential Learning including Modular Assessment	2G Total

Semester No : 3

2A Module Number	2B Modules & units	2C Number of Credits	2D Lectures	2E Practical Training	2F Experiential Learning including Modular Assessment	2G Total
25	**M-25 Evolution of Dravyaguna and Scope of AI applications.** **This module deals with the evolution of dravyaguna from the Vedic period to the present day. It also deals with scientific validation for changes in ecological factors and flora/ fauna, and knowledge on the Scope and challenges of AI in Dravyaguna** **• M25U1 Evolution of Dravyaguna** Evolution of Dravyaguna from Vedic period to the present day. It also deals with scientific validation for changes in ecological factors and flora/ fauna. **• M25U3 AI in Dravyaguna** Scope and challenges of AI in Dravyaguna	3	15	30	45	90
26	**M-26 Quality Control of selected Formulation ingredients from Sharangadhara, AFI and API.** **Modules deal with the Quality control of ingredients and selected Formulations**	1	5	10	15	30

of the Sharangadhara Samhita, API, and AFI. understand the WHO guideline for quality control of crude drugs and regulatory compliance for herbal products global market.

• M26U1 Panchavidha Kashaya Kalpana, Sneha Kalpana, Sandhana Kalpana
Standardization and Quality control of raw drugs/ingredients and formulations of Panchavidha Kashaya Kalpana, Sneha Kalpana, Sandhana Kalpana etc (3 in each category)

		4	20	40	60	120

Semester No : 4

2A Module Number	2B Modules & units	2C Number of Credits	Notional Learning hours			
			2D Lectures	2E Practical Training	2F Experiential Learning including Modular Assessment	2G Total
27	**M-27 Plant Extracts** **Modules deal with brief knowledge of various methods, benefits, challenges, applications of plant extracts, and Scientific principles of compounding of proprietary medicines.** **• M27U1 Plant Extracts** Types, Utility, Rationality and Importance of Plant Extracts	2	10	20	30	60

	• **M27U2 proprietary medicines** Compounding of proprietary medicines					
28	**M-28 Poshaka Aushadhi -Integrating traditional wisdom with modern Nutraceutical concepts.** **The module deals with integrating modern concepts with traditional wisdom with respect to Poshaka aushadhi (Nutraceuticals), Knowledge on FSSAI guidelines, related to botanicals, and their impacts on Ayurveda and GRAS as per FDA.** • **M28U1 Poshaka Aushadhi and Nutraceuticals** Knowledge on Poshaka Aushadhi and Nutraceuticals • **M28U2 FSSAI guidelines, relevant to Botanicals & its impact on Ayurveda and GRAS as per FDA.** Knowledge on FSSAI guidelines, relevant to Botanicals & its impact on Ayurveda and GRAS as per FDA.	2	10	20	30	60
		4	**20**	**40**	**60**	**120**

Semester No : 5

2A Module Number	2B Modules & units	2C Number of Credits	Notional Learning hours			
			2D Lectures	2E Practical Training	2F Experiential Learning including	2G Total

					Modular Assessment	
29	**M-29 Regulatory Framework and Policies for ASU Drugs: Safety, Quality, and Compliance.** **Module Deals with regulatory framework and policies for ASU Drugs, ensuring safety, quality, and compliance (GMP). Knowledge on Drug & Cosmetic act and schedule Z Drugs.** **• M29U1 Regulatory Bodies and Policies in India and CDSCO** Various regulatory Bodies and Policies in India and CDSCO **• M29U2 Policies and Regulation on manufacture of ASU Drugs** Policies and Regulation on manufacture of ASU Drugs and their import & export **• M29U3 Drug & Cosmetics act and Schedule Z drugs** Knowledge on Drug & Cosmetics act and Schedule Z drugs	2	10	20	30	60
30	**M-30 Regulatory framework for biodiversity for conservation, Traditional Knowledge and Integration of traditional & contemporary medicine.** • **This module deals with the Regulatory framework for conservation related to Biodiversity for the conservation of Medicinal plants &Traditional knowledge w.r.t the national legal framework** • **Highlights the importance of promotion of traditional medicine, the role of NMPB in promoting sustainable use and cultivation, and preventing biopiracy. Also provides insights to the students and**	2	10	20	30	60

encourages them to be entrepreneurs of medicinal plants by acquainting them with the latest innovations in value-added medicine products

• **M30U1 National legal framework & Law**
National legal framework & Law pertaining to Ayurvedic drugs

• **M30U2 GCTM, NMPB/ RCFC for procurement of genuine raw material, TKDL and Patenting aspects of traditional knowledge**
GCTM, NMPB/ RCFC for procurement of genuine raw material, TKDL and Patenting aspects of traditional knowledge

• **M30U3 Ayush products and Entrepreneurship ,Skills towards innovation and entrepreneurship, Funding opportunities for research**
Value addition of Ayush products and Entrepreneurship ,Skills towards innovation and entrepreneurship, Funding opportunities for research

		4	**20**	**40**	**60**	**120**

Semester No : 6

2A Module Number	2B Modules & units	2C Number of Credits	Notional Learning hours			
			2D Lectures	2E Practical Training	2F Experiential Learning including Modular Assessment	2G Total
31	**M-31 Classical to contemporary aspects of Aushadha Dravya Part 7**	2	10	20	30	60

Module deals with the study of Aushadha Dravya (Based on available references) - Prayojya Anga, Rasapanchaka, Doshakarma, Agryakarma, Karma, Important Pharmacological Actions, Rogaghnata, Amayika prayoga in Vyadhi about various Srotas and Vyadhi Avastha, Yoga, Proprietary Medicines, Phyto constituents, Research Updates, Basonym and Synonyms with Etymological derivation, Botanical Name & Family, Regional Name, Gana Vargeekarana, Habitat and Morphological Description, Varieties, Grahya and Agrahya laxana, Adulterants, Substitutes, Toxic effects Shodhana and Anti dote (if any), Contraindication, Trade and Commerce, Any other Relevant information of the Drug and Classical references.

• M31U1 Dravya related to Mukha -Lalaprasekajanana, Trishnanigrahana, Mukhavaishadyakara, Dantashodhana, Dantadardhyakara. Amashaya-Triptighna,Rochana, Deepana, Pachana,Vamana,Vamanopaga. Antra -Purishajanana, Vatanulomana, Vishtambhi,Virechana –Mruduvirechana, Sukhavirechana Karma

Mukha

Lalaprasekajanana

1. Lanka (*Capsicum annnum* L.)

Trishnanigrahana

2. Yavasa (*Alhagi camelorum* Fisch.)

3. Dhanvayasa (*Fagonia cretica* L.)

4. Parpata (*Fumaria parviflora* L.)

5. Dhanyaka (*Coriandrum sativum* L.)

Mukhvaishadyakara

6. Latakasturi (*Hibiscus abelmoschus* L.)

Dantashodhana

7. Tejovati (*Zanthoxylum armatum* DC.)

Dantadardhyakara

8. Bakula (*Mimusops elengi* L.)

Amashaya-Triptighna

9. Shunthi (*Zingiber officinalis* Roscoe.)

10. Chavya (*Piper chaba* Hunter.)

Rochana

11. Vrikshamla (*Garcinia indica* Choisy.)

12. Amlavetasa (*Garcinia pedunculata* Roxb.)

13. Dadima (*Punica granatum* L.)

14. Matulunga (*Citrus medica* L.)

15. Jambira (*Citrus limos* Osbeck.)

16. Changeri (*Oxalis corniculata* L.)

17. Tintideeka (*Rhus parviflora* Roxb.)

Deepana

18. Hingu (*Ferula foetida* L.)

19. Ativisha (*Aconitum heterophyllum* Wall.)

20. Kalambaka (*Centaurea kalambakensis* Freyn.)

21. Chitraka (*Plumbago zeylanica* L.)

22. Maricha (*Piper nigrum* L.)

23. Jeeraka (*Cuminum cyminium* L.)

Pachana

24. Musta (*Cyperus rotundus* L.)

25. Erandkarkati (*Carica papaya* L.)

Vamana

26. Madanaphala (*Randia dumetorum* Lamk.)

27. Ikshwaku (*Lagenaria siceraria* Sand.)

28. Dhamargava (*Luffa aegyptiaca* Mill.)

29. Kritavedhana (*Luffa acutangula* Roxb.)

30. Arishtaka (*Sapindus trifoliatus* L.)

Vamanopaga

31. Hijjala (*Baringtonia acutangula* Gaertn.)

32. Shanapushpi (*Crotolaria juncea* L.)

Antra-Purishajanana

33. Masha (*Vigna mungo* Hepper.)

Vatanulomana

34. Putiha (*Mentha piperata* L.)

35. Marubaka (*Origanum majorana* L.)

36. Damanaka (*Artemisia vulgaris* L.)

37. Shatapushpa (*Anethum sowa* L.)

38. Mishreya (*Foeniculum vulgare* Mill.) 39. Nadihingu (*Gardenia gummifera* L.f.) Vishtambhi 40. Panasa (*Artocarpus integrifolia* L.) 41. Lakucha (*Artocarpus lakoocha* Buch-Ham) Virechana –Mruduvirechana 42. Phalgu (*Ficus carica* L.) 43. Atasi (*Linum usitatissimum* L.) 44. Ashwagola (*Plantago ovata* Forssk.) Sukhavirechana 45. Swarnapatri (*Cassia angustifolia* Vahl.) 46. Trivrut (*Operculina turpethum* (L.) Silva Manso) 47. Krishnabeeja (*Annona reticulata* L.) 48. Swarnakshiri (*Argemone mexicana* L.)					

32	**M-32 Classical to contemporary aspects of Aushadha Dravya Part 8**	2	10	20	30	60

Module deals with the study of Aushadha Dravya (Based on available references) - Prayojya Anga, Rasapanchaka, Doshakarma, Agryakarma, Karma, Important Pharmacological Actions, Rogaghnata, Amayika prayoga in Vyadhi about various Srotas and Vyadhi Avastha, Yoga, Proprietary Medicines, Phyto constituents, Research Updates, Basonym and Synonyms with Etymological derivation, Botanical Name & Family, Regional Name, Gana Vargeekarana, Habitat and Morphological Description, Varieties, Grahya and Agrahya laxana, Adulterants, Substitutes, Toxic effects Shodhana and Anti dote (if any), Contraindication, Trade and Commerce, Any other Relevant information of the Drug and Classical references.

• M32U1 Dravya related to Tikshnavirechana, Virechanopaga, Sanshodhana (Ubhyatobhagahara), Grahi Aamahara (Upshoshanahara), Stambhana, Purishavirajaniya, Shoolaprashamana, Krimighna and Arshoghna Karma
Tikshnavirechana

1. Danti (*Baliospermum montanum* Mudl.)

2. Dravanti (*Chlorophytum tuberosum* Baker.)

3. Snuhi (*Euphorbia nerifolia* L.)

4. Arka (*Calotropis procera* W.T. Aiton)

5. Indravaruni (*Citrullus colocynthis* Schrad.)

6. Kankushtha (*Garcinia morella* Desr.)

7. Katuka (*Picrorrhiza kurroa* Royle.)

8. Amlaparni (*Rheum astrale* D.Don)

9. Kumari (*Aloe vera* Burm.f.)

Virechanopaga

10. Peelu (*Salvadora persica* L.)

Samshodhana (Ubhyatobhagahara)

11. Devadali (*Luffa echinata* Roxb.)

Grahi

12. Bilva (*Aegle marmelos* L.)

13. Jatiphala (*Myristica fragrans* Houtt.)

14. Parnayavani (*Coleus aromaticum* Benth.)

Aamahara (Upshoshanahara)

15. Kutaja (*Holarrhena antidysenterica* (L.) Wall.)

16. Aralu (*Ailanthus excelsa* Roxb.)

17. Shyonaka (*Oroxylum indicum* Benth.)

Stambhana

18. Dhataki (*Woodfordia fruticosa* Kutz.)

19. Babbula (*Vachellia nilotica* PJH Hurter.)

20. Avartaki (*Cassia auriculata* Roxb.)

21. Avartani (*Helictres isora* L.)

22. Dhanvana (*Grewia tilaefolia* Vahl.)

23. Shami (*Prosopis cineraria* Druce.)

24. Mayaphala (*Quercus infectoria* Oliv.)

25. Mayurashikha (*Adiantum incisum* Forssk.)

26. Akashavalli (*Cuscuta reflexa* Roxb.)

Purishavirajaniya

27. Shallaki (*Boswellia serrata* Roxb.)

28. Shalmali (*salmalia malabaricum* DC.)

Shoolaprashamana

29. Yavani (*Trachyspermum ammi* Sprague.)

30. Ajamoda (*Carum roxburghianum* DC.)

31. Chandrashoora (*Lepidium sativum* L.)

32. Dhatura (*Datura metel* L.)

Krimighna

33. Vidanga (*Embelia ribes* Burm.)

34. Palasha (*Butea monosperma* Kurtz.)

35. Chouhara (*Artemisia maritima* L.)

36. Ingudi (*Balanites aegyptiaca* Delib.)

37. Barbari (*Ocimum basiliccum* L.)

38. Keetamari (*Aristolochia bracteata* Lam.)

39. Kampillaka (*Mallotus philippinensis* Muell.)

40. Bhandira (*Clerodendrum infortunatum* L.)

41. Akhuparni (*Ipomoea reniformis* Chois.)

Arshoghna

42. Mahanimba (*Melia azadirachta* L.) 43. Karira (*Capparis decidua* Edgew.) 44. Sunishannaka (*Marselia minuata* L.) **• M32U2 Dravya related to Yakrit and Pleeha Karma** Yakrit 1. Daruharidra (*Berberis aristata* DC) 2. Kakamachi (*Solanum nigrum* L.) 3. Apamarga (*Achyranthes aspera* L.) 4. Bhunimba (*Andrographis paniculata* Nees.) 5. Dugdhapheni (*Taraxum officinale* Weber.) 6. Kasani (*Cichorium intybus* L.) 7. Parijata (*Nyctanthes arbor-tristis* L.) Pleeha 8. Rohitaka (*Tecomella undulata* Seem.) 9. Sharapunkha (*Tephrosia purpurea* L.)					

		4	20	40	60	120
		16	80	160	240	480
		64	320	640	960	1920

Table 3 : Modules - Unit - Module Learning Objectives and Session Learning Objective- Notional Learning Hours- Domain-Level- TL Methods

Paper No : 1 Pharmacognostical Applications in Dravyaguna						
Semester No : 3						
3A Course Outcome	**3B Learning Objective (At the end of the (lecture/practical training /experiential learning) session, the students should be able to)**	**3C Notional learning Hours**	**3D Lecture/ Practical Training/ Experiential Learning**	**3E Domain/ Sub Domain**	**3F Level (Does/Shows how/ Knows how/Know)**	**3G Teaching Learning Methods**
Module 1 : Classical to contemporary aspects of Aushadha Dravya Part 1						
Module Learning Objectives **(At the end of the module, the students should be able to)** Discuss useful Part, Rasapanchaka, Agryakarma, Karma, Doshakarma, Rogaghnata, Amayika prayoga Justify their application in strotas, Various diseases and disease conditions.						
M 1 Unit 1 Dravya related to Medhya,Madakari,Sanjnasthapana,Nidrajanana,Vedanasthapana,Akshepajanana and Akshepashamana Karmas Medhya 1. Mandukparni (*Centella asiatica* L.) 2. Brahmi (*Bacopa monneiri* (L) Pennel) 3. Shankhapushpi (*Convolvulus pluricaulis* Chois.) 4. Jyotishmati (*Celastrus paniculatus* Willd.)						

5. Kushmanda (*Benincasa hispida* Thumb.)

Madakari

6. Ahiphena (*Papaver somniferum* L.)

7. Bhanga (*Cannabis sativa* L.)

Sanjnasthapana

8. Vacha (*Acorus calamus* L.)

9. Jatamansi (*Nardostachys jatamansi* DC.)

Nidrajanana

10. Sarpagandha (*Rauwolfia serpentina* Benth.)

Vedanasthapana

11. Rasna (*Pluchea lanceolata* Ol & H.)

12. Kadamba (*Anthocephalus cadamba* Roxb.)

13. Padmaka (*Prunus cerasoides* L.)

14. Vetasa (*Salix caprea* L.)

15. Jalavetasa (*Salix tetrasperma* Roxb.)

16. Parasika Yavani (*Hyoscymus niger* L.)

17. Guggulu (*Commiphora mukul* Hok ex.)

18. Eranda (*Ricinus communis* L.)

19. Gandhaprasarini (*Paederia foetida* L.)

20. Tagara (*Valeriana wallichi* DC.)

21. Nirgundi (*Vitex negundo* L.)

22. Palandu (*Allium cepa* L.)

23. Rasona (*Allium sativum* L.)

24. Devadaru (*Cedrus deodara* Roxb.)

25. Medasaka (*Litsea chinensis* Lour.)

26. Muchukanda (*Pterocarpus acerifolium* (L.) Willd.)

Akshepajanana

27. Kupilu (*Strychnos nux-vomica* L.)

Akshepashamana

28. Bhurjapatra (*Betula utilis* D.Don)

References: 2,3,5,12,14,29,32,33,34,35,40,42,50,62,63,76,77

3A	3B	3C	3D	3E	3F	3G
CO1,CO2	Identify the plant & learn their Nama Rupa (Nomenclature& Morphology) and explain its Guna Karma (Classical properties & Actions)	3	Lecture	CC	Knows-how	L&GD,L_VC,L,L&PPT
CO1,CO2	Differentiate the plant & learn their Nama Rupa (Nomenclature& Morphology) and explain its Guna Karma (Classical properties & Actions)	6	Practical Training 1.1	PSY-GUD	Shows-how	DA,D-M,DG,L_VC,DIS
CO1,CO2	Conduct the survey to categorize on the basis of their Nama Rupa (Nomenclature& Morphology) and appreciate their Guna Karma (Classical properties & Actions)	6	Experiential-Learning 1.1	AFT-VAL	Does	FV,RP,PSM,PrBL,D-M
CO5	Elaborate therapeutic uses & formulations of medicinal plants, apply evidence-based research in clinical practices & pharmaceutical industry.	2	Lecture	CC	Knows-how	L,L&PPT,L_VC,L&GD
CO5	Appraise therapeutic uses & formulations of medicinal plants, apply evidence-based research in clinical practices & pharmaceutical industry.	4	Practical Training 1.2	AFT-VAL	Shows-how	DA,DL,JC,DIS,SDL
CO5	Justify therapeutic uses & formulations of medicinal plants, apply evidence-based research in clinical practices & pharmaceutical industry.	6	Experiential-Learning 1.2	AFT-VAL	Does	DL,TUT,ML,FV,DG

M 1 Unit 2 Dravya related to Netra-Chakshushya,Rasya, Twacha-Swedjanana, -Swedopaga and Swedapanayana karmas Netra-Chakshushya

1. Chakshushya (*Cassia absus* (L) H. Irwin)

2. Kataka (*Strychnos potatorum* L.)

Karnya

3. Sudarshana (*Crinum asiaticum* L.)

4. Paribhadra (*Erythrina indica* Lam.)

Rasya

5. Meshashringi (*Gymnema sylvestre* R. Br.)

Twacha -Swedjanana

6. Vatsanabha (*Aconitum ferox* Wall.)

Swedopaga

7. Shobhanjana (*Moringa oleifera* L.)

Swedapanayana

8. Ushira (*Vetiveria zizanoides* L.)

References: 2,3,5,12,14,29,32,33,34,35,40,42,50,63,76,77

3A	**3B**	**3C**	**3D**	**3E**	**3F**	**3G**

CO1,CO2	Identify the plant & learn their Nama Rupa (Nomenclature& Morphology) and explain its Guna Karma (Classical properties & Actions)	3	Lecture	CC	Knows-how	L,L_VC, L&PPT ,L&GD
CO1,CO2	conduct the survey of plant & learn their Nama Rupa (Nomenclature& Morphology) and explain its Guna Karma (Classical properties & Actions)	6	Practical Training 1.3	PSY-GUD	Shows-how	DL,DA,L _VC,FV, DIS
CO1,CO2	Differntiate the plants & categorize on the basis of their Nama Rupa (Nomenclature& Morphology) and appreciate their Guna Karma (Classical properties & Actions)	7	Experiential-Learning 1.3	AFT-VAL	Does	RLE,D-M ,ML,L_V C,PL
CO5	Elaborate therapeutic uses & formulations of medicinal plants, apply evidence-based research in clinical practices & pharmaceutical industry.	2	Lecture	CC	Knows-how	L&GD,L &PPT ,L_VC,L
CO5	Appraise therapeutic uses & formulations of medicinal plants, apply evidence-based research in clinical practices & pharmaceutical industry.	4	Practical Training 1.4	PSY-GUD	Shows-how	SDL,ML, DA,PBL, DL
CO5	Classify therapeutic uses & formulations of medicinal plants, apply evidence-based research in clinical practices & pharmaceutical industry.	7	Experiential-Learning 1.4	AFT-VAL	Does	DIS,DL, ML,TUT, DG

Practical Training Activity

Practical Training 1.1 :

- Identification of fresh herbs and dry specimens
- Pharmacognostical and Phytochemical analysis
- Preparing digital herbarium
- Clinical use of single drugs

- In campus & Out campus Garden visit under the supervision of the faculty
- Learning by visiting the Raw drug museums
- Collection of photographs
- Learn about Collection of useful parts and preservation
- Exploring Phyto constituents and their Pharmacological actions by using data bases (Minimum one each in every karma)

Practical Training 1.2 :

- Preparation of single drug remedies
- Segregating drug based on Grahya Agrahyatva
- Procurement of drug based on quality standards

- Preparing Panchavidha kashaya kalpana in lab
- Practical on Quality control methods in Dravyaguna Lab
- Collection of Dravya and their officinal parts
- Postings in Clinical setup

Practical Training 1.3 :

- Identification of fresh herbs and dry specimens
- Pharmacognostical and Phytochemical analysis
- Preparing a digital herbarium
- Clinical use of single drugs

- In campus & Out of campus Garden visit under the supervision of the faculty
- Learning by visiting the Raw drug museums
- Collection of photographs
- Learn about the Collection of useful parts and preservation
- Exploring Phyto constituents and their Pharmacological actions by using databases (Minimum one each in every karma)

Practical Training 1.4 :

- Preparation of single drug remedies
- Segregating drugs based on Grahya Agrahyatva
- Procurement of drugs based on quality standards

- Preparing Panchavidha kashaya kalpana in the lab
- Practical on Quality control methods in Dravyaguna Lab
- Collection of Dravya and their officinal parts
- Postings in Clinical setup

Experiential learning Activity

Experiential-Learning 1.1 :

- Field survey

- Visitation to Garden
- Identification of fresh herbs and dry specimens

- Identify plants on the basis of key characters
- Observe and analyse use of single drugs & their formulations in clinical settings

Experiential-Learning 1.2 :

- Field survey
- Visitation to Garden
- Visit to pharmacy to identify, observe raw herbs and their formulations

- Case Study presentations
- Group Discussions
- Visit to Ayurveda pharmaceutical industries

Experiential-Learning 1.3 :

- Field survey
- Visitation to the Garden
- Identification of fresh herbs and dry specimens

- Identify plants based on key characters
- Observe and analyse the use of single drugs & their formulations in clinical settings

Experiential-Learning 1.4 :

- Field survey
- Visitation to Garden
- Visit to pharmacy to identify, observe raw herbs and their formulations

- Case Study presentations
- Group Discussions
- Visit to Ayurveda pharmaceutical industries

Modular Assessment

Assessment method	Hour
Instructions- Conduct a structured, modular assessment. The assessment will be for 50 marks. Keep a structured marking pattern. Utilize various assessment methods in each module throughout the semester. Keep a record of the structured pattern used for assessment. Calculate the Modular grade point as per Table 6C. SAQ: 5 questions (3 questions from unit 1 & 2 questions from unit 2) – 25 Marks and	4

• Field report evaluation: Evaluation of summary reports of Field visits, experiments in the lab, crude drug herbarium, or hospital: The report will be evaluated based on active participation during the visit/lab, observation book detailing the observations during the visit/lab, and record-keeping.-25 marks
or
Any practical in converted form can be taken for assessment. (25 Marks)
and
Any of the experiential as portfolio/reflections/presentations, can be taken as an assessment. (25 Marks)

3A Course Outcome	3B Learning Objective (At the end of the (lecture/practical training /experiential learning) session, the students should be able to)	3C Notional learning Hours	3D Lecture/ Practical Training/ Experiential Learning	3E Domain/ Sub Domain	3F Level (Does/Shows how/ Knows how/Know)	3G Teaching Learning Methods
Module 2 : Classical to contemporary aspects of Aushadha Dravya Part 2						
Module Learning Objectives **(At the end of the module, the students should be able to)** Discuss useful Part, Rasapanchaka, Agryakarma, Karma, Doshakarma, Rogaghnata, Amayika prayoga Justify their application in strotas, Various diseases and disease conditions.						
M 2 Unit 1 Dravya related to Keshya, Varnya,Vranropana,Snehopaga,Kandughna,Kusthagnha and Udardaprashamana Karmas Keshya 1. Narikela (*Cocos nucifera* L.) 2. Bhrungaraja (*Eclipta alba* Hask.)						

3. Nilini (*Indigofera tinctoria* L.)

Varnya

4. Kumkuma (*Crocus sativus* L.)

5. Ketaka (*Pandanus odoratissimus* L.)

Vranropana

6. Mamsarohini (*Soymida febrifuga* Juss.)

Snehopaga

7. Draksha (*Vitis vinifera* L.)

8. Shleshmataka (*Cordia dichotoma* G. Forst)

Kandughna

9. Karanja (*Pongamia pinnata Pierre*.)

10. Nimba (*Azadirachta indica* Juss.)

11. Sarshapa (*Brassica campestris* L.)

12. Jayanti (*Sesbania sesban* (L) Merr,)

13. Aranyajeeraka (*Centratherum anthelminticum* Kuntze)

Kusthagnha

14. Khadira (*Acacia catechu* Willd.)

15. Haridra (*Curcuma longa* L.)

16. Amragandhi Haridra (*Curcuma amada* Roxb.)

17. Aaragwadha (*Cassia fistula* L.)

18. Tuvaraka (*Hydnocarpus laurifolia* Demot.)

19. Bakuchi (*Psoralea corylifolia* L.)

20. Jati (*Jasminum grandiflorum* L.)

21. Madayantika (*Lawsonia inermis* L.)

22. Kakodumbara (*Ficus hispida* L.)

23. Saireyaka (*Barleria prionitis* L.)

24. Chakramada (*Cassia tora* L.)

25. Karaveera (*Nerium indicum* Mill.)

Udardaprashamana

26. Tinduka (*Diospyrus malabarica* Roxb.)

References: 2,3,5,12,14,29,32,33,34,35,40,42,50,63,76,77

3A	3B	3C	3D	3E	3F	3G
CO1,CO2	Identify the plant & learn their Nama Rupa (Nomenclature& Morphology) and explain its Guna Karma (Classical properties & Actions)	3	Lecture	CC	Knows-how	L_VC,L, L&GD,L &PPT
CO1,CO2	Differentiate the plant & learn their Nama Rupa (Nomenclature& Morphology) and explain its Guna Karma (Classical properties & Actions)	6	Practical Training 2.1	PSY-GUD	Shows-how	DA,DL,L _VC,DIS, FV
CO1,CO2	Conduct the survey of the plants & categorize on the basis of their Nama Rupa (Nomenclature& Morphology) and appreciate their Guna Karma (Classical properties & Actions)	7	Experiential-Learning 2.1	AFT-VAL	Does	DL,DA,D-M,FV,ML
CO5	Elaborate therapeutic uses & formulations of medicinal plants, apply evidence-based research in clinical practices & pharmaceutical industry.	2	Lecture	CC	Knows-how	L_VC,L& PPT ,L,L&GD
CO5	Appraise therapeutic uses & formulations of medicinal plants, apply evidence-based research in clinical practices & pharmaceutical industry.	4	Practical Training 2.2	PSY-MEC	Shows-how	DA,DL,R LE,JC,PS M
CO5	Justify therapeutic uses & formulations of medicinal plants, apply evidence-based research in clinical practices & pharmaceutical industry.	5	Experiential-Learning 2.2	AFT-VAL	Does	FV,DIS,T UT,DG,D L

M 2 Unit 2 Dravya related to Hridya and Raktabharashamaka Karmas Hridya

1. Arjuna (*Terminalia arjuna* Wight & A.)

2. Karpura (*Cinnamomum camphora* Nees.)

3. Vanapalandu (*Urginea indica* Kunth.)

4. Tambula (*Piper betle* L,)

5. Taruni (*Rosa centifolia* L.)

Raktabharashamaka

6. Rudraksha (*Elaecarpus angustifolius* Blume)

References: 2,3,5,12,14,29,32,33,34,35,40,42,50,63,76,77

3A	3B	3C	3D	3E	3F	3G
CO1,CO2	Identify the plant & learn their Nama Rupa (Nomenclature& Morphology) and explain its Guna Karma (Classical properties & Actions)	3	Lecture	CC	Knows-how	L,L&GD, L&PPT ,L_VC
CO1,CO2	Differentiate the plant & learn their Nama Rupa (Nomenclature& Morphology) and explain its Guna Karma (Classical properties & Actions)	6	Practical Training 2.3	PSY-GUD	Shows-how	L_VC,FV ,DG,DIS, DL
CO1,CO2	conduct the survey of plants & categorize on the basis of their Nama Rupa (Nomenclature& Morphology) and appreciate their Guna Karma (Classical properties & Actions)	7	Experiential-Learning 2.3	AFT-VAL	Does	L_VC,D G,ML,PL, RLE
CO5	Elaborate therapeutic uses & formulations of medicinal plants, apply evidence-based research in clinical practices & pharmaceutical industry.	2	Lecture	CC	Knows-how	L&PPT ,L&GD,L
CO5	Appraise therapeutic uses & formulations of medicinal plants, apply evidence-based research in clinical practices & pharmaceutical industry.	4	Practical Training 2.4	PSY-MEC	Shows-how	ML,RLE, DL,DIS,J

3A	3B	3C	3D	3E	3F	3G
						C
CO5	Justify therapeutic uses & formulations of medicinal plants, apply evidence-based research in clinical practices & pharmaceutical industry.	7	Experiential-Learning 2.4	AFT-RES	Does	DG,DIS,T PW,DL, ML

M 2 Unit 3 Dravya related to Shothahara,Gandamalanashaka Karma Shothahara

1. Agnimantha (*Premna integrifolia* L.)

2. Patala ((*Stereospermum suaveolens* DC.)

3. Gambhari (*Gmelina arborea* L.)

4. Manakanda (*Colocasia indica* Lour.)

5. Himsra (*Capparis sepiaria* L.)

6. Adhahpushpi (*Trichodesma indicum* (L) Sm.)

7. Shakhotaka (*Streblus asper* Lour.)

Gandamalanashaka

8. Kanchanara (*Bauhinia variegata* L.)

9. Kandira (*Rananculus scleratus* L.)

References: 2,3,5,12,14,29,32,33,34,35,40,42,50,63,76,77

3A	**3B**	**3C**	**3D**	**3E**	**3F**	**3G**

Practical Training Activity
Practical Training 2.1 :   • Identification of fresh herbs and dry specimens   • Pharmacognostical and Phytochemical analysis   • Preparing digital herbarium   • Clinical use of single drugs
   • In campus & Out campus Garden visit under the supervision of the faculty   • Learning by visiting the Raw drug museums   • Collection of photographs   • Learn about Collection of useful parts and preservation   • Exploring Phyto constituents and their Pharmacological actions by using data bases (Minimum one each in every karma)
Practical Training 2.2 :   • Preparation of single drug remedies   • Segregating drug based on Grahya Agrahyatva   • Procurement of drug based on quality standards
   • Preparing Panchavidha kashaya kalpana in lab   • Practical on Quality control methods in Dravyaguna Lab

- Collection of Dravya and their officinal parts
- Postings in Clinical setup

Practical Training 2.3 :

- Identification of fresh herbs and dry specimens
- Pharmacognostical and Phytochemical analysis
- Preparing digital herbarium
- Clinical use of single drugs

- In campus & Out campus Garden visit under the supervision of the faculty
- Learning by visiting the Raw drug museums
- Collection of photographs
- Learn about Collection of useful parts and preservation
- Exploring Phyto constituents and their Pharmacological actions by using data bases (Minimum one each in every karma)

Practical Training 2.4 :

- Preparation of single drug remedies
- Segregating drug based on Grahya Agrahyatva
- Procurement of drug based on quality standards

- Preparing Panchavidha kashaya kalpana in lab
- Practical on Quality control methods in Dravyaguna Lab
- Collection of Dravya and their officinal parts
- Postings in Clinical setup

Experiential learning Activity

Experiential-Learning 2.1 :

- Field survey
- Visitation to Garden
- Identification of fresh herbs and dry specimens

- Identify plants on the basis of key characters
- Observe and analyse use of single drugs & their formulations in clinical settings

Experiential-Learning 2.2 :

- Field survey
- Visitation to Garden
- Visit to pharmacy to identify, observe raw herbs and their formulations

- Case Study presentations
- Group Discussions
- Visit to Ayurveda pharmaceutical industries

Experiential-Learning 2.3 :

- Field survey
- Visitation to Garden
- Identification of fresh herbs and dry specimens

- Identify plants on the basis of key characters
- Observe and analyse use of single drugs & their formulations in clinical settings

Experiential-Learning 2.4 :

- Field survey
- Visitation to Garden
- Visit to pharmacy to identify, observe raw herbs and their formulations

- Case Study presentations
- Group Discussions

- Visit to Ayurveda pharmaceutical industries

Modular Assessment	
Assessment method	**Hour**
Instructions- Conduct a structured, modular assessment. The assessment will be for 50 marks. Keep a structured marking pattern. Utilize various assessment methods in each module throughout the semester. Keep a record of the structured pattern used for assessment. Calculate the Modular grade point as per Table 6C. SAQ: 5 questions (2 questions from unit 1, 2 questions from unit 2 & 1 question from unit 3) – 25 Marks and Field report evaluation: Evaluation of summary reports of Field visits, experiments in the lab, crude drug herbarium or hospital: The report will be evaluated on the basis of active participation during the visit/lab, observation book detailing the observations during the visit/lab, and record-keeping.-25 marks or Any practical in converted form can be taken for assessment. (25 Marks) and Any of the experiential as portfolio/reflections/presentations, can be taken as an assessment. (25 Marks)	4

Semester No : 4

3A Course Outcome	3B Learning Objective (At the end of the (lecture/practical training /experiential learning) session, the students should be able to)	3C Notional learning Hours	3D Lecture/ Practical Training/ Experiential Learning	3E Domain/ Sub Domain	3F Level (Does/Shows how/ Knows how/Know)	3G Teaching Learning Methods
Module 3 : Nomenclature and basonym, synonyms, homonyms-based identification of classical drugs.						

Module Learning Objectives
(At the end of the module, the students should be able to)

1. Explain the concepts of basonyms, synonyms, and homonyms in classical drug nomenclature.
2. Analyze the etymological derivation of basonyms and synonyms of classical drugs.
3. Utilize knowledge of Vedic taxonomy and lexicons to enhance understanding of classical drug nomenclature.

M 3 Unit 1 Vedic taxonomy & lexicons Contributions of Vedic taxonomy & lexicons (Kosa) series for classical drugs in terms of terminology.

References: 1,2,3,4,5,62,70,149

3A	3B	3C	3D	3E	3F	3G
CO2	Discuss Vedic taxonomy and its significance in understanding classical drug nomenclature.	2	Lecture	CC	Knows-how	L&GD,SIM,L&PPT ,L,L_VC
CO2	Explore lexicons (Kosa) series and their importance in understanding classical drug terminology & provide examples of lexicons.	3	Lecture	CC	Knows-how	L_VC,L&PPT ,L,L&GD
CO2	Demonstrate the key points of Vedic taxonomy in classical drug nomenclature.	4	Practical Training 3.1	PSY-GUD	Shows-how	CBL,LS,DIS,FV
CO2	Appraise the structure of the different lexicons with understanding classical drug terminology and importance of accurate terminology in classical drug identification and usage.	5	Practical Training 3.2	PSY-GUD	Shows-how	LS,CBL,FV,DIS
CO2	Value the practical applications of Vedic taxonomy in real-world scenarios.	6	Experiential-Learning 3.1	AFT-VAL	Does	L&PPT , L,L&GD,

3A	3B	3C	3D	3E	3F	3G
						DIS
CO2	Participate in conducting various descriptive studies of lexicons (Kosa) and its practical applications.	6	Experiential-Learning 3.2	AFT-REC	Does	L,L&PPT ,L&GD

M 3 Unit 2 Basonym, Synonyms and Homonyms of drugs Importance of basonym, synonyms, homonyms of drugs in relation to identification, and their importance and characterization, properties, action and therapeutic uses.

References: 1,2,3,4,5,62,70,149

3A	3B	3C	3D	3E	3F	3G
CO2	Discuss basonym, synonyms, and homonyms, and explain their importance in drug identification and characterization.	2	Lecture	CC	Knows-how	TBL,D,DL,FV,PER
CO2	Analyze the relevance of basonym, synonyms, and homonyms in classical drug research and practice.	1	Lecture	CAN	Knows-how	ML,L&GD,LS,L,L&PPT
CO3,CO4	Illustrate the importance of understanding basonyms, synonyms, and homonyms in ensuring accurate drug identification and characterization.	3	Practical Training 3.3	PSY-MEC	Shows-how	LS,L,L&PPT ,L&GD
CO2	Demonstrate an understanding of the relevance of basonyms, synonyms, and homonyms in classical, drug research and practice.	3	Practical Training 3.4	PSY-MEC	Shows-how	FV,D,TUT,LS,DIS
CO2	Engage in thoughtful discussions on basonym, synonyms, and homonyms, and their importance in drug identification and characterization.	5	Experiential-Learning 3.3	AFT-REC	Does	D,DL,DG ,DIS
CO2	Perform the macro and microscopic study of stem, stem bark and stem tuber for its Identification and characterization.	1	Practical Training 3.5	PSY-MEC	Shows-how	DIS,D
CO2	Appraise the significance of basonym, synonyms, and homonyms in classical, drug research and practice, by reflecting on their impact on therapeutic decision-making.	4	Experiential-Learning 3.4	AFT-VAL	Does	SDL,DIS,ML

M 3 Unit 3 Etymological derivation of Basonyms and Synonyms Etymological derivation of basonym, synonyms of drugs with examples.

References: 1,2,3,4,5,62,70,149

3A	3B	3C	3D	3E	3F	3G
CO2	Explain the importance of etymology in understanding the origins and meanings of drug names.	1	Lecture	CC	Knows-how	FV,TUT,D,W,LS
CO2	Evaluate the role of basonym in establishing the original name of a drug.	1	Lecture	CE	Knows-how	DG,L&PPT,DIS,FV
CO2	Demonstrate the etymology of various drug names to understand their origins and meanings.	2	Practical Training 3.6	PSY-MEC	Shows-how	D,PER,DL,DG
CO2	Practice the effective use of basonyms and synonyms in drug nomenclature.	2	Practical Training 3.7	PSY-GUD	Shows-how	TBL,TPW,LS,ML,FV
CO2	Discuss the etymology of drug names.	3	Experiential-Learning 3.5	AFT-REC	Shows-how	PER,TBL,FV,TPW,DG
CO2	Reflect on personal experiences and practices related to drug nomenclature,.	2	Experiential-Learning 3.6	AFT-SET	Shows-how	JC,DIS,LS,TBL

Practical Training Activity

Practical Training 3.1 : Key points of Vedic taxonomy in classical drug nomenclature

- The teacher refers to discuss plant naming system using the Sanskrit language, and primary attention is given to the external and physical features of plants like root, stem, leaf, flower, fruit and other organs, for the plant naming process, so that they could easily be identified by correlating their names to the external features.
- Students will be divided into 2 to 3 groups and each group will be involved in identifying the plant using any of the methods demonstrated by the teacher.
- Followed by a presentation and discussion.

Practical Training 3.2 : Principles of Vedic taxonomy and their application in classical drug nomenclature.

- The teacher will present plant names which have been clarified through the concept of etymology.
- Students will be divided into 2 to 3 groups and each group will be involved in identification of classical drugs through the concept of etymology demonstrated by the teacher.
- Followed by a presentation and discussion.

Practical Training 3.3 : Importance of understanding basonyms, synonyms, and homonyms in drug identification and characterization.

- The teacher will demonstrate different ways of identifying drug with the help of basonym, synonyms, and homonyms.
- Case Studies: Students will be divided into groups and each group will be allotted a list of classical drugs, asking them to illustrate the application of basonym, synonyms, and homonyms.
- Group Activity: Students will be divided into groups and each group will be allotted a list of classical drugs, asking them to identify the basonym, synonyms, and potential homonyms.

Practical Training 3.4 : Relevance of basonyms, synonyms, and homonyms in classical, drug research and practice.

- The teacher will demonstrate different ways of identifying drug with the help of basonym, synonyms, and homonyms.
- Case Studies: Studies: Students will be divided into groups and each group will be allotted classical drugs to illustrate the application of basonym, synonyms, and homonyms in research and practice.
- Group Discussion: Studies: Students will be divided into groups and each group will be discussing the relevance of basonym, synonyms, and homonyms in classical drug research and practice.

Practical Training 3.5 : Identification and characterization of stem, stem bark and stem tuber

- Identify and classify Stem, Stem bark and stem tuber types.
- Measure length, diameter and growth rate.
- Observe anatomy using microscopy.

Practical Training 3.6 : Etymology of various drug names

- The teacher will demonstrate different ways of identifying drug to analyze the etymology.
- Divide students into groups and assign each group a set of drug names.
- Ask each group to analyze the etymology of their assigned drug names.
- Ask each group to present their findings and discuss the origins and meanings of the drug names.

Practical Training 3.7 : Effective use of basonyms and synonyms in drug nomenclature.
 • The teacher will demonstrate basonym & synonyms matching. • Create a matching exercise where students match drug names with their synonyms. • Provide examples of drugs with multiple synonyms

Experiential learning Activity

Experiential-Learning 3.1 : Practical applications and significance of Vedic taxonomy.
 • Students will identify a topic of interest related to Vedic taxonomy. • Do a literature search of drug nomenclature using the systematic approach. • Evaluate the collected literature under the guidance of a teacher.
Experiential-Learning 3.2 : Descriptive studies of lexicons (Kosa) and its practical applications.
 • Students will identify a topic of interest related to lexicons (Kosa). • Do a literature search of drug using the systematic approach of etymology. • Evaluate the collected literature under the guidance of a teacher.
Experiential-Learning 3.3 : Critical role of basonym, synonyms, and homonyms in ensuring accurate drug identification.

Students will be divided into groups.

- The teacher will assign a group with a list of drug names and ask them to identify the basonym, synonyms, and potential homonyms.
- Ask students to standardize the terminology for each drug using basonym and synonyms.

Experiential-Learning 3.4 : Significance of basonym, synonyms, and homonyms in classical, drug research and practice

Students will be divided into groups

- The teacher will assign a group project where students have to research and present on a classical drug, including its basonym, synonyms, and potential homonyms.
- Ask each group to present their findings and discuss the importance of accurate identification.

Experiential-Learning 3.5 : Drug Etymology.

Students will be divided into groups.

- Students to analyze the etymology of a specific drug name and present their findings.
- Students to create a database of drug names with their etymologies.
- Students use case studies to illustrate the importance of etymology in understanding drug names

Experiential-Learning 3.6 : Importance of accurate drug nomenclature by participating in hands-on activities.

Students will be divided into groups

- Create a matching game where students match drug names with their basonyms and synonyms.
- Ask students to work in groups to create a presentation or poster on basonym and synonyms in drug nomenclature.

Modular Assessment	
Assessment method	**Hour**
Instructions- Conduct a structured modular assessment. The assessment will be for 50 marks. Keep a structured marking pattern. Use different assessment methods in each module for the semester. Keep a record of the structured pattern used for assessment. Calculate the Modular grade point as per Table 6C. Multiple Choice Questions (10 marks) Short Answer Questions (15 Marks) and Field/Lab report evaluation: 25 marks Evaluation of summary reports of Field visits, The report will be evaluated on the basis of 1. Understanding of basonym, synonyms, and homonyms 2. Ability to apply knowledge to practical scenarios 3. Critical thinking and problem-solving skills or Any practical in converted form can be taken for assessment. (25 Marks) and Any of the experiential as portfolio/ reflections / presentations can be taken as assessment. (25 Marks)	4

3A Course Outcome	3B Learning Objective (At the end of the (lecture/practical training /experiential learning) session, the students should be able to)	3C Notional learning Hours	3D Lecture/ Practical Training/ Experiential Learning	3E Domain/ Sub Domain	3F Level (Does/Shows how/ Knows how/Know)	3G Teaching Learning Methods

Module 4 : Botanical Identification of plants used in current practice

Module Learning Objectives
(At the end of the module, the students should be able to)

1. Explain the basics of plant taxonomy and nomenclature.
2. Discuss medicinal plant families and species based on their key morphological features used in Ayurveda.
3. Familiarize with resources like World Flora , DNA barcoding and guidelines of ICBN and ICNCP for plant identification.

M 4 Unit 1 Taxonomy & Plant Nomenclature. Knowledge of general taxonomy & Plant Nomenclature.

References: 6,7,8,11

3A	3B	3C	3D	3E	3F	3G
CO2	Justify the principles of plant taxonomy and nomenclature.	3	Lecture	CE	Knows-how	DIS,L&PPT ,L&GD
CO2	Demonstrate the ability to classify and nomenclature of medicinal plants accurately.	6	Practical Training 4.1	PSY-GUD	Shows-how	L&GD,L&PPT ,PER
CO2	Participate in the diversity and complexity of plant taxonomy and nomenclature.	8	Experiential-Learning 4.1	AFT-REC	Shows-how	L&PPT ,DIS,EDU

M 4 Unit 2 Key identifying characters of Plants Key identifying characters of Family and species of medicinal plants Used in Ayurveda.

References: 6,7,8,9,11

3A	3B	3C	3D	3E	3F	3G

CO2	Summarize the botanical identification of medicinal plants: Family and Species characteristics.	3	Lecture	CC	Knows-how	DIS,DL,FV,D,DG
CO2	Execute the ability to identify key characters of medicinal plants.	7	Practical Training 4.2	PSY-MEC	Shows-how	DA,DG,SIM,DIS,FV
CO2	Appraise the significance and complexity of medicinal plant identification.	9	Experiential-Learning 4.2	AFT-VAL	Does	EDU,CBL,DIS,SIM,L

M 4 Unit 3 International Code of Botanical Nomenclature for Cultivated Plants , World Flora online & DNA bar coding. International Code of Botanical Nomenclature (ICBN) and the International Code of Nomenclature for Cultivated Plants (ICNCP), World Flora online & DNA bar coding.

References: 5,6,7,8,9,10,11

3A	3B	3C	3D	3E	3F	3G
CO2,CO4	Interpret the botanical nomenclature in the digital age: ICBN, ICNCP, World Flora Online, and DNA Barcoding	4	Lecture	CC	Knows-how	D,DIS,FV,DA
CO2,CO4	Adapt practical skills in plant nomenclature and identification using ICBN, ICNCP, World Flora Online, and DNA Barcoding.	7	Practical Training 4.3	PSY-ADT	Shows-how	D,D-M,DA,RP,FV
CO2,CO4	Develop an appreciation for the importance and application of plant nomenclature rules (ICBN, ICNCP) and tools (World Flora Online, DNA Barcoding).	9	Experiential-Learning 4.3	AFT-RES	Shows-how	L&PPT,L,L&GD

Practical Training Activity

Practical Training 4.1 : Demonstrating classification and nomenclature exercises

- Divide students into small groups.
- Provide each group with a set of cards or labels with different kingdoms, phyla, classes, orders, families, genera, and species.
- Ask each group to classify the plants into different kingdoms, phyla, classes, orders, families, genera, and species.
- Have learners work together to match the substances with their corresponding classifications and nomenclature.

Practical Training 4.2 : Demonstrating the identifying Key Characters of Medicinal Plants

1. Set up several stations with different medicinal plants (fresh or dried specimens, images, or models).
2. At each station, provide a worksheet or checklist with key characters to observe (e.g., leaf shape, flower color, root structure).
3. Divide learners into small groups and have them rotate through the stations.
4. At each station, learners should:

    i. Observe the plant specimen.
    ii. Identify and record the key characters.
    iii. Use a plant identification key or reference materials to verify their observations.
5. Encourage learners to handle the plant specimens (if possible) and use magnifying glasses or microscopes to observe details.

Practical Training 4.3 : Demonstrate practical exercises in Plant Nomenclature applying ICBN and ICNCP and Digital plant identification by using World Flora Online and DNA Barcoding.

Demonstrating ICBN and ICNCP

    1. Introduce learners to World Flora Online and demonstrate its features, DNA Barcoding and its applications in plant identification.
    2. Provide learners with a set of plant specimens or images.

   A. Ask them to apply ICBN and ICNCP rules to:

    i. Identify the correct botanical names.
      ii. Format the names according to international standards.

   B. Have learners work in pairs or small groups to complete the exercises

    3. Provide learners with a simulated DNA sequencing dataset or a real dataset (if feasible).

   A. Ask them to:

 i. Analyse the dataset using a DNA Barcoding tool or software.
      ii. Identify the plant species based on the DNA sequence data.
      iii. Discuss the advantages and limitations of this method.

Experiential learning Activity

Experiential-Learning 4.1 : Exploring plant taxonomy and nomenclature

1. Divide students into small groups and provide them with:
   i. A list of clues and challenges related to plant taxonomy and nomenclature.
   ii. Access to plant specimens, images, or digital resources.
2. Ask learners to work together to:
   i. Solve the clues and challenges.
   ii. Explore the diversity of plant species and their taxonomic relationships.

3. Encourage learners to reflect on their experiences and discuss:
   i. The importance of accurate plant identification.
   ii. The challenges and complexities of plant taxonomy.

Experiential-Learning 4.2 : Exploring Medicinal Plant Identification

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1. Take students on a guided tour of a botanical garden, greenhouse, or medicinal plant farm.
2. Provide learners with opportunities to:

   i. Observe and handle medicinal plants.
   ii. Discuss the properties, uses of each plant.
3. Ask learners to reflect on their experiences and consider.
   i. The importance of accurate identification in medicinal plant use.
   ii. The potential consequences of misidentification.
   iii. The cultural and historical significance of medicinal plants.

Experiential-Learning 4.3 : Exploring plant nomenclature ICBN, ICNCP, World Flora Online, and DNA Barcoding".

Divide students into small groups and assign each group a case study:

- A plant species
- A plant species with multiple common names.
- A plant species with disputed classification.

Ask learners to:

- Research and apply ICBN and ICNCP rules to their case study
- Use World Flora Online and DNA Barcoding to support their research.

- Present their findings and discuss the implications of accurate plant nomenclature.

Modular Assessment	
Assessment method	**Hour**
Instructions- Conduct a structured modular assessment. The assessment will be for 50 marks. Keep a structured marking pattern. Use different assessment methods in each module for the semester. Keep a record of the structured pattern used for assessment. Calculate the Modular grade point as per Table 6C. Multiple Choice Question (10 marks) Short Answer Question (15 marks) and Field Visit Assessment (25 marks) Evaluation of summary reports of Field visits, The report will be evaluated on the basis of 1. Plant Identification 2. Documentation 3. Critical Thinking 4. Participation or Any practical in converted form can be taken for assessment. (25 Marks) and Any of the experiential as portfolio/ reflections / presentations can be taken as assessment. (25 Marks)	4

Semester No : 5

3A Course Outcome	3B Learning Objective (At the end of the (lecture/practical training /experiential learning) session, the students should be able to)	3C Notional learning Hours	3D Lecture/ Practical Training/ Experiential Learning	3E Domain/ Sub Domain	3F Level (Does/Shows how/ Knows how/Kno	3G Teaching Learning Methods

| | w) | |

Module 5 : Identification, source & availability of plant-based Raw Drugs.

Module Learning Objectives
(At the end of the module, the students should be able to)

    1. Describe the macroscopic features of various plant   parts.
    2. Distinguish macroscopic features of various   plant parts.
    3. Assess the availability of raw drugs of plant origin and factors influencing their supply chain.

M 5 Unit 1 Root, rhizome and underground parts Root, rhizome and underground parts

References: 12,13,14,28,29,50

3A	3B	3C	3D	3E	3F	3G
CO2,CO7	Describe the distinguishing characters of roots, rhizomes, and underground parts and their sources as a raw drugs.	2	Lecture	CC	Knows-how	DSN,BL, L&GD,L &PPT
CO2	Performe identification and analyze medicinal roots, rhizomes, and underground parts.	5	Practical Training 5.1	PSY-MEC	Shows-how	L,LS,L& PPT ,L&GD
CO2,CO7	Value the importance of sustainable sourcing and identification of medicinal roots, rhizomes, and underground parts.	7	Experiential-Learning 5.1	AFT-VAL	Does	FV,DG

M 5 Unit 2 Stem, stem bark and heart wood Stem, stem bark and heart wood

References: 12,13,14,28,29,50

3A	3B	3C	3D	3E	3F	3G
CO2,CO7	Discuss the distinguishing characters of stem, stem bark and heart wood and their sources as a raw drug.	2	Lecture	CC	Knows-how	D,FV,DG
CO2	Demonstrate practical skills in identifying and analyzing medicinal stems, stem barks, and heart woods.	5	Practical Training 5.2	PSY-MEC	Shows-how	L,L&GD, L&PPT ,BL
CO1,CO7	Participate in the sustainable sourcing and identification of medicinal stem, stem bark and heart wood.	6	Experiential-Learning 5.2	AFT-RES	Does	SDL,DIS, L&GD

M 5 Unit 3 Leaves, flowers, fruits, seeds Leaves, flowers, fruits, seeds

References: 12,13,14,28,29,50

3A	3B	3C	3D	3E	3F	3G
CO1	Describe the distinguishing characters of leaves, flowers, fruits, seeds and their sources as a raw drugs.	3	Lecture	CC	Knows-how	DIS,DL,D G
CO1	Demonstrate practical skills in identifying and analyzing medicinal cinal leaves, flowers, fruits and seeds.	5	Practical Training 5.3	PSY-GUD	Shows-how	DG,PrBL, DL,PER
CO1,CO7	Develop an appreciation for the importance of sustainable sourcing and identification of medicinal leaves, flowers, fruits, seeds.	7	Experiential-Learning 5.3	AFT-VAL	Shows-how	PrBL,DL, ML,DIS

M 5 Unit 4 Whole herb,unorganised drugs and insect galls. Whole herb,unorganised drugs and insect galls.

References: 12,13,14,28,29,50

3A	3B	3C	3D	3E	3F	3G
CO1,CO7	Describe the distinguishing characters of whole herb, unorganised drugs and insect galls and their sources of raw drugs.	3	Lecture	CC	Knows-how	TUT,DIS, PL,LS,D

| CO1,CO7 | Demonstrate practical skills in identifying and analyzing of medicinal whole herb, unorganised drugs and insect galls. | 5 | Practical Training 5.4 | PSY-MEC | Shows-how | LS,DIS,D,DG |
| CO1,CO7 | Explore medicinal Whole herb, unorganised drugs and insect galls: identification, sourcing, and sustainability | 6 | Experiential-Learning 5.4 | AFT-VAL | Shows-how | IBL,BS,BL |

Practical Training Activity

Practical Training 5.1 : Practical identification (macroscopic, microscopic, chemical characteristics and adulterants) of root, rhizome and underground parts.

1. Prepare a specimen of medicinal Root, rhizome and underground parts for hands-on examination.

2. Divide students into small groups and provide each group with:

    i. Specimens of Root, rhizome and underground parts.
    ii. Microscopes and hand lenses for closer examination.
    iii. Reference materials (e.g., textbooks, atlases, or online resources).
    iv. Instruments and reagents for preliminary phytochemical study

3. Ask learners to:
    i. Observe and describe the macroscopic and microscopic
      features of Root, rhizome and underground parts.
    ii. Identify the plant species of each specimen.
    iii. Record their observations and findings.
    iv. Chemical characteristics of Root, rhizome and underground parts
4. Identification of adulterants in Root, rhizome and underground parts

Practical Training 5.2 : Practical identification (macroscopic, microscopic, chemical characteristics and adulterants) of stem, stem bark and heart wood.

1. Prepare a selection of medicinal Stem, stem bark and heart wood. For hands-on examination.

2. Divide students into small groups and provide each group with:

    i. Specimens of Stem, stem bark and heart wood.
    ii. Microscopes and hand lenses for closer examination.
    iii. Reference materials (e.g., textbooks, atlases, or online resources).
    iv. Instruments and reagents for preliminary phytochemical study.

3. Ask learners to:
    i. Observe and describe the macroscopic and microscopic features of stem, stem bark and heart wood.
    ii. Identify the plant species of each specimen.
    iii. Record their observations and findings.
    iv. Chemical characteristics of stem, stem bark and heart wood
    v. Identification of adulterants in stem, stem bark and heart wood.

Practical Training 5.3 : Practical identification (macroscopic, microscopic, chemical characteristics and adulterants) of leaves, flowers, fruits, seeds.

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1. Prepare a selection of medicinal leaves, flowers, fruits, seeds. for hands-on examination.

2. Divide students into small groups and provide each group with:

    i. Specimens of leaves, flowers, fruits, seeds.
    ii. Microscopes and hand lenses for closer examination.
    iii. Reference materials (e.g., textbooks, atlases, or online resources).
    iv. Instruments and reagents for preliminary phytochemical study

3. Ask learners to:

i. Observe and describe the macroscopic and microscopic

ii. Features of leaves, flowers, fruits, seeds.

iii. Identify the plant species of each specimen.

iv. Record their observations and findings.

v. Chemical characteristics of leaves, flowers, fruits, seeds.

vi. Identification of adulterants in leaves, flowers, fruits, seeds

Practical Training 5.4 : Perform the identification (macroscopic, microscopic, chemical characteristics and adulterants) of whole herb, unorganised drugs and insect galls.

1. Prepare a specimen of medicinal whole herb, unorganised drugs and insect galls. for hands-on examination.
2. Divide students into small groups and provide each group with:

i. Specimens of whole herb, unorganised drugs and insect galls.

ii. Microscopes and hand lenses for closer examination.

iii. Reference materials (e.g., textbooks, atlases, or online resources).

iv. Instruments and reagents for preliminary phytochemical study

3. Ask learners to:

i. Observe and describe the macroscopic and microscopic features of whole herb, unorganised

drugs and insect galls.

ii. Identify the plant species of each specimen.

iii. Record their observations and findings.

iv. Chemical characteristics of whole herb, unorganised drugs

and insect galls

3. Identification of adulterants in whole herb, unorganised drugs and insect galls

Experiential learning Activity

Experiential-Learning 5.1 : Identification, sourcing, and sustainability of medicinal roots, rhizomes, and underground parts.

1. Organize a field trip to:

i. A medicinal plant garden or medicinal plant farm featuring roots, rhizomes, and underground parts.

ii. A local market or herbal shop selling medicinal roots, rhizomes, and underground parts.

2. Ask students to:
  i. Observe and identify different types of medicinal roots, rhizomes, and underground parts.
  ii. Discuss the importance of sustainable sourcing and harvesting practices.

Experiential-Learning 5.2 : Identification, sourcing, and sustainability of medicinal roots, rhizomes, and underground parts.

1. Student will be exploring the cultivation and sustainability of medicinal Stem, stem bark and heart wood
2. Student will identify and analyze the sourcing of medicinal Stem, stem bark and heart wood, including sustainable harvesting practices and conservation efforts.
3. Field Study on Root Sourcing of Stem, stem bark and heart wood
4. Student will identify and analyze the sourcing of medicinal Stem, stem bark and heart wood, including sustainable harvesting practices and conservation efforts.

Experiential-Learning 5.3 : Identification, sourcing, and sustainability of medicinal leaves, flowers, fruits and seeds.

1. Organize a field trip to:

  i. A medicinal plant garden or medicinal plant farm featuring leaves, flowers, fruits and seeds
  ii. A local market or herbal shop selling medicinal flowers, fruits and seeds
  2. Ask students to:
  i. Observe and identify different types of medicinal flowers, fruits and seeds
  ii. Discuss the importance of sustainable sourcing and harvesting practices.

Experiential-Learning 5.4 : Identification, sourcing, and sustainability of medicinal whole herb, unorganised drugs and insect galls.

1. Student will be exploring the cultivation and sustainability of medicinal whole herb, unorganised drugs and insect galls.
2. Field Study on Medicinal Root Sourcing   Student will identify and analyze the sourcing of medicinal whole herb, unorganised drugs and insect galls, including sustainable harvesting practices and conservation efforts.

Modular Assessment	
Assessment method	**Hour**
Instructions—Conduct a structured modular assessment. The assessment will be for 50 marks. Keep a structured marking pattern. Use different assessment methods in each module for the semester. Keep a record of the structured pattern used for assessment. Calculate the Modular grade point as per Table 6C. Report writing of field visits or crude drug herbarium or Drug testing Laboratory or Industry or hospital center. (25 marks) and Class presentation on Research / clinical/Viva-voce (25 marks) or Or Any practical in converted form can be taken for assessment. (25 Marks) And Any experiential as portfolio/reflections/presentations, can be taken as an assessment. (25 Marks)	4

3A Course Outcome	3B Learning Objective (At the end of the (lecture/practical training /experiential learning) session, the students should be able to)	3C Notional learning Hours	3D Lecture/ Practical Training/ Experiential Learning	3E Domain/ Sub Domain	3F Level (Does/Shows how/ Knows how/Know)	3G Teaching Learning Methods
Module 6 : Vrikshayurveda, Cultivation, Conservation and, Tissue Culture of medicinal plants.						
Module Learning Objectives **(At the end of the module, the students should be able to)** 1. Apply the principles of Vrikshayurveda in medicinal plant cultivation. 2. Explain the importance of sustainable cultivation, collection, and conservation practices for medicinal plants. 3. Describe the role of tissue culture in medicinal plant propagation and conservation.						

M 6 Unit 1 Principles of Vrikshayurveda Application of principles explained in Vrikshayurveda.

References: 15,66

3A	3B	3C	3D	3E	3F	3G
CO6	Explain the fundamental principles and applications of Vrikshayurveda.	2	Lecture	CC	Knows-how	L&PPT , BL,EDU, BS
CO6	Execute the applications of Vrikshayurveda in medicinal plant cultivation.	7	Practical Training 6.1	PSY-GUD	Shows-how	DL,DIS,D G,D
CO6	Illustrate the knowledge of Vrikshayurveda.	8	Experiential-Learning 6.1	PSY-MEC	Does	DG,GBL, FV

M 6 Unit 2 Cultivation, Conservation and Collection of useful parts of plants Cultivation & Conservation of medicinal plants, Collection of useful parts of plants

References: 15,19,20,21,22

3A	3B	3C	3D	3E	3F	3G
CO6	Describe the best practices of medicinal plant cultivation and collection.	4	Lecture	CC	Knows-how	DIS,LS,L &PPT
CO6	Demonstrate the practical techniques for medicinal plant conservation and collection.	7	Practical Training 6.2	PSY-GUD	Shows-how	D,FV,DIS ,GBL,DG
CO6	Illustrate the knowledge of Medicinal Plant Cultivation and Collection in Practice.	9	Experiential-Learning 6.2	PSY-MEC	Does	L&PPT ,BL,BS

M 6 Unit 3 Tissue culture techniques. Tissue culture techniques.

References: 16,17,18

3A	3B	3C	3D	3E	3F	3G
CO6	Explain the plant tissue culture principles and techniques.	4	Lecture	CC	Know	BS,FV,DG,DIS
CO6	Adapt the knowledge of Medicinal Plant Cultivation and Collection.	6	Practical Training 6.3	PSY-GUD	Shows-how	D-BED,EDU,D,DIS
CO6	Adapt the Procedure knowledge of tissue culture for plant propagation and conservation.	9	Experiential-Learning 6.3	PSY-MEC	Does	L&PPT , GBL,L&GD

Practical Training Activity

Practical Training 6.1 : Applications of Vrikshayurveda in medicinal plant cultivation.

The teacher demonstration the application of Vrikshayurveda principles:

1. Soil preparation and planting of medicinal plants.
2. Pruning and training of medicinal plants.
3. Pest and disease management of medicinal plants.
4. Harvesting and post-harvest handling of medicinal plants.

Practical Training 6.2 : Techniques for medicinal plant conservation and collection.

The teacher demonstrates:

1. Sustainable collection techniques for medicinal plants and

2. Conservation strategies for medicinal plants.

Practical Training 6.3 : Plant tissue culture methods for propagation and conservation of medicinal plants.

A tissue culture expert / Teacher will showcase practical techniques via video presentation

1. The importance of sterile technique and media preparation in plant tissue culture.
2. Selection and preparation of explants for plant tissue culture.
3. Inoculation and incubation of plant tissue cultures.
4. Regeneration and acclimatization of plantlets from tissue culture.
5. Use of cryopreservation for plant conservation.

Experiential learning Activity

Experiential-Learning 6.1 : Acquire the knowledge of Vrikshayurveda.

Activity will be carried out in existing medicinal plant garden.
1. Divide students into small groups and assign each group a specific
   medicinal plant species.
2. Ask learners to:
   i. Prepare the soil according to Vrikshayurveda principles (e.g.,
      testing soil pH, adding organic amendments).
   ii. Plant and nurture the medicinal plant species using Vrikshayurveda
      techniques (e.g., pruning, irrigation, pest management).
   3. Have learners reflect on their experiences and discuss:
   i. The benefits and challenges of applying Vrikshayurveda principles
      in medicinal plant cultivation.
   ii. The importance of sustainable and environmentally friendly
      practices in medicinal plant cultivation

Experiential-Learning 6.2 : Exploring the knowledge of Medicinal Plant Cultivation and Collection in Practice.

Activity will be carried out in existing medicinal plant garden.
1. Ask learners to:
  i. Demonstrate sustainable harvesting techniques (e.g., selective
   harvesting).
  ii. Practice proper handling and storage of medicinal plants
    (e.g., drying, packaging).
  iii. Identify and document plant species, habitats, and conservation
    status.
2. Have learners reflect on their experiences and discuss:
  i. The importance of sustainable harvesting and conservation practices.
  ii. The impact of over-harvesting and destructive practices on medicinal plant.

Experiential-Learning 6.3 : Exploring the knowledge of tissue culture for plant propagation and conservation.

A tissue culture expert will showcase practical techniques in existing plant tissue culture laboratory
 	
1. Provide learners with:
  i. Sterile equipment (e.g., laminar flow hood, autoclave).
  ii. Plant tissue culture media and materials (e.g., agar, growth
    regulators).
  iii. Plant samples (e.g., leaves, stems).
2. Ask students to:
  i. Sterilize and prepare plant samples for tissue culture.
  ii. Prepare and inoculate tissue culture media with plant samples.
  iii. Incubate and maintain plant tissue cultures.
  iv. Observe and record plant growth and development.

Modular Assessment

Assessment method	**Hour**
Instructions- Conduct a structured modular assessment. The assessment will be for 50 marks. Keep a structured marking pattern. Use different assessment	4

methods in each module for the semester. Keep a record of the structured pattern used for assessment. Calculate the Modular grade point as per Table 6C.

Multiple Choice Question (10 marks)

Short Answer Question (15 marks)

and

Field Visit Assessment (25 marks)

Evaluation of summary reports of Field visits, The report will be evaluated on the basis of

1. Plant Identification

2. Documentation

3. Critical Thinking

4. Participation

Or

Any practical in converted form can be taken for assessment. (25 Marks)

And

Any experiential as portfolio/reflections/presentations, can be taken as an assessment. (25 Marks)

Semester No : 6

3A Course Outcome	3B Learning Objective (At the end of the (lecture/practical training /experiential learning) session, the students should be able to)	3C Notional learning Hours	3D Lecture/ Practical Training/ Experiential Learning	3E Domain/ Sub Domain	3F Level (Does/Shows how/ Knows how/Know)	3G Teaching Learning Methods
Module 7 : Pharmacognosy & Quality Standards of Ayurvedic Medicinal Plants.						

Module Learning Objectives
(At the end of the module, the students should be able to)

   1. Utilize the principles of pharmacognosy and its application in evaluating medicinal plants used in Ayurveda.

2. Explain the importance of quality standards in ensuring the safety and efficacy of medicinal plants.

3. Explain the instrumentation, methodology, and advantages of each analytical technique.

M 7 Unit 1 Alternative parts and substitute plant drugs Knowledge about classical references of alternative parts and substitute plant drugs mentioned in classical texts.

References: 12,13,23,24,25,26,27,28,29

3A	3B	3C	3D	3E	3F	3G
CO3	Discuss the classical references and substitute plant drugs in Ayurveda.	2	Lecture	CC	Knows-how	JC,ML,L,LS
CO3	Execute and Analyze Alternative Parts and Substitute Plant Drugs.	5	Practical Training 7.1	PSY-GUD	Shows-how	ML,W,TBL,PrBL,DIS
CO3	Explore alternative parts and substitute plant drugs.	7	Experiential-Learning 7.1	PSY-MEC	Does	D,ML,PSM,W,DIS

M 7 Unit 2 Morphological, macroscopic and microscopic characteristics of adulterant/alternate / substitute plant drugs. Study of morphological, macroscopic and microscopic characteristics of adulterant/alternate / substitute plant drugs.

References: 12,13,23,24,25,26,27,28,29

3A	3B	3C	3D	3E	3F	3G
CO3	Discuss adulteration and substitution in medicinal Plants.	2	Lecture	CC	Knows-how	L,LS,W,L_VC,L&PPT

CO3,CO4	Perform the identifying adulterants and substitutes in medicinal plants.	5	Practical Training 7.2	PSY-MEC	Shows-how	ML,LRI,TUT,W,DIS
CO3,CO4	Engage in detecting adulterants and substitutes in medicinal plants.	6	Experiential-Learning 7.2	AFT-RES	Shows-how	DIS,ML,W,FV,TUT

M 7 Unit 3 Solvent system, estimation procedures of assay/ analytical methods of chemical constituents (major) and leading biological marker in relation to safety, efficacy and quality. Standard, solvent system, estimation procedures of assay/ analytical methods of chemical constituents (major) and leading biological marker in relation to safety, efficacy and quality.

References: 13,27,29

3A	3B	3C	3D	3E	3F	3G
CO4	Describe standardization and estimation of chemical constituents in medicinal Plants	3	Lecture	CC	Knows-how	LS,L&GD,L&PPT,ML,W
CO4	Conduct standardisation and estmation tests for standardization and estimation of bioactive constituents.	5	Practical Training 7.3	PSY-MEC	Shows-how	DIS,W,D,TUT
CO4	Participate in quality control of medicinal plants by analyical methods	7	Experiential-Learning 7.3	AFT-VAL	Does	DIS,TPW,FV,PER,JC

M 7 Unit 4 Analytical methods Analytical methods- Thin Layer Chromatography (TLC), High Performance Thin Layer Chromatography (HPTLC), High Performance Liquid Chromatography (HPLC) and Gas Liquid Chromatography (GLC).

References: 12,27,29

3A	3B	3C	3D	3E	3F	3G

CO4	Discuss chromatographic techniques for medicinal plant analysis.	3	Lecture	CC	Knows-how	L&PPT , L,ML,W, LS
CO4	Apply chromatographic techniques in medicinal plant analysis.	5	Practical Training 7.4	PSY-SET	Shows-how	D,W
CO4	Adopt chromatography technique/method for analysis of medicinal plants	6	Experiential-Learning 7.4	PSY-MEC	Does	ML,DIS,JC,PER,L

Practical Training Activity

Practical Training 7.1 : Alternative parts and Substitute plant drugs from classical test.

1. Provide students with:
   i. Various plant samples, including alternative parts and substitutes.
   ii. Microscopes, slides, and other laboratory equipment.
2. Ask students to:
   i. Identify and describe the morphological and anatomical characteristics of alternative parts and substitute
      plant drugs.
   ii. Analyze the similarities and differences between the original and substitute plant drugs.

Practical Training 7.2 : Adulterants and substitutes in medicinal plants.

The teacher will demonstrate

1. Introduction: Introduction to alternative parts and substitute plant drugs, their importance, and challenges.
2. Sample Collection: Collection of plant samples, including alternative parts and substitute plant drugs.
3. Macroscopic Examination: Macroscopic examination of plant samples, including observation of morphological characteristics.
4. Microscopic Examination: Microscopic examination of plant samples, including observation of histological characteristics.
5. Chemical Analysis: Chemical analysis of plant samples using techniques such as TLC and HPLC.
6. Comparison: Comparison of alternative parts and substitute plant drugs with authentic plant materials

Practical Training 7.3 : Medicinal plants: standardization and estimation.

The teacher will demonstrate
Identification and quantification of bioactive compounds and markers.
1. Provide students with:
  i. Medicinal plant samples.
  ii. Laboratory equipment (e.g.TLC [chromatography]).
2. Ask students to:
  i. Extract and prepare medicinal plant samples for analysis.
  ii. Conduct standardization and estimation tests (e.g., TLC, HPLC, UV-Vis spectroscopy).
  iii.Calculate and interpret results.

Practical Training 7.4 : Chromatographic Analysis of Medicinal Plants.

  1. Introduction to chromatographic techniques (HPTLC, GLC)
  2. Sample preparation and extraction of medicinal plant samples.
  3. Chromatographic analysis of medicinal plant samples.
  4. Identification and quantification of bioactive compounds.

Experiential learning Activity

Experiential-Learning 7.1 : Classical knowledge: alternative parts and substitute plant drugs, in modern practice.

Debate and Discussion

1. Students will participate in a debate or discussion on the use of alternative parts and substitute plant drugs.

Clinical Correlation

2. Students will discuss the clinical applications of alternative parts and substitute plant drugs.
3. Formulation Development
4. Students will design and develop formulations using alternative parts and substitute plant drugs.

Experiential-Learning 7.2 : Hands-on approach to identifying adulterants and substitutes.

Students will analyze case studies of adulteration in medicinal plants and develop strategies for detection and prevention.

1. Examine medicinal plant samples and identify potential adulterants or substitutes based on visual characteristics.
2. Examine medicinal plant samples using microscopy and identify potential adulterants or substitutes based on microscopic characteristics.
3. Conduct chemical tests (e.g., TLC, colorimetric tests) on medicinal plant samples to detect potential adulterants or substitutes.
4. Analyze medicinal plant samples using chromatographic techniques (e.g., HPLC, GC) to detect potential adulterants or substitutes.

Experiential-Learning 7.3 : Analytical methods for medicinal plant Quality Control: A practical experience.

Students will evaluate the quality of medicinal plant samples using analytical methods and develop a quality control plan:

1. Collect and prepare medicinal plant samples for analysis.
2. Examine medicinal plant samples using macroscopic and microscopic techniques
3. Conduct physicochemical tests (e.g., moisture content, ash value, extractive value) on medicinal plant samples
4. Analyze medicinal plant samples using chromatographic techniques (e.g., TLC, HPLC)

Experiential-Learning 7.4 : Chromatography: Instrumental analysis of medicinal plants	

Lab Activity

1. Students will work in groups to analyze medicinal plant samples using different chromatographic techniques.
2. Each group will present their results and discuss the advantages and limitations of each technique.
3. Students will compare and contrast the results obtained from different techniques.

Journal Club Discussion

1. Comparison of chromatographic techniques for medicinal plant analysis.
2. Advantages and limitations of each technique.
3. Applications of chromatographic techniques in medicinal plant research.
4. Future directions in chromatographic analysis of medicinal plants.

Modular Assessment

Assessment method	Hour
Instructions—Conduct a structured modular assessment. The assessment will be for 50 marks. Keep a structured marking pattern. Use different assessment methods in each module for the semester. Keep a record of the structured pattern used for assessment. Calculate the Modular grade point as per Table 6C. Multiple-choice questions (10 marks) Analytical method identification (10 marks)	4

Short-answer questions (10 marks)
Application-based question (20 marks)
or
Any practical in converted form can be taken for assessment. (25 Marks)
and
 Any experiential as portfolio/reflections/presentations, can be taken as an assessment. (25 Marks)

3A Course Outcome	3B Learning Objective (At the end of the (lecture/practical training /experiential learning) session, the students should be able to)	3C Notional learning Hours	3D Lecture/ Practical Training/ Experiential Learning	3E Domain/ Sub Domain	3F Level (Does/Shows how/ Knows how/Know)	3G Teaching Learning Methods
Module 8 : Applied aspects of Bheshaja Pariksha, Prashasta Bheshaja and Bheshaja Prayoga						
Module Learning Objectives **(At the end of the module, the students should be able to)** 1. Discuss the importance of examining Ayurvedic drugs for quality, authenticity, and potency. 2. Identify the characteristics of good quality Ayurvedic drugs, including authenticity, purity, and potency. 3. Demonstrate safe and effective use of Ayurvedic drugs in clinical practice, including proper dosage, preparation, and administration.						
M 8 Unit 1 Bheshaja Parikshavidhi. Bheshaja Parikshavidhi. **References:** 30,31,32,33,34						
3A	**3B**	**3C**	**3D**	**3E**	**3F**	**3G**

3A	3B	3C	3D	3E	3F	3G
CO1,CO2	Describe the principles of Bheshaja Parikshavidhi and its application clinical practice and research.	1	Lecture	CC	Knows-how	FV,D,L&GD,L_VC,L
CO1,CO2	Demonstrate the examination of drugs with specific characteristics, their specific actions, grown in specific region, collection during specific season, collection at right time, preservation.	5	Practical Training 8.1	PSY-GUD	Shows-how	D-M,ML,DIS,FV,DG
CO1,CO2	Develop an appreciation for the specific characteristics of Ayurvedic drugs, regional and seasonal variations, preservation methods.	7	Experiential-Learning 8.1	AFT-VAL	Shows-how	DIS,FV,ML,PBL,D

M 8 Unit 2 Prashasthabheshaja Prashsthabheshaja

References: 30,31,32,33,34,36

3A	3B	3C	3D	3E	3F	3G
CO2	Explain the concept of Prashasta Bheshaja and its significance in Ayurvedic medicine.	2	Lecture	CC	Knows-how	LS,L,TPW,L_VC,L&GD
CO5	Demonstrate the preparation of different formulations of a single Ayurvedic drug and understand its application in various disease conditions.	5	Practical Training 8.2	PSY-GUD	Shows-how	DG,PER,D,DL
CO5	Appraise for preparing different formulations of Ayurvedic drugs and applying them in clinical practice through case studies and interpretation of findings.	6	Experiential-Learning 8.2	AFT-VAL	Shows-how	FV,ML,DIS,PrBL,PER

M 8 Unit 3 Bheshaja Marga and Sevanakala Bheshaja Marga and Sevanakala

References: 32,33,34,42

3A	3B	3C	3D	3E	3F	3G

3A	3B	3C	3D	3E	3F	3G
CO1	Discuss the concept of Bheshaja Marga and Sevanakala	1	Lecture	CC	Knows-how	L,TUT,L &PPT ,W,L_VC
CO1	Demonstrate different routes of administration of Ayurvedic medicines and their applications, and how to apply the concepts of Bheshaja Marga and Sevanakala in clinical practice.	5	Practical Training 8.3	PSY-GUD	Shows-how	PBL,W,D L,FV,DIS
CO1	Develop a deep understanding and appreciation for different routes of administration of Ayurvedic medicines and applying the concepts of Bheshaja Marga and Sevanakala in clinical practice.	7	Experiential-Learning 8.3	AFT-VAL	Shows-how	DL,FV,M L,DIS,D
CO6,CO7	Justify the importance of sustainable collection practices in medicinal plant harvesting.	2	Lecture	CE	Knows-how	JC,PER,D IS,TBL,L &PPT
CO6	Describe the extinct, endangered, vulnerable medicinal plant species:	1	Lecture	CC	Knows-how	L&GD,B L,L&PPT
CO7	Discuss good agricultural and collection practices with its principle,guidelines	1	Lecture	CC	Knows-how	L&GD,G BL

M 8 Unit 4 Matra, Anupana Matra, Anupana

References: 30,31,32,33,34,35,36,37,38,39

3A	3B	3C	3D	3E	3F	3G
CO1	Explain the clinical considerations of Matra and Anupana in Ayurvedic Practice.	2	Lecture	CC	Knows-how	L&GD,JC ,BL,L&P

						PT
CO1	Demonstrate a comprehensive and practical understanding of Matra (dosage) and Anupana (vehicle/substance) in Ayurvedic practice.	5	Practical Training 8.4	PSY-GUD	Shows-how	L&GD,L &PPT ,DIS,BL
CO1	Appraise the importance of matra (dosage) and Anupana (vehicle) in Ayurvedic medicine and apply this knowledge in clinical practice.	6	Experiential-Learning 8.4	AFT-VAL	Shows-how	DL,PER, D,FV,DIS

Practical Training Activity

Practical Training 8.1 : Examination and application of medicinal plants with specific characteristics.

1. Provide learners with medicinal plant samples with specific characteristics (e.g., grown in specific region, collected during specific season).
2. Ask learners to:

    i. Examine the plant samples and identify their characteristics.
    ii. Demonstrate the proper collection, preservation, and storage methods.
    iii. Discuss the importance of collection at the right time and administration in the right dose.

Practical Training 8.2 : Preparation of different formulations and its application

1. Selection of Ayurvedic Drug: Choose a single Ayurvedic drug (e.g., Haritaki) and prepare different formulations (e.g., Churna, Kwath, Ghrita,).
2. Preparation of Formulations: Demonstrate the preparation of each formulation, highlighting the specific techniques and ingredients used.

3. Application in Disease Conditions: Discuss the application of each formulation in various disease conditions, such as:

    i. Churna for digestive issues
    ii. Kwath for oral health
    iii. Ghrita for eye health

The teacher will demonstrate the how to select the most appropriate formulation of the Ayurvedic drug based on the disease condition, patient characteristics, and other factors.

Practical Training 8.3 : Ayurvedic medicine administration: Routes and Applications.

1. Demonstration of Routes: Demonstrate different routes of administration, such as:
    i. Oral (e.g., tablets, powders, decoctions)
    ii. External (e.g., topical application, nasya)
    iii. Rectal (e.g., basti)
    iv. Vaginal (e.g., yonibasti)
2. Applications and Case Studies: Discuss the applications of each route in various disease conditions,   using case studies to illustrate the concepts.
3. Sevanakala: Explain the principles of Sevanakala, and demonstrate how to apply them in clinical practice,   considering factors such as:
    i. Timing of administration (e.g., morning, evening, with food)
    ii. Disease condition and patient characteristics

Practical Training 8.4 : Matra and Anupana in Ayurvedic Practice.

1. Calculating Matra: Calculate the appropriate Matra for different Ayurvedic medicines, considering factors   such as:
    i. Patient's age, sex, desh, kal, bal and prakruti
    ii. Disease condition and severity
    iii. Medicine's potency and properties
2. Selecting Anupana: Select suitable Anupana for various Ayurvedic medicines, considering factors such   as:
    i. Enhancing efficacy

ii. Reducing side effects

iii. Patient's condition and needs

3. Practical Demonstration: Demonstrate the preparation and administration of Ayurvedic medicines with   appropriate Matra and Anupana.

4. Case Studies: Discuss case studies to illustrate the application of Matra and Anupana in clinical practice.

Experiential learning Activity

Experiential-Learning 8.1 : Appreciating Ayurvedic drug characteristics.

1. Scholars examine and identify Ayurvedic drugs based on their morphology, color, odor, and texture.
2. Participants conduct evaluation of Ayurvedic drugs to identify specific characteristics.
3. Participants collect Ayurvedic drugs from different regions to compare characteristics.
4. Participants study the impact of seasonal variations on Ayurvedic drug quality and potency.
5. Participants learn and practice different preservation methods, such as drying, freezing, or storing in airtight containers.

Experiential-Learning 8.2 : Exploring Ayurvedic Formulations: A Case Study Approach.

1. Group Project: Divide learners into groups to prepare different formulations of an Ayurvedic drug (e.g., Churna, Kwath, Ghrita, Tail, Vatika etc).
2. Case Studies: Assign case studies to each group, where they will apply the prepared formulations and document the outcomes.
3. Findings and Recommendations: Have each group present their findings and recommendations, highlighting the efficacy and safety of the formulations.
4. Peer Feedback: Encourage peer feedback and discussion to foster critical thinking and appreciation for Ayurvedic formulations.

Experiential-Learning 8.3 : Bheshaja Marga and Sevanakala in clinical practice.
1. Hands-on Training: Provide hands-on training to learners on different routes of administration, such as oral, topical, nasal, and rectal. 2. Case Studies: Use case studies to illustrate the application of Bheshaja Marga and Sevanakala in clinical practice. 3. Reflective Journaling: Have learners maintain a reflective journal to document their experiences, challenges, and insights.

Experiential-Learning 8.4 : Matra and Anupana: A Path to Effective Ayurvedic Practice
1. Case Study Discussion: Discuss case studies highlighting the impact of Matra and Anupana on treatment outcomes. 2. Reflective Journaling: Have learners maintain a reflective journal to document their thoughts and insights on Matra and Anupana. 3. Group Debate: Organize a group debate on the significance of Matra and Anupana in Ayurvedic medicine. 4. Clinical Application: Have students apply Matra and Anupana principles in clinical practice and share their experiences.

Modular Assessment

Assessment method	Hour
Instructions—Conduct a structured, modular assessment. The assessment will be for 50 marks. Keep a structured marking pattern. Use different assessment methods in each module for the semester. Keep a record of the structured pattern used for assessment. Calculate the Modular grade point as per Table 6C. Multiple-choice questions (25 marks) and Short-answer questions (25 marks) or Any practical in converted form can be taken for assessment. (25 Marks) and Any experiential as portfolio/reflections/presentations, can be taken as an assessment. (25 Marks)	4

	Paper No : 2 Applied Pharmacology in Dravyaguna

Semester No : 3

Module 9 : Pharmacology & Karma of Nadi and Twacha with contemporary correlation.

Module Learning Objectives
(At the end of the module, the students should be able to)

1. Illustrate Classical and practical implications of Karma in the context of Ayurveda and contemporary science.
2. Describe Classification, Mechanism of action, dose & side effects of relevant drugs mentioned in contemporary science
3. Analyse the scientific evidences supporting use of Ayurvedic herbs in Nervous system disorders.

M 9 Unit 1 Basic Prinicples of Pharmacology and Drug action in convetntional medicine Basic Principles of Pharmacology and Drug action in conventntional medicine

References: 42,84,85,88,91,92

3A	3B	3C	3D	3E	3F	3G
CO1	Elaborate the concepts of pharmacokinetics (absorption, distribution, metabolism, excretion)	2	Lecture	CC	Knows-how	C_L,L&PPT
CO1	Discus the concepts of pharmacokinetics (absorption, distribution, metabolism, excretion)	5	Experiential-Learning 9.1	AFT-RES	Shows-how	DIS,PER,L_VC
CO1	Apply Pharmacodynamics (the mechanisms of drug action including receptor binding, dose-response relationships)	2	Lecture	CC	Knows-how	C_L,L_VC,L&PPT
CO1	Discuss pharmacodynamics (the mechanisms of drug action including receptor binding, dose-response relationships)	5	Experiential-Learning 9.2	AFT-RES	Does	DIS,PER

3A	3B	3C	3D	3E	3F	3G
CO1	Discuss the concept of therapeutic index and margin of safety	6	Practical Training 9.1	PSY-SET	Shows-how	DL,D

M 9 Unit 2 Karmas of Nadi Samsthana (Nervous system). 1. Medhya (memory enhancement)

2. Madkari (narcotics)

3. Sangya sthapan

4. Nindrajana

5. Nindrahara

6. Vednasthapana (analgesics)

7. Apasmarahara (Antiepileptics)

8. Akshepshamana (anti convulsants)

9. Sanjnahara (Anaesthetics)

References: 33,34,42,77,84,85,88,91,92

3A	3B	3C	3D	3E	3F	3G
CO1	Analyse classical and practical implications of Karma of Nadi Sansthana in the context of Ayurveda & and its nearest euqivalent pharmacological actions in contemporary science.	3	Lecture	CC	Knows-how	BS,L&G D,L&PPT
CO1	Illustrate classical and practical implications of Karma in the context of Ayurveda & and its nearest euqivalent pharmacological actions in contemporary science.	6	Practical Training 9.2	PSY-SET	Shows-how	JC,SY,D G,DIS,D-M
CO1	Observe classical and practical implications of Karma in the context of Ayurveda & and its nearest euqivalent pharmacological actions in contemporary science.	7	Experiential-Learning 9.3	AFT-REC	Does	DG,DL,C _L,BS,DIS
CO1	Discuss Classification, Mechanism of action, dose & side effects of relevant drugs mentioned in contemporary science	2	Lecture	CC	Knows-how	L_VC,L&PPT
CO1,CO2	Demonstrate about Classification, Mechanism of action, dose & side effects of relevant drugs mentioned in contemporary science	6	Practical Training 9.3	PSY-SET	Shows-how	ML,JC,DA,DIS

| CO1,CO2 | Discuss about Classification, Mechanism of action, dose & side effects of relevant drugs mentioned in contemporary science | 6 | Experiential-Learning 9.4 | AFT-RES | Does | ML,JC,DIS,LS,PER |

M 9 Unit 3 Karma related to Twacha1. Swedana & Swedopaga (Diaphoretics)
2. Swedapanyana (Antidiaphoretics)
3. Romshatana (Depilatories)
4. Keshya (Hair tonics)
5. Vranhara (anti ulcer) -
6. Snehan and Snehopag (emollients)
7. Rukshana
8. Varnya (Complexion enhancer)
9. Kandughna (Antipruritic)
10. Kusthghna
11. Udardprashmana (Anti urticarial)
12. Rakshoghana (Antiseptics / Disinfectant)

References: 33,34,38,42,84,85,88,91,92

3A	3B	3C	3D	3E	3F	3G
CO1	Discuss classical and practical implications of Karma of Twacha in the context of Ayurveda & and its nearest euqivalent pharmacological actions in contemporary science	3	Lecture	CC	Knows-how	L&PPT,C_L,BS
CO1,CO2	Illustrate classical and practical implications of Karma of Twacha in the context of Ayurveda & and its nearest euqivalent pharmacological actions in contemporary science	6	Practical Training 9.4	PSY-SET	Shows-how	DG,JC,DL,DIS
CO1,CO2	Compare classical and practical implications of Karma of Twacha in the context of Ayurveda & and its nearest euqivalent pharmacological actions in contemporary science	8	Experiential-Learning 9.5	AFT-REC	Does	DL,C_L,BS,DG
CO1	Elaborate Classification, Mechanism of action, dose & side effects of relevant drugs mentioned in contemporary science	3	Lecture	CC	Knows-how	L&PPT,L
CO1,CO2	Demonstrate Classification, Mechanism of action, dose & side effects of relevant drugs mentioned in contemporary science related to Skin.	6	Practical Training 9.5	PSY-SET	Shows-how	JC,DL,DG,DIS

CO1,CO2	Observe about Classification, Mechanism of action, dose & side effects of relevant drugs mentioned in contemporary science related to Skin.	8	Experiential-Learning 9.6	AFT-REC	Does	DG,C_L, BS,DL

Practical Training Activity

Practical Training 9.1 :

- Therapeutic Index and margin of safety of Ayurvedic herbs in experimental modules

- Documenting insights from case studies
- Design experiment to determine the Therapeutic index and Margin of safety for Ayurvedic herbs
- Studying Pharmacokinetics by referring to various models.

Practical Training 9.2 : Orient correlation between Classical Karma with contemporary pharmacological actions with respect to Nadi Sansthana (Nervous System)

Conducting Phytochemical analysis on drugs used in Nadivaha Samsthana (Nervous System) to know mode of action.
Demo with videoclips pertaining to mode of actions drugs beneficial in Nadivaha Samsthana (Nervous System).
Understanding the mode of actions by studying treatment protocol followed in diseases related to Nadivaha Samsthana (Nervous System).

Practical Training 9.3 : Observe about Classification, Mechanism of action, dose & side effects

Conducting Phytochemical analysis on drugs used in Nadivaha Samsthana (Nervous System) to know mode of action.
Demo with videoclips pertaining to mode of actions drugs beneficial in Nadivaha Samsthana (Nervous System).
Understanding the mode of actions by studying treatment protocol followed in diseases related to Nadivaha Samsthana (Nervous System)

Practical Training 9.4 :

- Orientation on classical and practical implications of Karma of Twacha in the context of Ayurveda & and its nearest euqivalent pharmacological actions in contemporary science

- Conducting Phytochemical analysis on drugs used in Twacha (Skin) to know mode of action.
- Demo with videoclips pertaining to mode of actions drugs beneficial in Twacha (Skin).
- Understanding the mode of actions by studying treatment protocol followed in diseases related to Twacha (Skin).

Practical Training 9.5 :

- Orient about Classification, Mechanism of action, dose & side effects of relevant drugs mentioned in contemporary science related to Skin

- Conducting Phytochemical analysis on drugs used in Skin diseases to know mode of action.
- Demo with videoclips pertaining to mode of actions drugs beneficial in Skin diaseases.
- Understanding the mode of actions by studying treatment protocol followed in diseases related to Skin conditions.

Experiential learning Activity

Experiential-Learning 9.1 :

- Pharmacokinetics - ADME

- Virtual learning - Online Pharmacokinetic tutorials to be planned in class rooms
- Video clips to be shown on ADME- Pharmacokinnetics
- Developing models related to pharmacokinetics.
- Organizing discussions among groups made of PG Scholars.

Experiential-Learning 9.2 :

- Studying dose response relationship

- Virtual learning - Online Pharmacokinetic tutorials to be planned in class rooms
- Video clips to be shown on ADME- Pharmacokinnetics
- Developing models related to pharmacokinetics.
- Organizing discussions among groups made of PG Scholars.

Experiential-Learning 9.3 : Common and differentiating factors between Ayurveda and contemporary science in the context to Nadi Sansthna Karma

Brain Storming sessions on topics pertaining to Nadivaha Samsthana (Nervous system).

Showing videoclips pertaining to Nadivaha Samsthana (Nervous system).

Organizing Debate on different topics related to Nadivaha Samsthana (Nervous system)..

Group discussion by grouping PG Scholars.

Mobile learning to be planned by teachers by assigning topics related to Nadivaha Samsthana (Nervous system)..

Experiential-Learning 9.4 : Discussion, Mechanism of action, dose & side effects of relevant drugs mentioned in contemporary science

Showing videoclips pertaining to Nadivaha Samsthana (Nervous System).

Organizing Debate on different topics related to Nadivaha Samsthana (Nervous System).

Group discussion by grouping PG Scholars.

Mobile learning to be planned by teachers by assigning topics related to Nadivaha Samsthana (Nervous System).

Experiential-Learning 9.5 :

- Observe the classical and practical implications of Karma of Twacha in the context of Ayurveda & and its nearest euqivalent pharmacological actions in contemporary science

- Showing videoclips pertaining to Anatomy and Physiology of Twacha (Skin) .
- Organizing Debate on different topics related to twacha (Skin).
- Group discussion by grouping PG Scholars.
- Mobile learning to be planned by teachers by assigning topics related to Twacha (Skin).

Experiential-Learning 9.6 :

- Observe about Classification, Mechanism of action, dose & side effects of relevant drugs mentioned in contemporary science related to Skin.

- Showing videoclips pertaining to karma (Pharmacological action) related to skin.

- Brainstorming sessions on topics pertaining to Skin.
- Organizing Debate on different topics related to Skin.
- Group discussion by grouping PG Scholars.
- Mobile learning to be planned by teachers by assigning topics related to Skin.

Modular Assessment

Assessment method	Hour
Instructions - Conduct a structured Modular assessment. Assessment will be for 75 marks. Keep structured marking pattern. Use different assessment methods in each module for the semester. Keep record of the structured pattern used for assessment. Calculate the Modular grade point as per table. Case-based evaluation:Each student will be given a case scenario and the student will develop case sheet and treatment protocol by taking examples of Dravya having particular Karma (Pharmacological actions)- (25 Marks) Assessment is based on the effectiveness of the case developed and their interpretation. And Conducting written assessment on understanding, interpretation and utility of various Karma (Pharmacological actions) related to Nadivaha samsthana (Nervous system). (25 Marks) And Conducting written assessment on understanding, interpretation and utility of various Karma (Pharmacological actions) related to Twacha (Skin) (25 Marks). Or Conducting Quiz about Karma related to Nadivaha samsthana (Nervous system) and Twacha (Skin). (25 Marks) Or Arranging presentations about Karma related to Nadivaha samsthana (Nervous system) and Twacha (Skin). (25 Marks) or Any practical in converted form can be taken for assessment. (50 Marks) and Any experiential as portfolio/reflections/presentations, can be taken as an assessment. (25 Marks)	6

Module 10 : Karmas of the Prajanana Sansthana

Module Learning Objectives
(At the end of the module, the students should be able to)

Explore the Karmas of Prajanana Sansthana Like

1. Elaborate Classical and practical implications of Karma in the context of Ayurveda and contemporary science.
2. Describe Classification, Mechanism of action, dose & side effects of relevant drugs mentioned in contemporary science
3. Analyse the scientific evidences supporting use of Ayurvedic herbs in Prajanana Samsthana

M 10 Unit 1 Karmas of the Prajanan Sansthan1. Prajasthapana (Fetoprotection)

2. Vajikarana (Aphrodisiac)
3. Shukrajanana (Spermatogenic)
4. Garbhashaya uttejaka (Uterine Stimulants)
5. Garbhashaya sankochahara (Uterine relaxants)
6. Garbhanirodhaka (Contraception)
7. Artavajanaka (Emmanogogue)
8. Artavarodhaka (Anti-emmanogogue)

References: 33,34,38,40,41,42,77,84,85,88,91,92

3A	3B	3C	3D	3E	3F	3G
CO1	Analyse classical and practical aspects of Prajanana Samsthana Karma (Pharmacological Actions pertaining to Reproductive System) in the context of Ayurveda & and its nearest equivalent pharmacological actions in contemporary science.	3	Lecture	CAN	Knows-how	L_VC,L&PPT,L,L&GD
CO1,CO2	Perform phytochemical analysis of drugs used in Prajanana Samsthana Karma (Pharmacological Actions pertaining to Reproductive System) in the context of Ayurveda & and its nearest equivalent pharmacological actions in contemporary science.	5	Practical Training 10.1	PSY-GUD	Shows-how	CBL,DL,DG,BS,DIS
CO1,CO2	Justify classical and practical Aspect of Prajanana Samsthana Karma (Pharmacological	7	Experiential-	AFT-SET	Shows-	BL,ML,B

	Actions pertaining to Reproductive System) in the context of Ayurveda & and its nearest equivalent pharmacological actions in contemporary science.		Learning 10.1		how	S,CBL,DIS
CO1	Elaborate Classification, Mechanism of action, dose & side effects of relevant drugs mentioned in contemporary science.	2	Lecture	CC	Know	L,L&GD,BL,L_VC,L&PPT
CO1,CO2	Demonstrate Classification, Mechanism of action, dose & side effects of relevant drugs mentioned in contemporary science	5	Practical Training 10.2	CAP	Shows-how	DL,DIS,BS
CO1,CO2	Discuss about Classification, Mechanism of action, dose & side effects of relevant drugs mentioned in contemporary science	6	Experiential-Learning 10.2	AFT-RES	Shows-how	CBL,ML,DA,DIS,BS

Practical Training Activity

Practical Training 10.1 :

- Classical and practical aspects of Prajanana Samsthana Karma (Pharmacological Actions pertaining to Reproductive System) in the context of Ayurveda & and its nearest equivalent pharmacological actions in contemporary science.

- Performing Phytochemical analysis on drugs used in Prajanana Samsthana (Reproductive System)
- Teacher should demonstrate Physico chemical analysis of drugs used in Prajanana Samsthana (Reproductive System)

Practical Training 10.2 :

- Classification, Mechanism of action, dose & side effects of relevant drugs mentioned in contemporary science

- Teacher shall present the video clips on mechanism of actions pertaining to Reproductive System.
- Discussion on cases collected from hospital or on masked case sheets

Experiential learning Activity

Experiential-Learning 10.1 :

- Classical and practical Aspect of Prajanana Samsthana Karma (Pharmacological Actions pertaining to Reproductive System) in the context of Ayurveda & and its nearest equivalent pharmacological actions in contemporary science.

- Collecting the research articles related to pharmacological actions on Prajanana Samsthana (Reproductive System)
- Brain storming sessions by teachers on various topics related to Prajanana Samsthana (Reproductive System)

Experiential-Learning 10.2 :

- Classification, Mechanism of action, dose & side effects of relevant drugs mentioned in contemporary science

- Brainstorming sessions to be arranged to collect the information.

- Discussions among peer scholars regarding mechanism of action.
- Teacher should present the relevant video clips on mechanism of actions pertaining to Reproductiver System.

Modular Assessment

Assessment method	Hour
Assessment method Hours – 2 Instructions - Conduct a structured Modular assessment. Assessment will be for 25 marks per credit. Keep structured marking pattern. Use different assessment methods in each module for the semester. Keep record of the structured pattern used for assessment. Calculate the Modular grade point as per table. Conducting written assessment on understanding, interpretation and utility of various Karma (Pharmacological actions) related to Prajanana Samsthana (Reproductive system) (25 Marks) Or Arranging presentations about Karma related to Prajanana Samsthana (Reproductive system) (25 Marks). or Case-based evaluation: Each student will be given a case scenario and the student will develop case sheet and treatment protocol by taking examples of Dravya having particular Karma (Pharmacological actions).-(25 Marks) or Any practical in converted form can be taken for assessment. (25 Marks) or Any experiential as portfolio/reflections/presentations, can be taken as an assessment. (25 Marks)	2

Semester No : 4

Module 11 : Classical to contemporary aspects of Aushadha Dravya Part 3

Module Learning Objectives
(At the end of the module, the students should be able to)

    1. Identify and classify medicinal plants.

2. Describe the pharmacology of Medicinal plants based on Ayurveda and contemporary science.
3. Analyze the traditional and modern uses of medicinal plants.
4. Apply evidence-based research in clinical practice.

M 11 Unit 1 Dravya related to Sleshmahara (Chedana),Kasahara,Shwasahara and Kanthya karma Sleshmahara (Chedana)

1. Vibhitaka (*Terminalia belerica* Roxb.)

2. Vasa (*Adhatoda vasica* Nees.)

3. Talisa Patra (*Abbies webbiana* Lindle)

4. Lavanga (*Syzigium aromaticum* M.P.)

5. Twak (*Cinnamomum zeylanica Blume.)*

6. Yastimadhu (*Glycyrrhiza glabra* L.)

7. Gojihwa (*Onosma bracteatum* Wall.)

8. Bola (*Commiphora myrrh* Nees.)

9. Banafsha (*Viola odorata* L.)

Kasahara

1. Pippali (*Piper longum* L.)

2. Bruhati (*Solanum indicum* L.)
3. Kantakari (*Solanum xanthocarpum* S & W.)
4. Karkatshringi (*Pistacia integerrima* Stewart.)
5. Kasamarda (*Cassia occidentalis* L.)
6. Agastya (*Sesbania grandiflora* Poiret.)

Shwasahara

1. Shati (*Hedychium spicatum* Buch.)
2. Karchura (*Curcuma zedoria* Roscoe)
3. Pushkaramoola (*Inula racemosa* hook. F)
4. Bharangi (*Rotheca serratum* L.)
5. Dugdhika (*Euphorbia hirta* L.)
6. Somavalli (*Sarcostemma acidum* Roxb.)

Kanthya

1. Kulinjana (*Alpinia galanga* Willd.)
2. Tailaparna (*Eucalyptus globulus Labill.*)

References:
1,2,3,5,6,9,13,14,23,24,25,26,32,33,34,35,36,39,40,41,42,43,44,45,46,48,49,50,51,52,54,55,57,58,59,61,62,63,64,65,68,70,71,72,73,74,75,76,77,78,79,80,81,82,83,177

3A	3B	3C	3D	3E	3F	3G
CO1,CO2,CO5	Identify the plant & learn their Nama Rupa (Nomenclature& Morphology) and explain its Guna Karma (Classical properties & Actions)	3	Lecture	CC	Knows-how	L&GD,L_VC,L&PPT ,L
CO1,CO2,CO3,CO5,CO6,CO	Differentiate the plant & learn their Nama Rupa (Nomenclature& Morphology) and explain its Guna Karma (Classical properties & Actions)	5	Practical Training 11.1	PSY-GUD	Shows-how	DG,D-M,ML,DL,D

7						
CO1,CO2,CO3,CO5,CO6,CO7	Conduct the survey of plants & categorize on the basis of their Nama Rupa (Nomenclature& Morphology) and appreciate their Guna Karma (Classical properties & Actions)	7	Experiential-Learning 11.1	AFT-VAL	Does	FV,DG,D-M,ML,DIS
CO1,CO5,CO7	Elaborate therapeutic uses & formulations of medicinal plants, apply evidence-based research in clinical practices & pharmaceutical industry	2	Lecture	CC	Knows-how	L_VC,L&PPT,L,L&GD
CO1,CO2,CO3,CO4,CO6,CO7	Appraise therapeutic uses & formulations of medicinal plants, apply evidence-based research in clinical practices & pharmaceutical industry	5	Practical Training 11.2	PSY-MEC	Shows-how	DG,FV,ML,DIS,DL
CO1,CO2,CO3,CO5,CO6,CO7	Classify therapeutic uses & formulations of medicinal plants, apply evidence-based research in clinical practices & pharmaceutical industry	6	Experiential-Learning 11.2	AFT-VAL	Does	ML,DL,FV,D-M,W

M 11 Unit 2 Dravya related to Prajasthapana, Garbharodhaka, Garbhashayasankochaka, Artavajanana, Artavasangrahaniya, Stanyajanana, Stanyasangrahaniya and Stanyashodhana karma Prajasthapana

1. Durva (*Cynodon dactylon* Person,)

2. Kamala (*Nelumbo nucifera* Gaertn)

3. Kumuda (*Nymphea alba* L.)

4. Kasheruka (*Scirpus grossus* L.)

5. Shringataka (*Trapa bispinosa* Roxb.)

6. Putranjeevaka (*Putranjiva roxburghi* Roxb.)

Garbharodhaka

    7. Japa (*Hibiscus rosa-sinensis* L.)

Garbhashayasankochaka

    8. Ishvari (*Aristolochia indica* L.)

    9. Kalajaji (*Nigella sativa* L.)

    10. Karpasa (*Gossypium herbaceum* L.)

    11. Langali (*Gloriosa superba* L.)

    12. Kebuka (*Costus speciousus* L.)

    13. Haramala (*Peganum haramala* L.)

    14. Sadama (*Ruta graveolens* L.)

Artavajanana

    15. Pishacha karpasa (*Abroma angusta* L.f.)

    16. Vansha (*Bambusa bambos* (L.) Voss)

    17. Shana (*Crotolaria juncea* L.)

Artavasangrahaniya

18. Lodhra (*Symplocos racemosa* Roxb.)

19. Ashoka (*Saraca asoca* L.)

20. Patranga (*Caesalpinia sappan* L.)

Stanyajanana

21. Nala (*Arundo donax* L.)

22. Rohisha (*Cymbopogan martinii* Wats)

Stanyasangrahaniya

23. Mallika (*Jasminum officinale* L.)

Stanyashodhana

24. Patha (*Cissampelos pareira* L.)

References:
1,2,3,5,6,12,13,14,23,24,25,26,27,28,32,33,34,35,39,40,41,42,43,44,45,46,47,48,49,50,51,52,53,54,55,56,57,58,59,60,61,62,63,64,65,66,67,68,69,70,71,72,73,74,75,76,77,78,79,80,81,82,83,177

3A	3B	3C	3D	3E	3F	3G
CO1,CO5,CO7	Identify the plant & learn their Nama Rupa (Nomenclature& Morphology) and explain its Guna Karma (Classical properties & Actions)	3	Lecture	CC	Knows-how	L,L_VC, L&GD,L

						&PPT
CO1,CO2,CO3,CO5,CO6,CO7	Differentiate the plant & learn their Nama Rupa (Nomenclature& Morphology) and explain its Guna Karma (Classical properties & Actions)	5	Practical Training 11.3	PSY-GUD	Shows-how	JC,ML,FV,DIS
CO1,CO2,CO3,CO5,CO6,CO7	Conduct the survey of plants & categorize on the basis of their Nama Rupa (Nomenclature& Morphology) and appreciate their Guna Karma (Classical properties & Actions)	7	Experiential-Learning 11.3	AFT-VAL	Does	ML,D-M,DA,DIS,JC
CO1,CO5,CO7	Elaborate therapeutic uses & formulations of medicinal plants, apply evidence-based research in clinical practices & pharmaceutical industry	2	Lecture	CC	Knows-how	L&GD,L,L_VC,L&PPT
CO1,CO2,CO3,CO5,CO6,CO7	Appraise therapeutic uses & formulations of medicinal plants, apply evidence-based research in clinical practices & pharmaceutical industry	5	Practical Training 11.4	PSY-SET	Shows-how	DIS,DL,D-M,DA,DSN
CO1,CO2,CO3,CO5,CO6,CO7	Elaborate therapeutic uses & formulations of medicinal plants, apply evidence-based research in clinical practices & pharmaceutical industry.	6	Experiential-Learning 11.4	AFT-VAL	Does	FV,DIS,ML,JC

Practical Training Activity

Practical Training 11.1 :

- Identification of fresh herbs and dry specimens
- Pharmacognostical and Phytochemical analysis
- Preparing digital herbarium
- Clinical use of single drugs

- In campus & Out campus Garden visit under the supervision of the faculty
- Learning by visiting the Raw drug museums
- Collection of photographs
- Learn about Collection of useful parts and preservation
- Exploring Phyto constituents and their Pharmacological actions by using data bases (Minimum one each in every karma)

Practical Training 11.2 :

- Preparation of single drug remedies
- Segregating drug based on Grahya Agrahyatva
- Procurement of drug based on quality standards

- Preparing Panchavidha kashaya kalpana in lab
- Practical on Quality control methods in Dravyaguna Lab
- Collection of Dravya and their officinal parts
- Postings in Clinical setup

Practical Training 11.3 :

- Identification of fresh herbs and dry specimens
- Pharmacognostical and Phytochemical analysis
- Preparing digital herbarium
- Clinical use of single drugs

- In campus & Out campus Garden visit under the supervision of the faculty
- Learning by visiting the Raw drug museums
- Collection of photographs
- Learn about Collection of useful parts and preservation
- Exploring Phyto constituents and their Pharmacological actions by using data bases (Minimum one each in every karma)

Practical Training 11.4 :

- Preparation of single drug remedies
- Segregating drug based on Grahya Agrahyatva
- Procurement of drug based on quality standards

- Preparing Panchavidha kashaya kalpana in lab
- Practical on Quality control methods in Dravyaguna Lab
- Collection of Dravya and their officinal parts
- Postings in Clinical setup

Experiential learning Activity

Experiential-Learning 11.1 :

- Conducting Field survey
- Visitation to Garden

- Identification of fresh herbs and dry specimens

- Identify plants on the basis of key characters
- Observe and analyse use of single drugs & their formulations in clinical settings

Experiential-Learning 11.2 :

- Conducting Field survey
- Visitation to Garden
- Visit to pharmacy to identify, observe raw herbs and their formulations

- Presenting Case Study and discussing about single drug therapies.
- Group Discussions among PG scholars
- Visit to Ayurveda pharmaceutical industries to identify and acclamatize with raw materials.

Experiential-Learning 11.3 :

- Conducting Field survey
- Visitation to Garden
- Identification of fresh herbs and dry specimens

- Identify plants on the basis of key characters
- Observe and analyse use of single drugs & their formulations in clinical settings

Experiential-Learning 11.4 :

- Conducting Field survey
- Visitation to Garden
- Visit to pharmacy to identify, observe raw herbs and their formulations

- Presenting Case Studies on usage of single drug therapies.
- Group Discussions among PG scholars on various aspects of Medicinal Plants
- Visit to Ayurveda pharmaceutical industries

Modular Assessment

Assessment method	Hour
Instructions - Conduct a structured Modular assessment. Assessment will be for 50 marks. Keep a structured marking pattern. Utilize various assessment methods in each module throughout the semester. Keep a record of the structured pattern used for assessment. Calculate the Modular grade point as per the table. Written assessment on identification and Amayika prayoga of Dravya mentioned under Shwasana Samsthana (Respiratory system) (25 Marks) **And**	4

Written assessment on identification and Amayika prayoga of Dravya related to Stri Prajanana Sansthana (Female Reproductive System) (25 Marks)

OR

Conducting a quiz or multiple choice assessment on Dravya mentioned under Shwasana Samsthana (Respiratory system) (25 Marks)

and

Conducting a quiz or multiple choice assessment on Dravya related to Stri Prajanana Sansthana (Female Reproductive System) (25 Marks)

or

Any practical in converted form can be taken for assessment. (25 Marks)

and

Any experiential activity, such as a portfolio/reflections/presentations, can be taken as an assessment. (25 Marks)

Module 12 : Classical to contemporary aspects of Aushadha Dravya Part 4

Module Learning Objectives
(At the end of the module, the students should be able to)

1. Identify and classify medicinal plants.
2. Illustrate the pharmacology of Medicinal plants based on Ayurveda and contemporary science.
3. Analyze the traditional and modern uses of medicinal plants.
4. Apply evidence-based research in clinical practice.

M 12 Unit 1 Dravya related to Shukrajanan,Shukrashodhana and Shukrastambhana karma Shukrajanana

1. Mushali (*Chlorophytum borivilianum* Santapau)

2. Talamuli (*Curculigo orcheoides* Garten)

3. Shatavari (*Asparagus racemosus* Willd.)

4. Makhanna (*Euryale ferox* Salisb.)

5. Kokilaksha (*Asterecantha longifolia* Ness.)

6. Munjataka (*Orchis latifolia* L.)

7. Kapikachhu (*Mucuna pruriens* DC.)

8. Utangana (*Blepharis edulis* Forssk.)

Shukrashodhana

9. Kushtha (*Saussuria lappa* C.B. Clarke)

10. Katphala (*Myrica nagi* Thumb.)

Shukrastambhana
11. Akarakarabha (*Anacyclus pyrethrum* DC.)

References:
1,2,3,5,6,7,9,11,12,13,14,23,24,25,26,27,28,32,33,34,35,36,39,40,41,42,43,44,45,46,47,48,49,50,51,52,53,54,55,56,57,58,59,60,61,62,63,64,65,66,67,68,69,70,71,72,73,74,75,76,77,78,79,80,81,82,83,177

3A	3B	3C	3D	3E	3F	3G
CO1,CO2,CO5,CO7	Identify the plant & learn their Nama Rupa (Nomenclature& Morphology) and explain its Guna Karma (Classical properties & Actions)	3	Lecture	CC	Knows-how	L_VC,L, L&GD,L &PPT
CO1,CO2,CO3,CO5,CO6,CO7	Differentiate the plant & learn their Nama Rupa (Nomenclature& Morphology) and explain its Guna Karma (Classical properties & Actions)	6	Practical Training 12.1	PSY-GUD	Shows-how	DSN,DG, DL,FV,T BL
CO1,CO2,CO3	Conduct the survey of plants & categorize on the basis of their Nama Rupa	6	Experiential-	AFT-	Does	D,DL,PS

,CO5,CO6,CO7	(Nomenclature& Morphology) and appreciate their Guna Karma (Classical properties & Actions)		Learning 12.1	VAL		M,FV,PL
CO1,CO2,CO5,CO7	Elaborate therapeutic uses & formulations of medicinal plants, apply evidence-based research in clinical practices & pharmaceutical industry.	2	Lecture	CC	Knows-how	L,L&GD, L_VC,L& PPT
CO1,CO2,CO3,CO5,CO6,CO7	Appraise therapeutic uses & formulations of medicinal plants, apply evidence-based research in clinical practices & pharmaceutical industry.	4	Practical Training 12.2	PSY-SET	Shows-how	ML,SDL, DL,PSM, DIS
CO1,CO2,CO3,CO5,CO6,CO7	Justify therapeutic uses & formulations of medicinal plants, apply evidence-based research in clinical practices & pharmaceutical industry.	5	Experiential-Learning 12.2	AFT-SET	Does	TUT,ML, DIS,DL,FV

M 12 Unit 2 Dravya related to Mutravirechaniya, Mutrasangrahniya, Ashmaribhedana and Madhumehahara karma Mutravirechaniya

1. Punarnava (*Boerhavia diffusa* Linn.)

2. Gokshura (*Tribulus terrestris* Linn.)

3. Kusha (*Desmostachya bipinnata* Stap.)

4. Kasha (*Saccharum spontaneum* L.)

5. Shara (*Saccharum munja* L.)

6. Ikshu (*Saccharum officinarum* L.)

7. Bhumyamalaki (*Phyllanthus urinaria* L.)

8. Kankola (*Piper cubeba* L.)

9. Hapusha (*Juniperus communis* L.)

10. Ananas (*Ananas comosus* (L.) Merr)

11. Vandaka (*Dendrophthoe falcata* Ettingish)

12. Trapusha (*Cucumis sativus* L.)

Mutrasangrahniya

13. Jambu (*Eugenia jambolana* L.)

14. Amra (*Mangifera indica* L.)

15. Vata (*Ficus benghalensis* L.)

16. Udumbara (*Ficus racemosa* L.)

17. Ashwatha (*Ficus religiosa* L.)

18. Plaksha (*Ficus lacor* Buch. Hum)

19. Shala (*Shorea robusta* Gaertn)

20. Sarja (*Vateria indica* L.)

21. Dhawa (*Terminalia anogessiana* Gere & Boatwr)

22. Tinisha (*Ogenia dalbergioides* Benth.)

23. Ashmantaka (*Ficus rumphii* Blume)

24. Vikankata (*Flacourtia indica* L.Herit)

25. Kapeetana (*Albizia lebbeck* (L.) Benth)

Ashmaribhedana

26. Pashanabheda (*Berginia ligulata* Wall.)

27. Varuna (*Crataeva nurvala* Roxb.)

28. Kulatha (*Dolichos biflorus* L.)

29. Veerataru (*Dichrostachys cinerea* Wight)

30. Gorakshaganja (*Aerva lanata* Kuntze)

Madhumehahara

31. Beejaka (*Pterocarpus marsupium* L.)

32. Karavellaka (*Momordica charantia* L.)

33. Saptachakra (*Salacia chinensis* L.)

34. Bimbi (*Coccinia grandis* Voigt.)

References:

1,2,3,5,6,7,9,11,12,13,14,23,24,25,26,27,28,32,33,34,35,36,39,40,41,42,43,44,45,46,47,48,49,50,51,52,53,54,55,56,57,58,59,60,61,62,63,64,65,66,67,68,69,70,71,72,73,74, 75,76,77,78,79,80,81,82,83,177

3A	3B	3C	3D	3E	3F	3G
CO1,CO2,CO5,CO7	Identify the plant & learn their Nama Rupa (Nomenclature& Morphology) and explain its Guna Karma (Classical properties & Actions)	3	Lecture	CC	Knows-how	L&PPT , L&GD,L_VC,L
CO1,CO2,CO3,CO5,CO6,CO7	Differentiate the plant & learn their Nama Rupa (Nomenclature& Morphology) and explain its Guna Karma (Classical properties & Actions)	6	Practical Training 12.3	PSY-GUD	Shows-how	FV,DL,ML,DSN,DA
CO1,CO2,CO3,CO5,CO6,CO7	Conduct the survey of plants & categorize on the basis of their Nama Rupa (Nomenclature& Morphology) and appreciate their Guna Karma (Classical properties & Actions)	8	Experiential-Learning 12.3	AFT-VAL	Does	DIS,FV,ML,LS
CO1,CO2,CO5,CO7	Elaborate therapeutic uses & formulations of medicinal plants, apply evidence-based research in clinical practices & pharmaceutical industry	2	Lecture	CC	Knows-how	L_VC,L&PPT ,L,L&GD
CO1,CO2,CO3,CO5,CO6,CO7	Appraise therapeutic uses & formulations of medicinal plants, apply evidence-based research in clinical practices & pharmaceutical industry	4	Practical Training 12.4	PSY-SET	Shows-how	RLE,DL,FV,ML,JC
CO1,CO2,CO3,CO5,CO6,CO7	Justify therapeutic uses & formulations of medicinal plants, apply evidence-based research in clinical practices & pharmaceutical industry.	7	Experiential-Learning 12.4	AFT-REC	Does	DIS,ML,FV,DG,DL

Practical Training Activity

Practical Training 12.1 :

- Identification of fresh herbs and dry specimens
- Pharmacognostical and Phytochemical analysis
- Preparing digital herbarium
- Clinical use of single drugs

- In campus & Out campus Garden visit under the supervision of the faculty
- Learning by visiting the Raw drug museums
- Collection of photographs
- Learn about Collection of useful parts and preservation
- Exploring Phyto constituents and their Pharmacological actions by using data bases (Minimum one each in every karma)

Practical Training 12.2 :

- Preparation of single drug remedies
- Segregating drug based on Grahya Agrahyatva
- Procurement of drug based on quality standards

- Preparing Panchavidha kashaya kalpana in lab
- Practical on Quality control methods in Dravyaguna Lab
- Collection of Dravya and their officinal parts
- Postings in Clinical setup

Practical Training 12.3 :

- Identification of fresh herbs and dry specimens
- Pharmacognostical and Phytochemical analysis

- Preparing digital herbarium
- Clinical use of single drugs

- In campus & Out campus Garden visit under the supervision of the faculty
- Learning by visiting the Raw drug museums
- Collection of photographs
- Learn about Collection of useful parts and preservation
- Exploring Phyto constituents and their Pharmacological actions by using data bases (Minimum one each in every karma)

Practical Training 12.4 :

- Preparation of single drug remedies
- Segregating drug based on Grahya Agrahyatva
- Procurement of drug based on quality standards

- Preparing Panchavidha kashaya kalpana in lab
- Practical on Quality control methods in Dravyaguna Lab
- Collection of Dravya and their officinal parts
- Postings in Clinical setup

Experiential learning Activity

Experiential-Learning 12.1 :

- Conducting Field survey
- Visitation to Garden
- Identification of fresh herbs and dry specimens

- Identify plants on the basis of key characters
- Observe and analyse use of single drugs & their formulations in clinical settings

Experiential-Learning 12.2 :

- Conducting Field survey
- Visitation to Garden
- Visit to pharmacy to identify, observe raw herbs and their formulations

- Presenting Case Studies related to single drug therapies
- Group Discussions among PG scholars and topics should be assigned by teachers
- Visit to Ayurveda pharmaceutical industries
- Brain storming sessions on pertinant topics.
- Demo at Herbal garden.

Experiential-Learning 12.3 :

- Conducting Field survey
- Visitation to Garden
- Identification of fresh herbs and dry specimens

- Identify plants on the basis of key characters
- Observe and analyse use of single drugs & their formulations in clinical settings

Experiential-Learning 12.4 :

- Conducting Field survey
- Visitation to Garden
- Visit to pharmacy to identify, observe raw herbs and their formulations

- Demonostration in Herbal Garden
- Presentation of Case Studies on single drug therapies
- Group Discussions among PG Scholars
- Visit to Ayurveda pharmaceutical industries

Modular Assessment	
Assessment method	**Hour**
Instructions - Conduct a structured Modular assessment. Assessment will be for 50 marks. Keep a structured marking pattern. Utilize various assessment methods in each module throughout the semester. Keep a record of the structured pattern used for assessment. Calculate the Modular grade point as per the table. Written assessment on identification and Amayika prayoga of Dravya related to Purusha-Prajanana Samsthana (Male Reproductive System) (25 Marks) And Written assessment on identification and Amayika prayoga of Dravya related to Mutrvaha samsthana (Urinary Reproductive System) (25 Marks) or Conducting a quiz or multiple choice assessment on Dravya mentioned under Purusha-Prajanana Samsthana (Male Reproductive System) (25 Marks) and Conducting a quiz or multiple choice assessment on Dravya related to Mutrvaha samsthana (Urinary Reproductive System) (25 Marks) or Any practical in converted form can be taken for assessment. (25 Marks) and Any experiential activity, such as a portfolio/reflections/presentations, can be taken as an assessment. (25 Marks)	4

Semester No : 5

Module 13 : Karmas of the Pachana samsthana, Yakrit and Pliha.

Module Learning Objectives
(At the end of the module, the students should be able to)

1. Illustrate Classical and practical implications of Karma in the context of Ayurveda and contemporary science.
2. Describe Classification, Mechanism of action, dose & side effects of relevant drugs mentioned in contemporary science
3. Analyse the scientific evidences supporting use of Ayurvedic herbs in Digestive system, liver and spleen disorders.

M 13 Unit 1 Karmas of the Yakrit and Pliha 1. Yakrudrogahara (Hepatoprotective & Hepatocurative)

2. Plihavriddhihara

References: 33,34,38,42,77,84,85,88,91,92

3A	3B	3C	3D	3E	3F	3G
CO1	Analyse classical and practical aspects of Karma related to Yakrut and Pleeha (liver and spleen) in the context of Ayurveda & and its nearest euqivalent pharmacological actions in contemporary science.	2	Lecture	CC	Knows-how	L_VC,L&GD,BS,L, L&PPT
CO1,CO2	Perform phyotchemcial analysis of drugs used in Yakrut (liver) and Pleeha (spleen) in the context of Ayurveda & and its nearest euqivalent pharmacological actions in contemporary science.	4	Practical Training 13.1	PSY-SET	Shows-how	DIS,JC,DL,D-M,SY
CO1,CO2	Justifyclassical and practical implications of Karma of Yakrut (liver) and Pleeha (spleen) in the context of Ayurveda & and its nearest euqivalent pharmacological actions in contemporary science.	4	Experiential-Learning 13.1	AFT-REC	Does	C_L,BS, DG,DIS, DL
CO1	Elaborate Classification, Mechanism of action, dose & side effects of relevant drugs related to Yakrut (Liver) and Pleeha (Spleen) mentioned in contemporary science.	3	Lecture	CC	Knows-how	L_VC,L&PPT ,L,L&GD
CO1,CO2	Perform phyotchemcial analysis of drugs used in Yakrut (Liver) and Pleeha (Spleen) mentioned in contemporary science and Classification, Mechanism of action, dose & side effects of relevant drugs related to it	6	Practical Training 13.2	PSY-SET	Shows-how	DA,ML,JC,DIS
CO1,CO2	Discuss about Classification, Mechanism of action, dose & side effects of relevant drugs related to Yakrut (Liver) and Pleeha (Spleen) mentioned in contemporary science	9	Experiential-Learning 13.2	AFT-REC	Does	PL,PER,LS,DIS,ML

M 13 Unit 2 Karmas of the Pachansansthana1. Deepana (Appetizer)

2. Pachana (Digestion)

3. Triptighna (Antisatiative)

4. Vamaka (Emetic)

5. Chardighna (Antiemetic)

6. Anulomana (Carminative)

7. Sramsana (Laxative)

8. Bhedana (Choleretics / Purgative)

9. Rechana (Hydrogogue purgatives)

10. Grahi (Antidiarrhoeal – Absorptive)

11. Stambhana (Purisha Stambhana – Antidiarrhoeal)

12. Kirmighna (Anthelmintic, Antifungal, Antiviral & Antibiotics)

13. Amlapittahara (Anatcids)

References: 33,34,38,42,84,85,88,92

3A	3B	3C	3D	3E	3F	3G
CO1,CO2	Perform phyotchemcial analysis of drugs used in Pachana Sansthna (Digestive System) in the context of Ayurveda & and its nearest euqivalent pharmacological actions in contemporary science.	4	Practical Training 13.3	PSY-SET	Shows-how	D,JC,DG, DL,DIS
CO1	Analyse classical and practical aspects of Karma of Pachana Sansthan (Digestive System) in the context of Ayurveda & and its nearest euqivalent pharmacological actions in contemporary science.	2	Lecture	CC	Knows-how	L&PPT , L&GD,B S,L
CO1,CO2	Justify classical and practical Aspect of Karma of Pachana Sansthna (Digestive System) in the context of Ayurveda & and its nearest euqivalent pharmacological actions in contemporary science.	4	Experiential-Learning 13. 3	AFT-RES	Does	DIS,DG, DL,C_L, BS
CO1	Elaborate Classification, Mechanism of action, dose & side effects of relevant drugs of Digestive System mentioned in contemporary science.	3	Lecture	CC	Knows-how	L,L&PPT ,L_VC
CO1,CO2	Perform phyotchemcial analysis of drugs used in Digestive System mentioned in contemporary science and Classification, Mechanism of action, dose & side effects	6	Practical Training 13.4	PSY-SET	Shows-how	JC,ML,DI S,DA
CO1,CO2	Discuss about Classification, Mechanism of action, dose & side effects of relevant drugs of Digestive System mentioned in contemporary science	9	Experiential-Learning 13.	AFT-RES	Does	JC,ML,L_ VC,LS,DI

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Practical Training Activity

Practical Training 13.1 :

- Correlation between Classical Karma with contemporary pharmacological actions with respect to Yakrut (liver) and Pleeha (spleen)

- Conducting Phytochemical analysis on drugs used in Yakrut (Liver) & Pleeha (Spleen) to know mode of action.
- Demo with videoclips pertaining to mode of actions drugs beneficial in Yakrut (Liver) & Pleeha (Spleen).
- Understanding the mode of actions by studying treatment protocol followed in diseases related to Yakrut (Liver) & Pleeha (Spleen).

Practical Training 13.2 :

- Classification, Mechanism of action, dose & side effects of relevant drugs mentioned in contemporary science related to Yakrut (Liver) and Pleeha (Spleen)

- Conducting Phytochemical analysis on drugs used in Yakrut and Pleeha to know mode of action.
- Demo with videoclips pertaining to mode of actions drugs beneficial in Liver and Spleen.
- Understanding the mode of actions by studying treatment protocol followed in diseases related to Liver & Spleen.

Practical Training 13.3 : Correlation between Classical Karma with contemporary pharmacological actions with respect to Pachan Sansthana (Digestive System)

- Conducting Phytochemical analysis on drugs having karma related to Pachana Samsthana.(Digestive System) to know mode of action.
- Demo with videoclips pertaining to mode of actions drugs beneficial in Digestive System.
- Understanding the mode of actions by studying treatment protocol followed in diseases related to Digestive system.

Practical Training 13.4 :

- Classification, Mechanism of action, dose & side effects
- Making of Charts on mode of actions of drugs

- Conducting Phytochemical analysis on drugs used in Digestive System to know mode of action.
- Demo with videoclips pertaining to mode of actions drugs beneficial in Digestive System.
- Understanding the mode of actions by studying treatment protocol followed in diseases related to Digestive system.

Experiential learning Activity

Experiential-Learning 13.1 :

- Common and differentiating factors between Ayurveda and contemporary science in the context to Yakrut (liver) and Pleeha (spleen)

- Showing videoclips pertaining to Yakrat (Liver) & Pleeha (Spleen).
- Organizing Debate on different topics related to Yakrut (Liver) & Pleeha (Spleen).
- Group discussion by grouping PG Scholars.
- Mobile learning to be planned by teachers by assigning topics related to Yakrut (Liver) & Pleeha (Spleen).

Experiential-Learning 13.2 :

- Classification, Mechanism of action, dose & side effects of relevant drugs mentioned in contemporary science related to Yakrut (Liver) and Pleeha (Spleen).

- Showing videoclips pertaining to Yakrut (Liver) & Pleeha (Spleen).
- Organizing Debate on different topics related to Liver & Spleen
- Group discussion by grouping PG Scholars.
- Mobile learning to be planned by teachers by assigning topics related to Liver and Spleen.

Experiential-Learning 13.3 :

- Common and differentiating factors between Ayurveda and contemporary science in the context to Pachana Sansthna (Digestive System)

- Showing videoclips pertaining to Pachana Samsthana (Digestive System).
- Organizing Debate on different topics related to Pachana Samsthana (Digestive System).

- Group discussion by grouping PG Scholars.
- Mobile learning to be planned by teachers by assigning topics related to Pachana Samsthana (Digestive System).

Experiential-Learning 13.4 :

- Classification, Mechanism of action, dose & side effects of relevant drugs mentioned in contemporary science

- Showing videoclips pertaining to Pachana Samsthana (Digestive System).
- Organizing Debate on different topics related to Samsthana (Digestive System).
- Group discussion by grouping PG Scholars.
- Mobile learning to be planned by teachers by assigning topics related to Samsthana (Digestive System)..

Modular Assessment

Assessment method	Hour
Instructions - Conduct a structured Modular assessment. Assessment will be for 50 marks. Keep structured marking pattern. Use different assessment methods in each module for the semester. Keep record of the structured pattern used for assessment. Calculate the Modular grade point as per table. Case-based evaluation: (25 Marks) Each student will be given a case scenario and the student will develop case sheet and treatment protocol by taking examples of Dravya having particular Karma (Pharmacological actions). Assessment is based on the effectiveness of the case developed and their interpretation. and Conducting written assessment on understanding, interpretation and utility of various Karma (Pharmacological actions) related to) Yakrut (Liver) & Pleeha (Spleen). (25 Marks) or	4

Conducting written assessment on understanding, interpretation and utility of various Karma (Pharmacological actions) related to Pachana Samsthana (Digestive System). (25 Marks)
 Or
Conducting Quiz about Karma related to Yakrit (Liver) and Pleeha (Spleen). (25 Marks)
Or
Conducting Quiz about Karma related to Pachana Samsthana (Digestive System). (25 Marks)
Or
Conducting Presentations about Karma related to Yakrit (Liver) and Pleeha (Spleen). (25 Marks)
Or
Conducting Presentations about Karma related to Pachana Samsthana (Digestive System). (25 Marks)
or
Any practical in converted form can be taken for assessment. (25 Marks)
and
Any experiential as portfolio/reflections/presentations, can be taken as an assessment. (25 Marks)

Module 14 : Karmas related to Sarvadehika, Mutrvaha samsthana and Dhatu karma.

Module Learning Objectives
(At the end of the module, the students should be able to)

1. Illustrate Classical and practical implications of Karma in the context of Ayurveda and contemporary science.
2. Describe Classification, Mechanism of action, dose & side effects of relevant drugs mentioned in contemporary science
3. Analyse the scientific evidences supporting use of Ayurvedic herbs in Urinary system, Actions related to whole body and Actions related to tissues.

M 14 Unit 1 Sarvadehika Karmas

1. Jawarghna (Antipyretic)
2. Vishamajvaraghna (Antimalarial)

References: 32,33,34,38,42,77,84,85,88,91

3A	3B	3C	3D	3E	3F	3G
CO1	Analyse classical and practical aspects of Sarvadaihik Karma (Pharmacological Actions affecting whole body) in the context of Ayurveda & and its nearest euqivalent pharmacological actions in contemporary science.	1	Lecture	CC	Knows-how	L&GD,BS,L,L&PPT
CO1,CO2	Perform phyotchemcial analysis of drugs used in Sarvadaihik Karma (Pharmacological Actions affecting whole body) in the context of Ayurveda & and its nearest euqivalent pharmacological actions in contemporary science.	1	Practical Training 14.1	PSY-SET	Shows-how	D,JC,SY,D-M,DG
CO1,CO2	Justify classical and practical Aspect of Sarvadaihik Karma (Pharmacological Actions affecting whole body) in the context of Ayurveda & and its nearest euqivalent pharmacological actions in contemporary science.	2	Experiential-Learning 14.1	AFT-RES	Shows-how	BS,DG,C_L,DIS,DL
CO1	Elaborate Classification, Mechanism of action, dose & side effects of relevant drugs mentioned in contemporary science.	1	Lecture	CK	Know	L&PPT,L,L_VC
CO1,CO2	Perform phyotchemcial analysis of drugs used in Sarvadaihika Karma, Classification, Mechanism of action, dose & side effects of relevant drugs mentioned in contemporary science	3	Practical Training 14.2	PSY-SET	Shows-how	DIS,JC,ML,DA
CO1,CO2	Discuss about Classification, Mechanism of action, dose & side effects of relevant drugs mentioned in contemporary science	4	Experiential-Learning 14.2	AFT-RES	Shows-how	PL,LS,ML,JC,L_VC

M 14 Unit 2 Karmas of Mutrvahsansthana1. Mutrvirechanya (Diuretics)

2. Mutrvirajnya

3. Ashmaribhedana

4. Mutrsangrahaniya (Antidiuretics)

References:

3A	3B	3C	3D	3E	3F	3G
CO1,CO2	Discuss classical and practical aspects of Karma of Mutravaha Sansthana (Urinary	2	Practical	PSY-SET	Shows-	JC,DL,D,

	System) in the context of Ayurveda & and its nearest euqivalent pharmacological actions in contemporary science.		Training 14.3		how	D-M,DIS
CO1	Analyse classical and practical aspects of Karma of Mutravaha Sansthan (Urinary System) in the context of Ayurveda & and its nearest euqivalent pharmacological actions in contemporary science.	1	Lecture	CC	Knows-how	L&GD,L &PPT ,L
CO1,CO2	Justify classical and practical Aspect of Karma of Mutravaha Sansthana (Urinary System) in the context of Ayurveda & and its nearest euqivalent pharmacological actions in contemporary science.	3	Experiential-Learning 14. 3	AFT-RES	Does	DIS,DG, C_L,BS, DL
CO1	Elaborate Classification, Mechanism of action, dose & side effects of relevant drugs of Urinary System mentioned in contemporary science.	3	Lecture	CC	Knows-how	L&PPT ,L,L_VC
CO1,CO2	Perform phyotchemcial analysis of drugs used in Mutravaha Samsthana (Urinary System), Classification, Mechanism of action, dose & side effects of relevant drugs mentioned in contemporary science	6	Practical Training 14.4	PSY-SET	Shows-how	ML,JC,DIS,DA
CO1,CO2	Discuss about Classification, Mechanism of action, dose & side effects of relevant drugs of Urinary System mentioned in contemporary science	7	Experiential-Learning 14. 4	AFT-RES	Does	JC,LS,L_VC,DIS,PER

M 14 Unit 3 Dhatu karmas, Srotas Dhatukarma

1. Brimhana (Bulk promotive)
2. Langhana
3. Medohara (Antihyperlipidemic)
4. Madhumehahara (Anti Diabetic)

Karma related to Srotas

1. Abhishyandi
2. Pramathi

References: 30,31,32,33,34,38,42,77,84,85,88,91,92

3A	3B	3C	3D	3E	3F	3G

CO1	Analyse classical and practical aspects of Karma related to Dhatus (Tissues) and Strotas in the context of Ayurveda & and its nearest euqivalent pharmacological actions in contemporary science.	1	Lecture	CC	Knows-how	BS,L&GD,L&PPT,L
CO1,CO2	Perform phyotchemcial analysis of drugs used in Karma related to Dhatus (Tissues) and Strotas in the context of Ayurveda & and its nearest euqivalent pharmacological actions in contemporary science.	2	Practical Training 14.5	PSY-SET	Shows-how	DG,D-M,DIS,D,JC
CO1,CO2	Justify classical and practical Aspect of Dhatus (Tissue) and Strotas.in the context of Ayurveda & and its nearest euqivalent pharmacological actions in contemporary science.	3	Experiential-Learning 14.5	AFT-RES	Shows-how	DIS,C_L,BS,DG,DL
CO1	Elaborate Classification, Mechanism of action, dose & side effects of relevant drugs mentioned in contemporary science.	3	Lecture	CK	Know	L,L&GD,L&PPT,L_VC
CO1,CO2	Perform phyotchemcial analysis of drugs used in Dhatu Karma,Orient about Classification, Mechanism of action, dose & side effects of relevant drugs mentioned in contemporary science	6	Practical Training 14.6	PSY-SET	Shows-how	DA,DIS,BS,JC
CO1,CO2	Discuss about Classification, Mechanism of action, dose & side effects of relevant drugs mentioned in contemporary science	7	Experiential-Learning 14.6	AFT-RES	Does	ML,BS,PER,DIS,L_VC

Practical Training Activity

Practical Training 14.1 :

- Orient correlation between Classical Karma with contemporary pharmacological actions with respect to Sarvadaihik Karma (Pharmacological Actions affecting whole body)

- Conducting Phytochemical analysis on drugs used in Sarvadaihik Karma (Pharmacological Actions affecting whole body) to know mode of action.
- Demo with videoclips pertaining to mode of actions drugs beneficial in Sarvadaihik Karma (Pharmacological Actions affecting whole body).
- Understanding the mode of actions by studying treatment protocol followed in diseases related to Sarvadaihik Karma (Pharmacological Actions affecting whole body)

Practical Training 14.2 :

- Observe about Classification, Mechanism of action, dose & side effects
- Making of Charts on mode of actions of drugs

- Conducting Phytochemical analysis on drugs used in Sarvadaihika Karma to know mode of action.
- Demo with videoclips pertaining to mode of actions drugs beneficial in Sarvadaihika Karma
- Understanding the mode of actions by studying treatment protocol followed in diseases related to Sarvadaihika Karma

Practical Training 14.3 : correlation between Classical Karma with contemporary pharmacological actions with respect to Mutravaha Sansthana (Urinary System)

- Conducting Phytochemical analysis on drugs used in Mutravaha Sansthana (Urinary System) to know mode of action.
- Demo with videoclips pertaining to mode of actions drugs beneficial in Mutravaha Sansthana (Urinary System)
- Understanding the mode of actions by studying treatment protocol followed in diseases related to Mutravaha Sansthana (Urinary System)

Practical Training 14.4 : Classification, Mechanism of action, dose & side effects of relevant drugs mentioned in contemporary science related to Urinary System.

- Conducting Phytochemical analysis on drugs used in Mutravaha Samsthana (Urinary System) to know mode of action.
- Demo with videoclips pertaining to mode of actions drugs beneficial in Mutravaha Samsthana (Urinary System)
- Understanding the mode of actions by studying treatment protocol followed in diseases related to Mutravaha Samsthana (Urinary System)

Practical Training 14.5 :

- Correlation between Classical Karma with contemporary pharmacological actions with respect t Dhatus (Tissues) and Strotas

- Conducting Phytochemical analysis on drugs used in Dhatu Karma (Action on tissue) & Srotas (Channels) to know mode of action.
- Demo with videoclips pertaining to mode of actions drugs beneficial in Dhatu Karma (Action on tissue) & Srotas (Channels)
- Understanding the mode of actions by studying treatment protocol followed in diseases related to Dhatu Karma (Action on tissue) & Srotas (Channels)

Practical Training 14.6 :

- Mutravaha Samsthana (Urinary System) of Dhatu Karma, Classification, Mechanism of action, dose & side effects of relevant drugs mentioned in contemporary science related to Dhatus(Tissues) and Strotas.

- Conducting Phytochemical analysis on drugs used in Dhatu Karma (Actions related to Tissue) & Srotas (Channels) to know mode of action.
- Demo with videoclips pertaining to mode of actions drugs beneficial in Dhatu Karma (Actions related to Tissue) & Srotas (Channels)

- Understanding the mode of actions by studying treatment protocol followed in diseases related to Dhatu Karma (Actions related to Tissue) & Srotas (Channels)

Experiential learning Activity

Experiential-Learning 14.1 :

- Discuss the common and differentiating factors between Ayurveda and contemporary science in the context to Sarvadaihik Karma (Pharmacological Actions affecting whole body)

- Showing videoclips pertaining to Sarvadaihik Karma (Pharmacological Actions affecting whole body)
- Organizing Debate on different topics related to Sarvadaihik Karma (Pharmacological Actions affecting whole body)
- Group discussion by grouping PG Scholars.
- Mobile learning to be planned by teachers by assigning topics related to Sarvadaihik Karma (Pharmacological Actions affecting whole body)

Experiential-Learning 14.2 :

- Discuss and learn about Classification, Mechanism of action, dose & side effects of relevant drugs mentioned in contemporary science

- Showing videoclips pertaining to Sarvadaihika Karma
- Organizing Debate on different topics related to Sarvadaihika Karma
- Group discussion by grouping PG Scholars.

- Mobile learning to be planned by teachers by assigning topics related to Sarvadaihika Karma.

Experiential-Learning 14.3 :

- Discuss the common and differentiating factors between Ayurveda and contemporary science in the context to Mutravaha Sansthana (Urinary System)

- Showing videoclips pertaining to Mutravaha Sansthan (Urinary System)
- Organizing Debate on different topics related to Mutravaha Sansthan (Urinary System)
- Group discussion by grouping PG Scholars.
- Mobile learning to be planned by teachers by assigning topics related to Mutravaha Sansthan (Urinary System).

Experiential-Learning 14.4 :

- Discuss about Classification, Mechanism of action, dose & side effects of relevant drugs of Urinary System mentioned in contemporary science

- Showing videoclips pertaining to Mutravaha Samsthana (Urinary System)
- Organizing Debate on different topics related to Mutravaha Samsthana (Urinary System)
- Group discussion by grouping PG Scholars.
- Mobile learning to be planned by teachers by assigning topics related to Mutravaha Samsthana (Urinary System).

Experiential-Learning 14.5 :

- Common and differentiating factors between Ayurveda and contemporary science in the context to Dhatus (Tissue) and Strotas.

- Showing videoclips pertaining to Dhatu Karma (Action on Tissue) & Srotas (Channels).
- Organizing Debate on different topics related to Dhatu Karma (Action on Tissue) & Srotas (Channels).
- Group discussion by grouping PG Scholars.
- Mobile learning to be planned by teachers by assigning topics related to Dhatu Karma (Action on Tissue) & Srotas (Channels).

Experiential-Learning 14.6 :

- Discuss and learn about Classification, Mechanism of action, dose & side effects of relevant drugs mentioned in contemporary science

- Showing videoclips pertaining to Dhatu Karma (Actions related to tissues) and On Srotas (Channels).
- Organizing Debate on different topics related to Dhatu Karma (Actions related to tissues) and On Srotas (Channels).
- Group discussion by grouping PG Scholars.
- Mobile learning to be planned by teachers by assigning topics related to Dhatu Karma (Actions related to tissues) and On Srotas (Channels)..

Modular Assessment	
Assessment method	**Hour**
Instructions - Conduct a structured Modular assessment. Assessment will be for 50 marks . Keep structured marking pattern. Use different assessment methods in each module for the semester. Keep record of the structured pattern used for assessment. Calculate the Modular grade point as per table. Case-based evaluation: (25 Marks) Instructions - Conduct a structured Modular assessment. Assessment will be for 25 marks per credit. Keep structured marking pattern. Use different assessment methods in each module for the semester. Keep record of the structured pattern used for assessment. Calculate the Modular grade point as per table. Case-based evaluation: Each student will be given a case scenario and the student will develop case sheet and treatment protocol by taking examples of Dravya having particular Karma (Pharmacological actions).Assessment is based on the effectiveness of the case developed and their interpretation.-(25 Marks) and Conducting written assessment on understanding, interpretation and utility of various Karma (Pharmacological actions) related to Sarvadaihika Karmas. (25 Marks) or Conducting written assessment on understanding, interpretation and utility of various Karma (Pharmacological actions) related to Mutrvahsamsthana (Urinary Tract System . (25 Marks) or Conducting written assessment on understanding, interpretation and utility of various Karma (Pharmacological actions) related to Dhatu karmas & Srotas. (25 Marks) Or Conducting Quiz about Karma related to Sarvadaihika Karmas. (25 Marks) Or Conducting Quiz about Karma related to Mutrvahsamsthana (Urinary Tract System). (25 Marks) Or Conducting Quiz about Karma related to Mutrvahsamsthana Dhatu karmas & Srotas (25 Marks) Or Conducting Presentations about Karma related to Sarvadaihika Karmas (25 Marks) Or Conducting Presentations about Karma related to Mutrvahsamsthana (Urinary Tract System).	4

(25 Marks)

Or

Conducting Presentations about Karma related to Dhatu karmas & Srotas-(25 Marks)

or

Any practical in converted form can be taken for assessment. (25 Marks)

and

Any experiential as portfolio/reflections/presentations, can be taken as an assessment. (25 Marks)

Semester No : 6

Module 15 : Karmas of the Raktavaha Sansthana,Rasavahsansthana, Shwasansansthana

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Module Learning Objectives

(At the end of the module, the students should be able to)

1. Illustrate Classical and practical implications of Karma in the context of Ayurveda and contemporary science.
2. Describe Classification, Mechanism of action, dose & side effects of relevant drugs mentioned in contemporary science.
3. Analyse the scientific evidences supporting use of Ayurvedic herbs in Raktavaha(Cardiovascular) , Rasavaha and Shwasana Sansthana (Respiratory system) with contemporarymedical science

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M 15 Unit 1 Karmas of the Raktavaha Sansthana1. Hirdya (Cardiotonic / Antianginal)

2. Raktbharashamaka (Antihypertensive)

3. Raktavardhaka (Haematenics)

4. Raktastambhaka / Shonita Sanghatakara(Coagulants)

5. Raktasanghatahara (Anticoagulants)

References: 30,31,32,33,34,38,42,77,84,85,88,91,92

3A	3B	3C	3D	3E	3F	3G
CO1	Analyse classical and practicalimplications of Karma ofRaktavaha	2	Lecture	CC	Knows-	L&GD,L

3A	3B	3C	3D	3E	3F	3G
	sansthana(Cardiovascular System) in thecontext of Ayurveda & and itsnearest equivalentpharmacological actions incontemporary science				how	_VC,L&PPT ,L
CO1,CO2	Analyse classical and practicalimplications of Karma ofRaktavaha sansthana(Cardiovascular System) in thecontext of Ayurveda & and itsnearest equivalentpharmacological actions incontemporary science	4	Practical Training 15.1	PSY-SET	Shows-how	D-M,SY,DL,DG,DIS
CO1,CO2	Justify classical and practicalimplications of Karma related toRaktavaha sansthana(Cardiovascular System) in thecontext of Ayurveda & and its nearest equivalentpharmacological actions incontemporary science.	5	Experiential-Learning 15.1	AFT-RES	Does	DIS,C_L,DG,DL,BS
CO1	Elaborate Classification, Mechanismof action, dose & side effects ofrelevant drugs related to Cardiovascular systemmentioned in contemporaryscience	2	Lecture	CC	Knows-how	L_VC,L&GD,L&PPT ,L
CO1,CO2	Perform phyotchemcial analysis of drugs used in Raktavaha ssamshtana and its Classification,Mechanism of action, dose &side effects of relevant drugsmentioned in contemporaryscience related to Cardiovascular System	4	Practical Training 15.2	PSY-SET	Shows-how	PL,JC,ML,PER,LS
CO1,CO2	Discuss about Classification,Mechanism of action, dose &side effects of relevant drugsmentioned in contemporaryscience related to CardioVascular System	5	Experiential-Learning 15.2	AFT-RES	Does	L_VC,LS,PL,ML,PER

M 15 Unit 2 Karmas of Rasavahsansthana1. Shothahara (Antiinflammatory / NSAIDs)
2. Gandmalanashaka (Thyroid inhibitors)

References: 30,31,32,33,34,36,38,42,77,84,85,88,91,92

3A	3B	3C	3D	3E	3F	3G
CO1	Analyse classical and practicalimplications of Karma ofRasavaha sansthana (LymphaticSystem) in the context ofAyurveda & and its nearestequivalent pharmacologicalactions in contemporary science	2	Lecture	CC	Knows-how	L

3A	3B	3C	3D	3E	3F	3G
CO1,CO2	Analyse classical and practical implications of Karma of Rasavaha sansthana (Lymphatic System) in the context of Ayurveda & and its nearest equivalent pharmacological actions in contemporary science	3	Practical Training 15.3	PSY-GUD	Know	DIS
CO1,CO2	Justify classical and practical implications of Karma related to Rasavaha sansthana (LymphaticSystem) in the context of Ayurveda & and its nearest equivalent pharmacological actions in contemporary science	4	Experiential-Learning 15.3	AFT-CHR	Does	DG
CO1	Elaborate Classification, Mechanismof action, dose & side effects ofrelevant drugs mentioned incontemporary science related toLymphatic System	1	Lecture	CC	Knows-how	D-BED
CO1,CO2	Perform phyotchemcial analysis of drugs used in Rasavaha Samshtana and its Classification,Mechanism of action, dose & side effects of relevant drugs mentioned in contemporary science related to Lymphatic System.	3	Practical Training 15.4	PSY-MEC	Does	D-M
CO1,CO2	Discuss about Classification,Mechanism of action, dose &side effects of relevant drugsmentioned in contemporary science related to LymphaticSystem	4	Experiential-Learning 15.4	AFT-CHR	Does	DIS

M 15 Unit 3 Karmas of Shwasansansthana1. Shwasahara (Bronchodilators / Inhalants)
2. Kashara (Antitussive / Expectorants)
3. Hikkanigrahana (Antihiccough)
4. Kanthya & Swraya (Voice promoting)
5. Shoshahara (Antitubercular)

References: 30,31,32,33,34,36,38,42,77,84,85,88,91,92

3A	3B	3C	3D	3E	3F	3G
CO1	Analyse classical and practicalimplications of Karma ofShwasana sansthana(Respiratory System) in thecontext of Ayurveda & and itsnearest equivalentpharmacological actions incontemporary science	2	Lecture	CC	Knows-how	L&GD,L, L&PPT ,L_VC
CO1,CO2	Analyse classical and practical implications of Karma of Shwasana sansthana	3	Practical	PSY-	Shows-	DL,DIS,D-

	(Respiratory System) in thecontext of Ayurveda & and its nearest equivalent pharmacological actions in contemporary science.		Training 15.5	MEC	how	M
CO1,CO2	Justify classical and practicalimplications of Karma related toShwasana sansthana(Respiratory System) in thecontext of Ayurveda & and itsnearest equivalentpharmacological actions incontemporary science	4	Experiential-Learning 15.5	AFT-REC	Does	DIS
CO1	Elaborate Classification, Mechanismof action, dose & side effects ofrelevant drugs mentioned incontemporary science related toRespiratory System	1	Lecture	CC	Knows-how	DG
CO1,CO2	Perform phyotchemcial analysis of drugs used in Shwasana sansthana and its Classification,Mechanism of action, dose & side effects of relevant drugs mentioned in contemporary science related to Respiratory System.	3	Practical Training 15.6	PSY-GUD	Shows-how	D-M
CO1,CO2	Discuss about Classification,Mechanism of action, dose &side effects of relevant drugsmentioned in contemporary science related to Respiratory System	4	Experiential-Learning 15.6	AFT-REC	Shows-how	BS,PL,JC,DIS

Practical Training Activity

Practical Training 15.1 : Correlation between Classical Karma with contemporarypharmacological actions with respect to Raktavaha sansthana(Cardiovascular System)

- Conducting Phytochemical analysis on drugs used in Cardiovascular System to know mode of action.
- Demo with videoclips pertaining to mode of actions drugs beneficial in Cardiovascular System.
- Understanding the mode of actions by studying treatment protocol followed in diseases related to Cardiovascular system.
- Seminars on various Karma pertaining to Raktavaha Samsthana (Cardiovascular system)
- Group Discussions to be done by the scholars
- Journal Club to be be planned by the teachers by assigning PG scholars to refer peer reviewed scientific journals

Practical Training 15.2 : Classification, Mechanism of action, dose & sideeffects

- Conducting Phytochemical analysis on drugs used in Cardiovascular System to know mode of action.
- Demo with videoclips pertaining to mode of actions drugs beneficial in cardiovascular System.
- Understanding the mode of actions by studying case sheets having treatment protocol followed in diseases related to cardiovascular system.
- Making of Charts on mode of actions of drugs related to Cardiovascular system
- Debate to be organized by teacher
- Discussions to be conducted by making group among PG Scholars
- Role play on various concepts

Practical Training 15.3 : Correlation between Classical Karma with contemporarypharmacological actions with respect to Rasavaha sansthana (Lymphatic System)

Conducting Phytochemical analysis on drugs used in Lymphatic System to know mode of action.

Demo with videoclips pertaining to mode of actions drugs beneficial in Lymphatic System.

Understanding the mode of actions by studying treatment protocol followed in diseases related to Lymphatic system.

Seminars to be given to PG scholars by allotting different topics from Karmas mentioned under Rasavaha Samsthana

Group Discussions to be planned by grouping PG scholars in to 2 or 3 groups and topics to be assigned by the teachers

Case discussion to be done by giving various diseases mentioned under Rasa Vaha Smasthana.

Video clips to be shown on Pharmacological actions pertaining to Lymphatic system

Practical Training 15.4 : Classification, Mechanism of action, dose & sideeffects

- Conducting phytochemical analysis on the drugs used in Lymphatic system to know mechanism of action,
- Making of Charts on mode of actions of drugs,
- Demonostration on models explaining mechianism of action,
- Demo with Video clips on Drugs used in Lymphatic system,

Practical Training 15.5 : Correlation between Classical Karma with contemporary pharmacological actions with respect to Shwasana samsthana (Respiratory System)

- Phytochemical analysis on drugs having Karma related to Shwasana Samsthana
- Identifying drugs having various Karma related to Shwasana Samsthana

Practical Training 15.6 : Classification, Mechanism of action, dose & side effects

- Conducting Phytochemical analysis on drugs used in Respiratory System to know mode of action.
- Demo with videoclips pertaining to mode of actions drugs beneficial in Respiratory System.
- Understanding the mode of actions by studying treatment protocol followed in diseases related to Respiratory system.

Experiential learning Activity

Experiential-Learning 15.1 : Common and differentiating factors between Ayurveda and contemporary science in the context to Raktavaha samsthana (Cardiovascular System) Karma

- Showing videoclips pertaining to Raktavaha Samsthana.
- Group discussion by grouping PG Scholars by assigning topics..
- Mobile learning to be planned by teachers by assigning topics related to Raktavaha Samsthana.
- Debate to be organized by teacher on topics of Cardiovascular System
- Symposium to be arranged in the department

- Creating Learning Materials on various concepts of Raktavaha Samsthana

Experiential-Learning 15.2 :

- Discuss and learn about Classification, Mechanism of action, dose &side effects of relevant drugs mentioned in contemporary sciencerelated to Cardio Vascular system

- Brain storming sessions on topics related to Cardiovascular System.
- Showing videoclips pertaining to Cardiovascular System.
- Organizing Debate on different topics related to Cardiovascular System.
- Group discussion by grouping PG Scholars.
- Mobile learning to be planned by teachers by assigning topics related to Cardiovascular System.

Experiential-Learning 15.3 : Common and differentiating factorsbetween Ayurveda and contemporary science in the context to Rasavaha samsthana (Lymphatic System) Karma

Showing videoclips pertaining to Rasavaha sansthana (LymphaticSystem)
Organizing Debate on different topics related to Rasavaha sansthana (LymphaticSystem)
Group discussion by grouping PG Scholars.
Mobile learning to be planned by teachers by assigning topics related to Rasavaha sansthana (LymphaticSystem)

Experiential-Learning 15.4 :

- Discuss and learn about Classification, Mechanism of action, dose &side effects of relevant drugs mentioned in contemporary sciencerelated to Lymphatic System

- Showing videoclips pertaining to Rasavaha Samsthana.
- Organizing Debate on different topics related to Rasavaha Samsthana.
- Group discussion by grouping PG Scholars.
- Mobile learning to be planned by teachers by assigning topics related to Rasavaha Samsthana.
- Teacher will assign topics to PG scholars Mobile learning
- Discussions to be done on classification and mechanism of action used in lymphatic system
- Creative writing to be assigned to the PG scholars on dose and side effects of drugs used in lymphatic system

Experiential-Learning 15.5 : Common and differentiating factors between Ayurveda and contemporary science in the context to Shwasana samsthana (Respiratory System) Karma.

- Showing videoclips pertaining to Shwasana Samsthana.
- Organizing Debate on different topics related to Shwasana Samsthana.
- Group discussion by grouping PG Scholars.
- Mobile learning to be planned by teachers by assigning topics related to Shwasana Samsthana.

Experiential-Learning 15.6 :

- Discuss and learn about Classification, Mechanism of action, dose & side effects of relevant drugs mentioned in contemporary science related to Respiratory System

- Showing videoclips pertaining to Shwasana Samsthana.
- Organizing Debate on different topics related to Shwasana Samsthana.
- Group discussion by grouping PG Scholars and alloting topics.
- Mobile learning to be planned by teachers by assigning topics related to Shwasana Samsthana.

Modular Assessment

Assessment method	Hour
Assessment method Instructions - Conduct a structured Modular assessment. Assessment will be for 50 marks. Keep structured marking pattern. Use different assessment methods in each module for the semester. Keep record of the structured pattern used for assessment. Calculate the Modular grade point as per table. Case-based evaluation: Each student will be given a case scenario and the student will develop case sheet and treatment protocol by taking examples of Dravya having particular Karma (Pharmacological actions).Assessment is based on the effectiveness of the case developed and their interpretation.-(25 Marks) and Conducting written assessment on understanding, interpretation and utility of various Karma (Pharmacological actions) related to the Raktavaha Samsthana (Cardiovascular System). (25 Marks) or Conducting written assessment on understanding, interpretation and utility of various Karma (Pharmacological actions) related to Rasavahasamsthana (Lymphatic System). (25 Marks) or Conducting written assessment on understanding, interpretation and utility of various Karma (Pharmacological actions) related to Shwasansamsthana (Respiratory System). (25 Marks) Or Conducting Quiz about Karma related to the Raktavaha Samsthana (Cardiovascular System). (25 Marks) Or Conducting Quiz about Karma related to Rasavahasamsthana (Lymphatic System). (25 Marks) Or Conducting Quiz about Karma related to Shwasansamsthana (Respiratory System) (25 Marks) Or	4

Conducting Presentations about Karma related to the Raktavaha Samsthana (Cardiovascular System) (25 Marks)

Or

Conducting Presentations about Karma related to Rasavahasamsthana (Lymphatic System).

(25 Marks)

Or

Conducting Presentations about Karma related to Shwasansamsthana (Respiratory System).

or

Any practical in converted form can be taken for assessment. (25 Marks)

and

Any experiential as portfolio/reflections/presentations, can be taken as an assessment. (25 Marks)

Module 16 : Experimental models for evaluation of various pharmacological actions.

Module Learning Objectives
(At the end of the module, the students should be able to)

1.Illustrate the fundamental principles of experimental pharmacology.
2. Describe various experimental models used to evaluate pharmacological actions.
3. Identify the strengths and limitations of different experimental models.
4. Explore the possibilities of experimental designs in evaluating Ayurvedic herbs.

M 16 Unit 1 Toxicological Studies for Drug Risk and Safety Toxicological Studies for Drug Risk and Safety

- Animal toxicology

References: 84,85,86,87,88,92,93

3A	3B	3C	3D	3E	3F	3G

3A	3B	3C	3D	3E	3F	3G
CO1	Explain basic principles of experimental pharmacology and animal handling techniques.	1	Lecture	CC	Knows-how	L,L_VC, L&PPT
CO1	Demonstrate about basic principles of experimental pharmacology and animal handling techniques.	3	Practical Training 16.1	PSY-SET	Shows-how	DL,L_VC ,W,D
CO1	Appraise about basic principles of experimental pharmacology and animal handling techniques	3	Experiential-Learning 16.1	AFT-VAL	Does	C_L,D-M,DL,W

M 16 Unit 2 Genotoxicity, teratogenicity, carcinogenicity Understanding the need and scope of genotoxicity, teratogenicity, carcinogenicity

References: 84,85,86,87,88,91,92

3A	3B	3C	3D	3E	3F	3G
CO1,CO9	Describe various experimental models used to evaluate the pharmacological action and explain the strengths and limitations of different experimental models.	1	Lecture	CC	Knows-how	L&PPT , L&GD,L _VC,L
CO1,CO9	Design a basic experimental protocol using appropriate models.	2	Practical Training 16.2	PSY-SET	Shows-how	PBL,L_V C,PSM,D L,SIM
CO1,CO9	Apply experimental design principles to evaluate Ayurvedic herbs and Critique existing experimental designs in Ayurvedic research.	3	Experiential-Learning 16.2	AFT-RES	Does	TBL,BS,P ER,W,DL
CO1,CO9	Describe the pharmacological actions of selected Ayurvedic herbs and Explore the possibilities of experimental designs in evaluating them.	1	Lecture	CC	Knows-how	PrBL,TB L,L_VC, L&GD,T UT
CO1,CO9	Conduct experiments to evaluate the pharmacological actions of Ayurvedic herbs and Analyze and interpret data from experiments.	2	Practical Training 16.3	PSY-SET	Shows-how	BS,DA,D L,PER,M

3A	3B	3C	3D	3E	3F	3G
						nt
CO1,CO9	Develop innovative experimental designs for Ayurvedic herb evaluation and Integrate Ayurvedic principles with modern pharmacological concepts.	3	Experiential-Learning 16.3	AFT-RES	Does	W,TPW,DIS,SDL,TBL

M 16 Unit 3 Diuretics, Adaptogens & CNS activities & Anti oxidant Activity Diuretics, Adaptogens & CNS activities & Anti oxidant Activity

References: 42,84,85,86,87,88,91,92

3A	3B	3C	3D	3E	3F	3G
CO1,CO9	Describe various experimental models used to evaluate the pharmacological action and explain the strengths and limitations of different experimental models.	1	Lecture	CC	Knows-how	L&GD,L_VC,L&PPT ,L
CO1,CO9	Demonstrate basic experimental protocol using appropriate models with reference to Diuretic activity.	3	Practical Training 16.4	PSY-SET	Shows-how	DL,PrBL,PSM,PBL,L_VC
CO1,CO9	Apply experimental design principles to evaluate Ayurvedic herbs and Critique existing experimental designs in Ayurvedic research.	3	Experiential-Learning 16.4	AFT-RES	Does	W,BL,DL,PER,BS
CO1,CO9	Describe the pharmacological actions of selected Ayurvedic herbs and Explore the possibilities of experimental designs in evaluating them.	1	Lecture	CC	Knows-how	L&PPT ,L&GD,TBL,DIS,TUT
CO1,CO9	Conduct experiments to evaluate the pharmacological actions of Ayurvedic herbs and Analyze and interpret data from experiments.	2	Practical Training 16.5	PSY-SET	Knows-how	SY,DIS,TUT,DL,TBL
CO1,CO9	Develop innovative experimental designs for Ayurvedic herb evaluation and Integrate Ayurvedic principles with modern pharmacological concepts.	3	Experiential-Learning 16.	AFT-RES	Does	SIM,BS,SDL,DIS,T

			5			PW

M 16 Unit 4 Anti ulcer, Cardio protective & Hepatoprotective Activity. Anti ulcer, Cardio protective & Hepatoprotective Activity.

References: 42,84,85,86,87,88,91,92

3A	3B	3C	3D	3E	3F	3G
CO1,CO9	Describe various experimental models used to evaluate the pharmacological action and explain the strengths and limitations of different experimental models.	1	Lecture	CC	Knows-how	L,L&PPT ,L&GD,L _VC
CO1,CO9	Demonstrate basic experimental protocol by using appropriate models with reference to Anti ulcer and Cardioprotective activity	2	Practical Training 16.6	PSY-SET	Knows-how	PSM,L_V C,PBL,SI M,DL
CO1,CO9	Apply experimental design principles to evaluate Ayurvedic herbs and Critique existing experimental designs in Ayurvedic research.	3	Experiential-Learning 16. 6	AFT-RES	Does	SY,DL,T BL,W,BL
CO1,CO9	Describe the pharmacological actions of selected Ayurvedic herbs and Explore the possibilities of experimental designs in evaluating them.	1	Lecture	CC	Knows-how	L,TBL,L &PPT ,L &GD,L_ VC
CO1,CO9	Conduct experiments to evaluate the pharmacological actions of Ayurvedic herbs and Analyze and interpret data from experiments.	2	Practical Training 16.7	PSY-SET	Shows-how	DA,DIS,P ER,LRI,S Y

3A	3B	3C	3D	3E	3F	3G
CO1,CO9	Develop innovative experimental designs for Ayurvedic herb evaluation and Integrate Ayurvedic principles with modern pharmacological concepts.	3	Experiential-Learning 16.7	AFT-RES	Does	TPW,W,SY,BS,TUT

M 16 Unit 5 Anti diabetic, Anti hypertensive, Anti hyper lipidemic Activity. Anti diabetic, Anti hypertensive, Anti hyper lipidemic Activity.

References: 42,84,85,86,87,91,92

3A	3B	3C	3D	3E	3F	3G
CO1,CO9	Describe various experimental models used to evaluate the pharmacological action and explain the strengths and limitations of different experimental models.	1	Lecture	CC	Knows-how	L&GD,L&PPT,L_VC,L
CO1,CO9	Design a basic experimental protocol using appropriate models.	2	Practical Training 16.8	PSY-SET	Shows-how	SY,L_VC,PER,PSM,DL
CO1,CO9	Apply experimental design principles to evaluate Ayurvedic herbs and Critique existing experimental designs in Ayurvedic research.	3	Experiential-Learning 16.8	AFT-RES	Does	SY,PER,W,TBL,DL
CO1,CO9	Describe the pharmacological actions of selected Ayurvedic herbs and Explore the possibilities of experimental designs in evaluating them.	2	Lecture	CC	Knows-how	TBL,PBL,L_VC,L&PPT,DIS
CO1,CO9	Conduct experiments to evaluate the pharmacological actions of Ayurvedic herbs and Analyze and interpret data from experiments.	2	Practical Training 16.9	PSY-SET	Shows-how	LRI,SY,BS,TBL,L_

							VC
CO1,CO9	Develop innovative experimental designs for Ayurvedic herb evaluation and Integrate Ayurvedic principles with modern pharmacological concepts.	2	Experiential-Learning 16.9	AFT-RES	Does		SDL,TPW,SY,DIS,TUT

Practical Training Activity

Practical Training 16.1 :

- Animal handling and care
- Hands on training on handling animals
- Toxicological studies

- Visit to animal house facility
- Video clips on animal handling techniques

1. Practice handling and restraining small animals (e.g., mice, rats).
2. Collection of evidence based research on various animal activities
3. Showing videoclips on various toxicological studies on different animal models.

Practical Training 16.2 : Genotoxicity and carcinogenecity

Watch videoclips related to various models used for Geno Toxicity studies of Ayurveda Herbs.

Practical Training 16.3 : Teratogenecity Activity of single Dravya in animal model.
Observe Videoclips of various models with special reference to Teratogenecity activity
Practical Training 16.4 : Conduct or observe the experiment on Diuretic activity of Ayurveda Herbs
Conduct or Observe Diuretic activity of Ayurveda Herbs Watch videoclips on various models used for Diuretic Activity.
Practical Training 16.5 : Adaptogen & CNS activities and Anti oxidant Activity of single Dravya in animal model.
Conduct or observe animal Experiment to evaluate the Adaptogen & CNS activities of selected herb. Watch Videoclips of various models used for Adaptogen & CNS activities. Conduct or observe Anti oxidant activity of selected herb. Watch Videoclops of models used for Anti oxidant activity.
Practical Training 16.6 : Understand a basic experimental protocol by using appropriate models with reference to Anti ulcer and Cardioprotective activity on selected herb
Conduct or observe experiments on Anti ulcer activity in animal models. Watch video clips of studies conducted on Anti ulcer activity. Conduct or observe experiments on Cardioprotective activity in animal models. Watch video clips of studies conducted on Cardioprotective activity.
Practical Training 16.7 : Hepato Protective Activity of single Dravya in animal model
Conduct or observe Hepato protective activity of selected herbs in animal models. Watch videoclips on Hepato protectivity activity on animal models.
Practical Training 16.8 : Assess the Anti Diabetic activity of Ayurveda Herbs on animal models.
Conduct or Observe Anti Diabetic activity among animal models on a selected single herb. Watch videoclips on various models related to Antidiabetic activity of Ayurveda Herbs.
Practical Training 16.9 : Evaluate Antihypertensive and Anti Hyper li[pidemic activity of Ayurveda Herbs.
Conduct animal Experiment to evaluate Antihypertensive activity of selected single herb.

Watch the video clips of experimental research conducted on Antihypertensive activity. .

Conduct animal Experiment to evaluate Antihyperlipidemic activity of selected single herb.

Watch the video clips of experimental research conducted on AAntihypertensive activity.

Experiential learning Activity

Experiential-Learning 16.1 :

- Animal Behavior Observations:
- Animal Welfare and Ethics: -
- Animal handling and techniques

- Observe and record animal behavior (e.g., locomotor activity, social interaction).
- Identify signs of stress, pain, or distress.
- Discuss and debate animal welfare and ethics in research.
- Develop protocols for minimizing animal distress and promoting welfare.
- Learn proper techniques for injection, blood collection, and sampling

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Experiential-Learning 16.2 :

- Experimental Design Workshop:
- Case Study Analysis:

- Participate in a workshop to design experiments for Ayurvedic herb evaluation.

- Analyze existing research studies on Ayurvedic herbs with reference to Genotoxicity. Teratogenecity and Carcinogenecity.

Experiential-Learning 16.3 :

- Herb-Drug Interaction Study:
- Pharmacological Profile Development:

- Design and conduct a study on herb-drug interactions
- Develop a pharmacological profile for a selected Ayurvedic herbs

Experiential-Learning 16.4 :

- Experimental Design Workshop:
- Case Study Analysis:

- Participate in a workshop to design experiments for Ayurvedic herb evaluation.
- Analyze existing research studies on Ayurvedic herbs.

Experiential-Learning 16.5 : 1. Herb-Drug Interaction Study:

2. Pharmacological Profile Development:

Design and conduct a study on herb-drug interactions.
Develop a pharmacological profile for a selected Ayurvedic herb.

Experiential-Learning 16.6 : 1. Experimental Design Workshop:
2. Case Study Analysis:

Participate in a workshop to design experiments for Ayurvedic herb evaluation.
Analyze existing research studies on Ayurvedic herbs.

Experiential-Learning 16.7 :

- Herb-Drug Interaction Study:
- Pharmacological Profile Development:

- Design and conduct a study on herb-drug interactions.
- Develop a pharmacological profile for a selected Ayurvedic herb.

Experiential-Learning 16.8 :

- Experimental Design Workshop:
- Case Study Analysis:

- Participate in a workshop to design experiments for Ayurvedic herb evaluation.
- Analyze existing research studies on Ayurvedic herbs.

Experiential-Learning 16.9 :

- Herb-Drug Interaction Study:
- Pharmacological Profile Development:

- Design and conduct a study on herb-drug interactions.
- Develop a pharmacological profile for a selected Ayurvedic herb.

Modular Assessment

Assessment method	Hour
Instructions - Conduct a structured Modular assessment. Assessment will be for 50 marks. Keep structured marking pattern. Use different assessment methods in each module for the semester. Keep record of the structured pattern used for assessment. Calculate the Modular grade point as per table. Conducting written assessment on understanding, interpretation, utility and scope of experimental models of Diuretics, Adaptogens, CNS activities and Anti-oxidant activity. (25 Marks) And Conducting written assessment on understanding, interpretation, utility and scope of experimental models of Anti-ulcer, Cardio protective & Hepatoprotective Activity. (25 Marks) or Conducting written assessment on understanding, interpretation, utility and scope of experimental models of Anti diabetic, Anti-hypertensive, Anti hyper lipidemic Activity. (25 Marks) Or	4

Presentation of research works related to all the experimental models (25 Marks)

Or

Conducting Quiz on Toxicology, Genotoxicity, Teratogenicity, Carcinogenicity and various experimental models

Assessment method

Instructions - Conduct a structured Modular assessment. Assessment will be for 50 marks. Keep structured marking pattern. Use different assessment methods in each module for the semester. Keep record of the structured pattern used for assessment. Calculate the Modular grade point as per table.

Case-based evaluation: Each student will be given a case scenario and the student will develop case sheet and treatment protocol by taking examples of Dravya having particular Karma (Pharmacological actions).Assessment is based on the effectiveness of the case developed and their interpretation.-(25 Marks)

and

Conducting written assessment on understanding, interpretation and utility of various Karma (Pharmacological actions) related to the Raktavaha Samsthana (Cardiovascular System). (25 Marks)

or

Conducting written assessment on understanding, interpretation and utility of various Karma (Pharmacological actions) related to Rasavahasamsthana (Lymphatic System). (25 Marks)

or

Conducting written assessment on understanding, interpretation and utility of various Karma (Pharmacological actions) related to Shwasansamsthana (Respiratory System). (25 Marks)

Or

Conducting Quiz about Karma related to the Raktavaha Samsthana (Cardiovascular System). (25 Marks)

Or

Conducting Quiz about Karma related to Rasavahasamsthana (Lymphatic System). (25 Marks)

Or

Conducting Quiz about Karma related to Shwasansamsthana (Respiratory System) (25 Marks)

Or

Conducting Presentations about Karma related to the Raktavaha Samsthana (Cardiovascular System) (25 Marks)

Or

Conducting Presentations about Karma related to Rasavahasamsthana (Lymphatic System).
(25 Marks)

Or

Conducting Presentations about Karma related to Shwasansamsthana (Respiratory System).

or

Any practical in converted form can be taken for assessment. (25 Marks)
and
Any experiential as portfolio/reflections/presentations, can be taken as an assessment. (25 Marks)

Paper No : 3 Industrial Applications in Dravyaguna

Semester No : 3

Module 17 : Drug and Patient Safety

Module Learning Objectives
(At the end of the module, the students should be able to)

1.Describe the need of pharmacovigilance in Ayurved with its significance in enhancing patient safety and impact of types of drug incompatibilities with measures for ensuring drug safety
2. Demonstrate the steps involved in reporting an ADR and identify drug incompatibility to ensure drug safety
3.Participate in sensitization awareness programs with understanding of the reporting system of ADR with the need for rational prescription for patient safety

M 17 Unit 1 Pharmacovigilance Pharmacovigilance from Ayurveda and Contemporary Perspectives with measures for ensuring drug safety in Ayurveda

References: 89,90,91,92,93,94,95,96,97,98,99

3A	3B	3C	3D	3E	3F	3G
CO1	Justify the need for pharmacovigilance in Ayurveda with comprehensive knowledge of detection, reporting, and monitoring process for adverse drug reactions (ADRs) with measures for ensuring drug safety in Ayurveda	5	Lecture	CE	Knows-how	L&PPT ,L&GD,L
CO1	Demonstrate the significance and process involved in Detection, reporting and monitoring under Ayurveda and evaluate the measures to ensure drug safety	10	Practical Training 17.1	PSY-GUD	Shows-how	RLE,DIS, IBL,CBL, BS
CO1	Appraise the need and develop skills to be vigilant in detecting and prompt reporting of ADRs with analysing the causes for prevention and ensuring safety	10	Experiential-Learning 17.1	AFT-VAL	Does	RLE,CBL ,RP,PrBL

M 17 Unit 2 Samyoga Viruddha Siddhant in perspective of incompatibility Samyoga Viruddha Siddhant in perspective of incompatibility

References: 33,100,101,102,103,104,105

3A	3B	3C	3D	3E	3F	3G
CO1	Discuss the concept of Samyog Viruddha Siddhant in the context of drug interactions and interpret its implications in clinical efficacy and safety	3	Lecture	CAN	Knows-how	TUT,L&GD,L,L_VC,L&PPT
CO1	Identify the types of drug interactions and their clinical significance	5	Practical Training 17.2	PSY-SET	Shows-how	RLE,CBL,D-BED
CO1	Value the impact of drug interactions in current clinical presentations	8	Experiential-Learning 17.2	AFT-VAL	Does	LS,IBL,PBL,SDL,ML

M 17 Unit 3 Pharmacoepidemiology Pharmacoepidemiology

References: 106,107

3A	3B	3C	3D	3E	3F	3G
CO1	Explain the need of Pharmacoepidemiology and its relevance in healthcare	2	Lecture	CC	Knows-how	L&PPT , L&GD,L,BL
CO1	Illustrate the importance of Pharmacoepidemiology in clinical practice	5	Practical Training 17.3	PSY-SET	Shows-how	DIS,D
CO1	Appraise the significance of Pharmacoepidemiology in current clinical scenario.	8	Experiential-Learning 17.3	AFT-VAL	Does	PL,SDL,FV,TBL

Practical Training Activity
Practical Training 17.1 :
- Identify and analyse ADRs   - Demonstrate reporting of ADRs
- Describe case scenarios to identify ADRs and understand the actual cause in the notified case with modified scale for Ayurveda using Adverse Event Clinical Analysis Scale and evaluate and analyse the causes for ADR using standardized causality assessment tools .   - The teacher will facilitate hands on training to understand the method of reporting on the official website AyushSuraksha and discuss the essentials of the suspected adverse reactions form
Practical Training 17.2 :
- Demonstrate types of drug interactions   - Explore Studies on Herb –drug interactions with correlation of concept of Samyoga Viruddha
- The teacher will demonstrate prediction and analyzing mechanistic actions through databases .   - The teacher will discuss available models for evaluating Herb-drug interactions (DDIs), including in vitro and in vivo techniques (CYP studies) and observation studies by aligning with Samyoga Viruddha Siddhanta citing   classical examples.The teacher develops and discusses Case based scenarios that mimic real-world drug interaction as clinical presentations

Practical Training 17.3 :

- Illustrations of Drug usage and effects of Ayurvedic drugs

- The teacher will elaborate Effective prescription writing and review current trends in prescription patterns of use of drug , anupana, dose ,dosage form etc with potential implications on public health and safety along with classical considerations in specific diseases

Experiential learning Activity

Experiential-Learning 17.1 :

- Identifying and reporting of ADRs
- Appreciate need of Pharmacovigilance from Ayurveda and contemporary perspective
- Conduct Sensitization awareness programs on reporting ADRs
- Establish evidence for clinical safety of drugs
- Analyse the Influence of misleading advertisements of drugs and products on safety of Ayurvedic drugs

- Each scholar will be provided a case scenario .The scholar needs to identify the actual cause in the notified case with modified scale for Ayurveda using Adverse Event Clinical Analysis Scale and analyse the causes for ADR using standardized causality assessment tools .
- Carry Community based participatory research in the form of Survey to understand changes in contemporary scenario of practice by gathering feedback and opinions from practitioners or from OPD.The scholars should identify and categorize available classical literature like Abheshaja , Secondary effects of drugs to

align with the contemporary concepts and note the differences in current practice .

- The students can enact Role play to generate awareness of ADRs.The students should perform a critical reading and analysis of the emerging branches of pharmacovigilance in contemporary science with relevance in practice of Ayurved
- A Survey to know Consumer behaviour towards Ayurveda OTC medications and their impact on public health/safety   OR
- The students should visit Research papers on Pharmacovigilance or ADRs and analyse their implications .
- Each scholar should gather at least two instances   on misleading advertisements under Drug & Magic Remedies-objectionable advertisements Act,1954 & rules 1955 advertisements through media like TV, Newspaper, electronic and analyse its impact with current regulations on Misleading advertisements. Jago grahak jago website to analyse consumer behaviour .This will enable the scholars to have comprehensive understanding of   acts and rules from relevant extracts of Drug & Magic Remedies-objectionable advertisements Act,1954 & rules 1955 Consumer Protection Act 2019,Central Consumer Protection Authority (CCPA) Guidelines for Prevention of Misleading Advertisements and Endorsements for Misleading Advertisements, 2022 issued on 9 June, 2024 and to know the legalities and penalty .This should be submitted as a portfolio on objectionable advertisements

Experiential-Learning 17.2 :

- Analyse the types of Drug interactions through databases
- Impact on Clinical efficacy

- Each scholar is assigned a set of satmya and asatmya combination and the scholar is supposed to predict mechanistic interactions of the given set.
- The scholar should align   classical examples with contemporary clinical presentations to emphasize the implications of drug incompatibility and the teacher will discuss the key aspects of interaction

Experiential-Learning 17.3 :

- Analyse Drug usage and effects of Ayurvedic drugs
- Analysis of Prescription writing

- The scholars will conduct interviews with healthcare professionals either of OPD consultants or private practitioners to know about their current practice trends and needs Also review of publications on Pharmacoepidemiological studies to understand the efficacy and safety of drugs
- The scholars need to screen prescriptions of OPDs or IPDs and list out at least of one of each dosage form like kashaya ;ghrita ; snehapana etc in panchakarma prescription ,bhasmas and analyse the dose ,rationality and justify significance of ideal prescription in Ayurvedic practices with identification of common errors .The scholars should then formulate Criteria and process of   Rational prescription writing individualized and appropriate to clinical needs   which should be presented and discussed with the teacher .

Modular Assessment

Assessment method	Hour
Instructions- Conduct a structured Modular assessment. Assessment will be for 50 marks. Keep structured marking pattern. Use different assessment methods in each module for the semester. Keep record of the structured pattern used for assessment. Calculate the Modular grade point as per table 6 C. Simulation based Assessment – Student will be assigned simulated prescription where the student will identify errors or polypharmacy leading to drug interaction or may lead to ADR (25 Marks) And Students will screen the classics or research papers and submit few examples of ADRs or few examples of misleading advertisements with critical analysis on impact on safety of public health and strategies for prevention (25 Marks) Or Any two practicals in converted form can be taken for assessment. (25 Marks) And Any of the experiential as portfolio/ reflections / presentations can be taken as assessment.(25 Marks)	4

Module 18 : Sandigdha (Controversy) & Anukta Dravya in perspective of identification

Module Learning Objectives
(At the end of the module, the students should be able to)

1.Describe the reasons of controversy with resolving controversy and the need to   know the Adulterants and substitutes for safety in drug use.

2. Perform macroscopic and microscopic studies to identify the authenticity of the drug

3. Identify adulterants and proper substitutes for optimal therapeutic efficacy through scientific methods with   critical analysis of the updated researches.

M 18 Unit 1 Sandigdha Sandigdha(Controversy)

References: 115,116,117

3A	3B	3C	3D	3E	3F	3G
CO3	Describe various reasons behind the Sandhigdha(controversies) of medicinal plants and the effects of sandigdha (controversies) on therapeutic implications.	5	Lecture	CC	Knows-how	L&PPT , DIS,SDL, L&GD,BS
CO3	Demonstrate different aspects and reasons to identify Sandhigdh (controversy) in medicinal plants.	10	Practical Training 18.1	PSY-GUD	Shows-how	TBL,BS, DG,TUT
CO3	Illustrate critical thinking about resolving challenges and solutions of Sandhigdha (controversy) medicinal plants.	10	Experiential-Learning 18.1	AFT-VAL	Shows-how	FV,SDL, DIS,LRI, BS

M 18 Unit 2 Anukta dravya Anukta dravya (Extrapharmacopial drugs)

References: 118

3A	3B	3C	3D	3E	3F	3G
CO3	Discuss the need and significance of Anukta Dravya (Extra Pharmacopeal drugs)	5	Lecture	CC	Knows-how	L&PPT , BS,L&G

						D,DIS,L_VC
CO3	Demonstrate and discuss the ethnomedicinal approach of Anukta Dravya (Extra Pharmacopeal Drugs)	10	Practical Training 18.2	PSY-GUD	Shows-how	TBL,PL, D,DIS,SDL
CO3	Appraise the significance of Anukta Dravya (Extra Pharmacopeal Drugs)in current clinical scenario.	6	Experiential-Learning 18.2	AFT-VAL	Shows-how	JC,FV,BS ,DIS,SDL
CO3	Appraise the significance of Anukta Dravya (Extra Pharmacopeal Drugs)in current clinical scenario	10	Experiential-Learning 18.3	AFT-RES	Shows-how	D

Practical Training Activity

Practical Training 18.1 :

- Identifying the reasons behind Sandhigdha (controversies) in medicinal plants and solution to resolve the controversies.

- Group discussions to be conducted to enlist reasons behind controversies in medicinal plants also debates to be made on challenges and solutions on controversies of medicinal plants with the help of various classical literature.
- Genuine samples and market samples of medicinal plants should be collected to distinguish the contraversial aspects with the reasons.

Practical Training 18.2 :

- Demonstrate discuss and enlist various Anukta (extra pharmacological) drugs with ethnomedicinal approach used in different clinical conditions.

- Discuss regulatory framework for study of Anukta Dravya

- A group discussion on ethnomedicine approach of Anukta dravya and its implication on various clinical conditions will be conducted.
- Enlist Anukta dravyas available in market. Enlist & discuss regulatory framework for study of Anukta dravyas   through journal club activity.

Experiential learning Activity

Experiential-Learning 18.1 :

- Appreciate the need and develop skills to identify the reasons for controversies in medicinal plants.

- Identify and categorize available classical literature of medicinal plants.
- Perform a critical reading and analysis of the available context. Enlist confirmation of genuine plants on updated research

Experiential-Learning 18.2 :

- Develop critical thinking regarding the significance of Anukta Dravya (Extra Pharmacopeial Drugs in current clinical practice.

- Conduct interviews with healthcare professionals on safety aspects and use of Anukta dravyas in Critical reading of evidence-based
- Conduct group discussion on updated research on Anukta Dravya-with Suitable examples like Morinda citrifolia,Actinidia chinensis

Experiential-Learning 18.3 :

- Develop critical thinking regarding the significance of Anukta Dravya (Extra Pharmacopeial Drugs in current clinical practice

- Conduct interviews with healthcare professionals on safety aspects and use of Anukta dravyas in Critical reading of evidence-based
- Conduct group discussion on updated research on Anukta Dravya-with suitable examples like Costus igneous,Stevia rebaudiana,Entada rheedi,Avena sativa,Memecylon malabaricum,,Nothapodytes nimmoniana,

Modular Assessment

Assessment method	Hour
Assessment method Instructions – Conduct a structured modular assessment. Assessment will be for 50 marks. Keep structured marking pattern. Use different assessment methods in each module for the semester. Keep record of the structured pattern used for assessment. Calculate the Modular grade point as per Table 6C. Debate – Students will debate on controversial aspects of a plant -25 Marks and SAQ 5 marks each - 25 Marks **or** Students will be tasked with interviewing a Vaidya regarding the inclusion of Anukta Dravya in their practices and its utility in practice – 25 Marks and Students will present various aspects of research on Anukta Dravya -25 Marks **or**	4

Any two practicals in converted form can be taken for assessment. 25 Marks
and
Any of the experiential as portfolio/ reflections / presentations can be taken as assessment.25 Marks

Semester No : 4

Module 19 : Leads to Drug discovery & new drug development

Module Learning Objectives
(At the end of the module, the students should be able to)

1. Analyse the therapeutic claims of ethnic groups to explore new leads and understand phases of drug discovery and drug development via molecular biology techniques and Clinical trials.
2. Conduct reviews to explore new leads in ethnopractice and understand tools in omics to identify molecular targets and drug development through clinical trials.
3. Identify key traditional medicinal plants that can serve as potential leads and drug discovery through scientific tools, a critical reading, and analysis of the research updates

M 19 Unit 1 Ethnomedicinal studies in drug discovery Understanding of ethnomedicinal studies in drug discovery

References: 113,115

3A	3B	3C	3D	3E	3F	3G
CO1,CO4,CO6	Describe the importance of ethnomedicinal studies in preserving traditional knowledge	3	Lecture	CC	Knows-how	L,L_VC, L&PPT
CO1,CO4,CO6	Demonstrate of proforma to document information on ethnomedicine for data collection and analysis.	6	Practical Training 19.1	PSY-GUD	Shows-how	D,Mnt,TP W
CO1,CO4,CO6	Interpret usage patterns and claims of medicinal plants in various ethnic communities	6	Experiential-	AFT-	Shows-	RP,PER,S

| | | | | | Learning 19.1 | VAL | how | DL,TUT |

M 19 Unit 2 Omics Understanding preclinical drug discovery with respect to omics
Introduction to proteomics and metabolomics and its applications

References: 119,120

3A	3B	3C	3D	3E	3F	3G
CO1,CO4,CO6	Explain the need of omics approach in drug discovery and development	5	Lecture	CC	Knows-how	L&PPT ,L_VC,L
CO1,CO4,CO6	Demonstrate available tutorials/tools on concept and application of proteomics, metabolomics in Ayurveda.	7	Practical Training 19.2	PSY-GUD	Shows-how	TPW,TUT,D
CO1,CO4,CO6	Analyze and discuss concept of omics in drug development of Ayurveda by working on databses	10	Experiential-Learning 19.2	AFT-REC	Does	SDL,TUT ,PER

M 19 Unit 3 Cheminformatics in drug discovery and drug design, Computer aided Drug design (CADD), network pharmacology Use of cheminformatics in drug discovery and drug design, Computer aided Drug design (CADD), network pharmacology

References: 113

3A	3B	3C	3D	3E	3F	3G
CO1,CO4,CO6	Acquire knowledge on Use of cheminformatics in drug discovery and drug design, Computer aided Drug design (CADD),	3	Lecture	CC	Knows-how	L&PPT ,L,L_VC
CO1,CO4,CO6	Demonstrate of use of cheminformatics in drug discovery and drug design	6	Practical Training 19.3	PSY-GUD	Shows-how	D,Mnt,TPW
CO1,CO4,CO6	Analysis and discussion on available tools for use of cheminformatics in drug discovery and drug design	9	Experiential-Learning 19.	AFT-VAL	Shows-how	ML,PER,LS,TUT,S

		3			DL

M 19 Unit 4 Pharmacogenomics and Ayurgenomics, Concept of Pharmacogenomics and Ayurgenomics,

References: 113,121,122,123

3A	3B	3C	3D	3E	3F	3G
CO1,CO4,CO6	Explain the concept of Pharmacogenomics and Ayurgenomics	2	Lecture	CC	Knows-how	L,L_VC, L&PPT
CO1,CO4,CO6	Demonstrate of available tools on Concept of Pharmacogenomics and Ayurgenomics.	5	Practical Training 19.4	PSY-GUD	Shows-how	TPW,Mnt,D
CO1,CO4,CO6	Analyse the Concept of Pharmacogenomics and Ayurgenomics	7	Experiential-Learning 19.4	AFT-REC	Shows-how	LS,SDL,TUT,ML,PER

M 19 Unit 5 Reverse Pharmacology, Clinical pharmacology and evidence based research Knowledge of repurposing through Reverse Pharmacology, Clinical pharmacology and evidence based research

References: 113,123,124

3A	3B	3C	3D	3E	3F	3G
CO1,CO4,CO6	Discuss the concepts of Reverse Pharmacology, Clinical pharmacology and evidence based research	2	Lecture	CC	Knows-how	L&PPT,L,L_VC
CO1,CO4,CO6	Demonstrate of available tools on Reverse Pharmacology, Clinical pharmacology and evidence based research	6	Practical Training 19.5	PSY-GUD	Shows-how	Mnt,D,TPW,TUT
CO1,CO4,CO6	Analyse the applications of Reverse Pharmacology, Clinical pharmacology and evidence based research in Ayurveda.	7	Experiential-Learning 19.5	AFT-REC	Shows-how	TUT,PER,SDL,LS,ML

Practical Training Activity
Practical Training 19.1 : Document information on ethnomedicine
Role play - Short KAP study comprising questionnaire to document information in that specific area - Development of region specific proforma for KAP study.
Practical Training 19.2 : Concept and application of proteomics and metabolomics
- Demonstrating available tutorials/tools on Advanced proteomic techniques such as Gel-based and chromatography based approaches - Demonstrating available tutorials/tools on techniques of omics and metabolomics along with principles of HPLC, LCMS/MS, QToF, MALDI, etc.
Practical Training 19.3 : - Cheminformatics in drug discovery and drug design - Network pharmacology
- Demonstrations showing the freely available for searching information in Databases and internet resources about plants, their therapeutic effects, names of phytoconstituents and their structures.(IMPPAT, Dukes, etc) - Demonstration in searching data of medicinal plants in freely available software for prediction of biological activity, docking, generation of descriptors and QSAR modelling.

- Revision of Network pharmacology practical demo.

Practical Training 19.4 :

- Concept of Pharmacogenomics and Ayurgenomics.

- Demonstrating available tools on Fundamentals of molecular biology and exploration of genetic polymorphisms.
- Tutorials/ tools about obtaining information in pharmacogenomics, databases therein.

Practical Training 19.5 :

- Tools on Reverse Pharmacology, Clinical pharmacology and evidence based research

- Demonstrating available toolson Reverse Pharmacology, Clinical pharmacology (NDCT 2019) and evidence based research
- Group discussions on Principles and phases of clinical trial.

Experiential learning Activity

Experiential-Learning 19.1 :

- Patterns and claims of medicinal plants in various ethnic communities

Role play

- Brain storming on updated research literature available on ethnomedicinal claims
- Tutorials on statistical techniques employed in ethnomedicinal studies for taking leads
- Review published case studies that illustrate the application of ethnomedicine in Ayurveda.
- Interaction and participate in brainstorming with experts

Experiential-Learning 19.2 :

- Concept of omics

- Analyse through searching of dedicated freely available databases of proteins (Uniprot) and metabolites (HMDB), Protein sequence and functional information db like KEGG, and PANTHER (video clips & guest lectures)
- Visit to the dedicated laboratories having proteomic /metabolomic facilities.
- Analysis of Application of metabolomics to study the metabolic effects of Ayurvedic formulations based on updated research manuscripts.

Experiential-Learning 19.3 :

- Cheminformatics in drug discovery and drug design

- Performing search in data of medicinal plants in freely available software for prediction of biological activity, docking, generation of descriptors and QSAR modelling.
- Seminar on use of cheminformatics
- Critical reading on applications in drug repurposing, network pharmacology with their pros and cons
- Self -directed learning on applications of these in Ayurveda.
- Participation and interaction groups

Experiential-Learning 19.4 :

- Concept of Pharmacogenomics and Ayurgenomics

- Seminar on pharmacogenomics/Ayurgenomics
- Self -directed learning through tutorials and review of available literature for analysing the applied aspects.

Experiential-Learning 19.5 :

- Applications of Reverse Pharmacology, Clinical pharmacology and evidence based research in Ayurveda

- Critical reading on phytopharmaceuticals,
- Critical reading on insights of reverse pharmacology avaialble in published literature.
- Inputs from Clinical pharmacologist wherever applicable.
- Webinar on reverse pharmacology

Modular Assessment

Assessment method	Hour
Instructions- Conduct a structured Modular assessment. Assessment will be for 75 marks. Keep a structured marking pattern. Utilize various assessment methods in each module throughout the semester. Keep a record of the structured pattern used for assessment. Calculate the Modular grade point as per Table 6 C. **Pre-post Questionnaire** - A list of MCQ-type questions may be given to students before teaching the units 2-5 as a pre-assessment. Later, after completion of a portion of individual units, the same questionnaire may be circulated by changing the sequence or framing of questions as a part of the post-assessment. (75 Marks) Or Practical on any one database by assigning any drug and intended disease by posing questions in case of a unit dealing with omics.- 10 marks and **Group presentations (2 students/group)-** Students in a group of two can be assigned topics from units 2-5 for presentations in light of current updates (eg, NDCT act, amendments in D& C act; overview of software used in cheminformatics, etc.) - 15 Marks and **Project-Based Assessments**: Student will be assigned some small project/task on exploring the rationale for the placement of dravyas of a Mahakshaya by Charaka or gana of Sushruta in one group by searching information on common phytoconstituents and/or disease linkages and interpretation based on dravyaguna fundamentals -25 Marks and **Record keeping** – Log book verification on documentation of tasks accomplished and meticulous recording of observations-25 Marks or Any practical in converted form can be taken for assessment. (50 Marks) and Any experiential activity, such as a portfolio/reflections/presentations, can be taken as an assessment. (25 Marks)	6

Module 20 : Novelty and Principles in compounding dosage forms

Module Learning Objectives
(At the end of the module, the students should be able to)

    1. Describe the concept of dosage forms documented in the classics, with the necessity to develop new dosage forms.
    2 . Differentiate in preparation and regulatory aspects of classical dosage forms and standardized phytoextracts
    3. Demonstrate the ability to critically analyse the principles of compounding in classics and be able to develop modified convenient dosage forms

M 20 Unit 1 NDCT,2019 Overview of Phytopharmaceuticals with regulatory aspect for single drug. (NDCT,2019)

References: 116,117,118

3A	3B	3C	3D	3E	3F	3G
CO9	Evaluate the scope and difference between phytopharmaceuticals and whole herbal drugs with the regulatory aspects	1	Lecture	CE	Knows-how	L_VC,L&GD,L,SDL,L&PPT
CO9	Differentiate phytopharmaceuticals and whole herbal drugs including regulatory aspects with regards to clinical efficacy and safety	2	Practical Training 20.1	PSY-SET	Shows-how	DIS,L_VC,W,IBL
CO9	Categorize the differences between phytopharmaceuticals and whole herbal drugs with the regulatory aspects pertaining to clinical and industrial applications	4	Experiential-Learning 20.1	AFT-SET	Does	PrBL,IBL,SDL,TUT,GBL

M 20 Unit 2 Novel drug delivery systems Insights on novel drug delivery systems

References: 119,120,121

3A	3B	3C	3D	3E	3F	3G
CO9	Appraise the understanding of the novel drug delivery systems , advanced extraction techniques and technologies in Ayurved dosage forms of single drugs	2	Lecture	CAN	Knows-how	L,BL,DIS ,L&GD,L &PPT
CO9	Discuss the need of novel drug delivery systems, advanced extraction techniques and technologies in Ayurved dosage forms of single drugs	3	Practical Training 20.2	PSY-SET	Shows-how	BL,W,DL ,L_VC
CO9	Appraise the need of novel drug delivery systems , advanced extraction techniques and technologies in Ayurved dosage forms of single drugs	3	Experiential-Learning 20. 2	AFT-VAL	Shows-how	Mnt,FV,B S,TBL,Pr BL

M 20 Unit 3 Dosage forms Ayurvedic Principles and dosage forms in classical texts and contemporary science

References: 122,123,124,125

3A	3B	3C	3D	3E	3F	3G
CO9	Illustrate the Traditional and modern dosage forms emphasizing feasibility and advantages with principles mentioned in Ayurved	2	Lecture	CAP	Knows-how	BL,L_VC ,L&PPT , L&GD,DI S
CO9	Demonstrate the Traditional dosage forms with knowledge on development of modern dosage forms with rational understanding of principles of mentioned in Ayurveda	5	Practical Training 20.3	PSY-GUD	Shows-how	W,DL,D A,D
CO9	Appraise the differences in Traditional and modern dosage forms with rational understanding of principles of mentioned in Ayurved	6	Experiential-Learning 20. 3	AFT-VAL	Does	FV,C_L,P rBL

Practical Training Activity

Practical Training 20.1 :

- Difference between phytopharmaceutical and whole herbal drugs with regulatory aspects

- Key differences between phytopharmaceuticals and whole herbal drugs with Regulatory aspects including NDCT 2019 with difference in Manufacturing aspects will be elaborated by the teacher

Practical Training 20.2 :

- Novel drug Delivery systems and Advanced technology for Drug Delivery
- Types of extraction techniques and drying methods to enhance shelf life

- The teacher will discuss different Novel drug delivery systems for phytoconstituents and also advanced technologies either demonstrating /referring through videos or webinar
- The teacher will elaborate the extraction techniques and Types of drying methods- for enhanced shelf life and bioactivity

Practical Training 20.3 :

- Dosage forms of Ayurved and conventional along with novel dosage forms

- The teacher will demonstrate the dosage forms outlined in classical texts followed by the process of development and application of modern and novel dosage forms.

Experiential learning Activity

Experiential-Learning 20.1 :

- Difference between phytopharmaceutical and whole herbal drugs

- Students will be given task of enlisting few examples of phytopharmaceuticals available and the methodology of preparation like extraction ,isolation and testing of plant compounds thus enabling comprehensive learning by the student.

Experiential-Learning 20.2 :

- Current emerging trends in novel drug delivery systems, advanced technologies for drug delivery
- Types of extraction techniques and drying methods to enhance shelf life

- The teacher will assign each scholar to review any one drug delivery system like Nano carriers or targeted Drug Delivery systems or any contemporary developments i.e. cutting edge technology used to develop new dosage forms, drug dose maximisation, optimization eg 3 D printing /additive manufacturing and other advanced technologies followed by evaluation of potential of these modified dosage forms to improve efficacy and safety of Ayurvedic formulations
- A debate initiated by the teacher where the teacher will allot any one extraction technique or drying method like freeze drying, spray drying, ultrasound assisted dring etc where student needs to critically analyse the technologies of herbal drugs with its significance in current scenario with emphasis on advantages and

limitations

Experiential-Learning 20.3 :

- Prepare dosage forms of Ayurved and conventional along with novel dosage forms
- Feasibility ,advantages and limitations of different dosage forms.
- Aquaint with Principles of Ayurved in Compounding formulations of drugs

- Each scholar will be assigned a dosage form in which the student will prepare and discuss on the novelty that can be brought into the formulation for convenience and enhanced bioavailability.
- The teacher will facilitate a debate on the Feasibility ,advantages and limitations of different dosage forms.
- A Project based learning where the scholars will identify the Principles of traditional dosage forms , Bhavana, Sanskara and Compounding from texts like Sharangadhar Samhita and other relevant texts and analyse the basis of simple formulations like Mishrak gana ,Potentiated formulations like Chausashtha pippali, Sukshma Triphala etc , and other relevant formulations mentioned in classics with contemporary understanding through updated research works and showcase any one innovation in dosage form development

Modular Assessment

Assessment method	Hour
Instructions- Conduct a structured Modular assessment. Assessment will be for 25 marks. Keep a structured marking pattern. Utilize various assessment methods in each module throughout the semester. Keep a record of the structured pattern used for assessment. Calculate the Modular grade point as per Table 6C. Debate – Students will debate on the pros and cons of any Novel drug Delivery systems or any advanced technology for Drug Delivery and check the feasibility and limitations (15 Marks) SAQ 5 marks each (10 Marks)	2

Or

Any two practicals in converted form can be taken for assessment. (15 Marks)

And

Any of the experiential as portfolio/reflections/presentations, can be taken as an assessment. (10 Marks)

Semester No : 5

Module 21 : Classical to contemporary aspects of Aushadha Dravya Part 5

Module Learning Objectives
(At the end of the module, the students should be able to)

1. Identify and classify medicinal plants.
2. Illustrate the pharmacology of Medicinal plants based on Ayurveda and contemporary science.
3. Analyze the traditional and modern uses of medicinal plants.
4. Apply evidence-based research in clinical practice.

M 21 Unit 1 Dravya related to Jwaraghna,Vishamajwaraghna,Dahaprashamanaand Sheetaprashamana karma Jwaraghna

1. Sahadevi (*Vernonia cinerea* L.)

2. Kiratatikta (*Swertia chirata* Buch-Ham)

3. Haridru (*Adina cordifolia* Brandis)

4. Trayamana (*Gentiana kurr*o Royle)

5. Patola (*Tricosanthes dioica* Roxb.)

6. Murva (*Marsedenia tenacissima* Wigh)

7. Kashtadaru (*Monoon longifolium* Sonn.)

Vishamajwaraghna

8. Saptaparna (*Alstonia scholaris* R.Br.)

9. Nakhi (*Achatina fulica* Ferrusac.)

10. Kantaki karanja (*Caesalpinia crista* L.)

11. Dronapushpi (*Leucas cephalotes* Spreng.)

12. Tulasi (*Ocimum sanctum* L.)

Dahaprashamana

13. Chandana (*Santalum album* L.)

14. Utpala (*Nymphaea nouchali* Burm.f,)

15. Raktachandana (*Pterocarpus santalinus* L.)

16. Ela (*Elettaria cardamomum* Maton.)

17. Champaka (*Michelia champaka* L.)

18. Shaivala (*Ceratophyllumdemersum* L.)

19. Shaileya (*Parmelia perlatum* Choisy.)

Sheetaprashamana

20. Agaru (*Aquillaria agallocha* L.)

21. Bruhad Ela (*Amomum subulatum* Roxb.)

References:
1,2,5,9,13,14,23,24,25,26,32,33,34,35,36,39,40,41,42,43,44,45,46,48,49,50,51,52,54,55,57,58,59,61,62,63,64,65,68,70,71,72,73,74,75,76,77,78,79,80,81,82,83,177

3A	3B	3C	3D	3E	3F	3G
CO1,CO2,CO5,CO7	Identify the plant & learn their Nama Rupa (Nomenclature& Morphology) and explain its Guna Karma (Classical properties & Actions)	3	Lecture	CC	Knows-how	L&PPT , L_VC,L& GD,L
CO1,CO2,CO5,CO7	Differentiate the plant & learn their Nama Rupa (Nomenclature& Morphology) and explain its Guna Karma (Classical properties & Actions)	6	Practical Training 21.1	PSY-GUD	Shows-how	D-M,DG, DIS,DL,D SN
CO1,CO2,CO5,CO7	Conduct the survey of plants & categorize on the basis of their Nama Rupa (Nomenclature& Morphology) and appreciate their Guna Karma (Classical properties & Actions)	6	Experiential-Learning 21.1	AFT-VAL	Does	L_VC,RL E,PL,D-M,PER
CO1,CO5,CO7	Elaborate therapeutic uses & formulations of medicinal plants, apply evidence-based research in clinical practices & pharmaceutical industry.	2	Lecture	CC	Knows-how	L&GD,L _VC,L&P PT ,L
CO1,CO5,CO7	Appraise therapeutic uses & formulations of medicinal plants, apply evidence-based research in clinical practices & pharmaceutical industry.	4	Practical Training 21.2	PSY-MEC	Shows-how	SDL,DA, PSM,DIS,

						ML
CO1,CO5,CO7	Justify therapeutic uses & formulations of medicinal plants, apply evidence-based research in clinical practices & pharmaceutical industry.	6	Experiential-Learning 21.2	AFT-VAL	Does	DL,TUT, ML,DG,FV

M 21 Unit 2 Dravya related to Balya,Jeevaniya,Sandhaniya and Rasayana karma Balya

1. Bala (*Sida cordifolia* L.)

2. Atibala (*Abutilon indicum* G.Don)

3. Mahabala (*Sida rhomboidea* Roxb.
4. Vidari (*Peureria tuberosa* DC.)
5. Varahi (*Dioscorea bulbifera* L.)
6. Tavaksheera (*Curcuma angustifolia* Roxb.)

Jeevaniya
7. Jeevanti (*Leptadenia reticulata* Retz.)
8. Mudgaparni (*Phaseolus trilobus* A.t.Hort)
9. Mashaparni (*Teramnus labialis* Spreng.)
Sandhaniya
10. Lajjalu (*Mimosa pudica* L.)
Rasayana
11. Haritaki (*Terminalia chebula* Retz.)
12. Amalaki (*Emblica officinalis* Gaertn.)
13. Guduchi (*Tinospora cordifolia* Miers.)
14. Ashwagandha (*Withania somnifera* Dunal.)
15. Vruddhadaru (*Argyreia speciosa* Sweet.)
16. Nagabala (*Grewia hirsuta* Vahl.)
17. Nagdamana (*Sansevieria roxburghiana* Schult.)

References:
1,2,3,5,6,7,9,11,12,13,14,23,24,25,26,27,28,32,33,34,35,36,39,40,41,42,43,44,45,46,47,48,49,50,51,52,53,54,55,56,57,58,59,60,61,62,63,64,65,66,67,68,69,70,71,72,73,74,75,76,77,78,79,80,81,82,83,177

3A	3B	3C	3D	3E	3F	3G
CO1,CO2,CO5,CO7	Identify the plant & learn their Nama Rupa (Nomenclature& Morphology) and explain its Guna Karma (Classical properties & Actions)	3	Lecture	CC	Knows-how	L&PPT , L&GD,L, TBL,L_VC
CO1,CO2,CO5,CO7	Differentiate the plant & learn their Nama Rupa (Nomenclature& Morphology) and explain its Guna Karma (Classical properties & Actions)	6	Practical Training 21.3	PSY-GUD	Shows-how	DL,DA,L_VC,TBL,DSN
CO1,CO2,CO5,CO7	Conduct the survey of plants & categorize on the basis of their Nama Rupa (Nomenclature& Morphology) and appreciate their Guna Karma (Classical properties & Actions)	6	Experiential-Learning 21.3	AFT-VAL	Does	DG,RP,PSM,L_VC,DL
CO1,CO5,CO7	Elaborate therapeutic uses & formulations of medicinal plants, apply evidence-based research in clinical practices & pharmaceutical industry.	2	Lecture	CC	Knows-how	L&GD,L_VC,L,L&PPT
CO1,CO5,CO7	Appraise therapeutic uses & formulations of medicinal plants, apply evidence-based research in clinical practices & pharmaceutical industry.	4	Practical Training 21.4	PSY-ORG	Shows-how	RLE,SDL,DIS,JC,DA
CO1,CO5,CO7	Justify therapeutic uses & formulations of medicinal plants, apply evidence-based research in clinical practices & pharmaceutical industry.	8	Experiential-Learning 21.4	AFT-VAL	Does	TUT,ML,DL,DG,DIS

Practical Training Activity

Practical Training 21.1 :

- Identification of fresh herbs and dry specimens
- Pharmacognostical and Phytochemical analysis
- Preparing digital herbarium
- Clinical use of single drugs

- In campus & Out campus Garden visit under the supervision of the faculty
- Learning by visiting the Raw drug museums
- Collection of photographs
- Learn about Collection of useful parts and preservation
- Exploring Phyto constituents and their Pharmacological actions by using data bases (Minimum one each in every karma)

Practical Training 21.2 :

- Preparation of single drug remedies
- Segregating drug based on Grahya Agrahyatva
- Procurement of drug based on quality standards

- Preparing Panchavidha kashaya kalpana in lab
- Practical on Quality control methods in Dravyaguna Lab
- Collection of Dravya and their officinal parts
- Postings in Clinical setup

Practical Training 21.3 :

- Identification of fresh herbs and dry specimens
- Pharmacognostical and Phytochemical analysis
- Preparing digital herbarium
- Clinical use of single drugs

- In campus & Out campus Garden visit under the supervision of the faculty
- Learning by visiting the Raw drug museums
- Collection of photographs
- Learn about Collection of useful parts and preservation
- Exploring Phyto constituents and their Pharmacological actions by using data bases (Minimum one each in every karma)

Practical Training 21.4 :

- Preparation of single drug remedies
- Segregating drug based on Grahya Agrahyatva
- Procurement of drug based on quality standards

- Preparing Panchavidha kashaya kalpana in lab
- Practical on Quality control methods in Dravyaguna Lab
- Collection of Dravya and their officinal parts
- Postings in Clinical setup

Experiential learning Activity
Experiential-Learning 21.1 : - Conducting Field survey - Visit to Garden - Identification of fresh herbs and dry specimens
- Identify plants on the basis of key characters - Observe and analyse use of single drugs & their formulations in clinical settings
Experiential-Learning 21.2 : - Conducting Field survey - Visit to Garden - Visit to pharmacy to identify, observe raw herbs and their formulations
- Case Study presentations - Group Discussions - Visit to Ayurveda pharmaceutical industries

Experiential-Learning 21.3 :

- Field survey
- Visit to Garden
- Identification of fresh herbs and dry specimens

- Identify plants on the basis of key characters
- Observe and analyse use of single drugs & their formulations in clinical settings

Experiential-Learning 21.4 :

- Field survey
- Visit to Garden
- Visit to pharmacy to identify, observe raw herbs and their formulations

- Case Study presentations
- Group Discussions
- Visit to Ayurveda pharmaceutical industries

Modular Assessment	
Assessment method	**Hour**
Instructions- Conduct a structured Modular assessment. Assessment will be for 75 marks. Keep a structured marking pattern. Utilize various assessment methods in each module throughout the semester. Keep a record of the structured pattern used for assessment. Calculate the Modular grade point as per Table 6C. Case scenario-based assessment. Each student will be presented with a case scenario, and the student has to analyse and interpret the applied aspects of the particular plant with appropriate reasoning- 20 Marks and Demonstration of identification of plant with AI tools- 20 Marks and Compilation on one plant (herb descriptions evolved)- 20 marks and Visual representation: Ecological Journey of a given Plant from Vedic to Present era– 15 Marks Or Any practical in converted form can be taken for assessment. (75 Marks) Or Any of the experiential as portfolio/reflections/presentations, can be taken as an assessment. (75 Marks)	4

Module 22 : Classical to contemporary aspects of Aushadha Dravya Part 6

Module Learning Objectives
(At the end of the module, the students should be able to)

1. Identify and classify medicinal plants.
2. Illustrate the pharmacology of Medicinal plants based on Ayurveda and contemporary science.
3. Analyze the traditional and modern uses of medicinal plants.
4. Apply evidence-based research in clinical practice.

M 22 Unit 1 Dravya related to Vishaghna, Upavisha, Angamardaprashamana, Bruhana, Lekhana, Raktastambhana, Raktaprasadaka, Asthisandhaniya,Shoshahara and Raktaarbudanashaka Karma Vishaghna

1. Shirisha (*Albizzia lebbeck* Benth.)

2. Nirvisha (*Delphinium denudatum* Wall.)

3. Patalagarudi (*Cocculus hirsutis* Diels.)

4. Ankola (*Alangium salvifolium* Wang.)

Upavisha

5. Gunja (*Abrus precatorius* L.)

Angamardaprashamana

6. Shalaparni (*Desmodium gangeticum* DC.)

7. Prushniparni (*Uraria picta* Desr.)

8. Methika (*Trigonella foenum-graecum* L.)

Brumhana

9. Kharjura (*Phoenix sylvestris* Roxb.)

10. Madhuka (*Glycyrrhiza glabra* L.)

11. Chhatraka (*Agaricus campestris* L.)

Lekhana

12. Chirabilva (*Holoptelea integrifolia* Planch.)

13. Haimavati (*Iris germanica* L.)

Raktastambhana

14. Priyangu (*Callicarpa macrophylla* Vahl.)

15. Nagakeshara (*Mesua ferrea* L.)

16. Surapunnaga (*Ochrocarpus longifolius* Benth.)

17. Punnaga (*Calophyllum inophyllum* L.)

18. Parnabeeja (*Bryophyllum pinnatum* Lam.)

19. Ayapana (*Eupatorium triplinerve* Vahl.)

20. Jhandu (*Tagetes erecta* L.)

21. Shaka (*Tectona grandis* L.)

22. Kukundara (*Blumea lacera* DC.)

23. Jalakumbhi (*Pistia stratiotes* L.)

Raktaprasadaka

24. Sariva (*Hemidesmus indicus* R.Br.)

25. Manjistha (*Rubia cordifolia* L.)

26. Chopachini (*Smilax china* L.)

27. Mundi (*Sphaeranthes indicus* L.)

28. Shimshapa (*Dalbergia sissoo* Roxb.)

29. Suranjana (*Colchicum luteum* Baker.)

Asthisandhaniya

30. Asthishrinkhala (*Cissus quadrangularis* L.)

Shoshahara

31. Rudanti (*Cressa cretica* L.)

Raktaarbudanashaka

32. Sadapushpa (*Catharanthes roseus* G.Don.)

33. Vanatrapushi (*Podophyllum hexandrum* Royle)

References:
1,2,3,5,6,7,9,11,12,13,14,23,24,25,26,27,28,32,33,34,35,36,39,40,41,42,43,44,45,46,47,48,49,50,51,52,53,54,55,56,57,58,59,60,61,62,63,64,65,66,67,68,69,70,71,72,73,74,75,76,77,78,79,80,81,82,83,177

3A	3B	3C	3D	3E	3F	3G
CO1,CO2,CO5,CO7	Identify the plant & learn their Nama Rupa (Nomenclature& Morphology) and explain its Guna Karma (Classical properties & Actions)	3	Lecture	CC	Knows-how	L_VC,L,L&GD,L&PPT
CO1,CO2,CO5,CO7	Differentiate the plant & learn their Nama Rupa (Nomenclature& Morphology) and explain its Guna Karma (Classical properties & Actions)	10	Practical Training 22.1	PSY-GUD	Shows-how	DL,DG,L_VC,TBL,DSN
CO1,CO2,CO5,CO7	Conduct the survey of plants & categorize on the basis of their Nama Rupa (Nomenclature& Morphology) and appreciate their Guna Karma (Classical properties & Actions)	10	Experiential-Learning 22.1	AFT-VAL	Does	RP,L_VC,PSM,D-M,PER
CO1,CO5,CO7	Elaborate therapeutic uses & formulations of medicinal plants, apply evidence-based research in clinical practices & pharmaceutical industry.	7	Lecture	CC	Knows-how	L_VC,L&GD,L,L&PPT
CO1,CO5,CO7	Appraise therapeutic uses & formulations of medicinal plants, apply evidence-based research in clinical practices & pharmaceutical industry.	10	Practical Training 22.2	PSY-ORG	Shows-how	SDL,JC,RLE,ML,PSM
CO1,CO5,CO7	Justify therapeutic uses & formulations of medicinal plants, apply evidence-based research in clinical practices & pharmaceutical industry.	10	Experiential-Learning 22.2	AFT-VAL	Does	TUT,DL,DIS,FV,ML
CO1,CO5,CO7	Justify therapeutic uses & formulations of medicinal plants, apply evidence-based research in clinical practices & pharmaceutical industry.	6	Experiential-Learning 22.3	AFT-VAL	Does	DG,ML,FV,DL,TUT

Practical Training Activity
Practical Training 22.1 : - Identification of fresh herbs and dry specimens - Pharmacognostical and Phytochemical analysis - Preparing digital herbarium - Clinical use of single drugs
- In campus & Out campus Garden visit under the supervision of the faculty - Learning by visiting the Raw drug museums - Collection of photographs - Learn about Collection of useful parts and preservation - Exploring Phyto constituents and their Pharmacological actions by using data bases (Minimum one each in every karma)
Practical Training 22.2 : - Preparation of single drug remedies - Segregating drug based on Grahya Agrahyatva - Procurement of drug based on quality standards
- Preparing Panchavidha kashaya kalpana in lab - Practical on Quality control methods in Dravyaguna Lab

- Collection of Dravya and their officinal parts
- Postings in Clinical setup

Experiential learning Activity

Experiential-Learning 22.1 :

- Conducting Field survey
- Visit to Garden
- Identification of fresh herbs and dry specimens

- Identify plants on the basis of key characters
- Observe and analyse use of single drugs & their formulations in clinical settings

Experiential-Learning 22.2 :

- Conducting Field survey
- Visitt Garden
- Visit to pharmacy to identify, observe raw herbs and their formulations

- Case Study presentations
- Group Discussions

- Visit to Ayurveda pharmaceutical industries

Experiential-Learning 22.3 :

- Conducting Field survey
- Visit to Garden
- Visit to pharmacy to identify, observe raw herbs and their formulations

- Case Study presentations
- Group Discussions
- Visit to Ayurveda pharmaceutical industries

Modular Assessment

Assessment method	Hour
Assessment method Hours – 4 Instructions - Conduct a structured Modular assessment. Assessment will be for 50 marks. Keep a structured marking pattern. Utilize various assessment methods in each module throughout the semester. Keep a record of the structured pattern used for assessment. Calculate the Modular grade point as per the table.6C Written assessment on identification and Amayika prayoga of Dravya related to Vishaghna, Upavisha, Angamardaprashamana, Bruhana, Lekhana, Raktastambhana, Raktaprasadaka, Asthisandhaniya, Shoshahara, and Raktaarbudanashaka Karma (25 Marks) and Conducting a quiz or multiple choice assessment on Dravya mentioned under Vishaghna, Upavisha, Angamardaprashamana, Bruhana, Lekhana, Raktastambhana, Raktaprasadaka, Asthisandhaniya, Shoshahara, and Raktaarbudanashaka Karma (25 Marks)	4

or

Any practical in converted form can be taken for assessment. (25 Marks)

and

Any experiential activity, such as a portfolio/reflections/presentations, can be taken as an assessment. (25 Marks)

Semester No : 6

Module 23 : Study of plant-based dietary components and Animal-origin Drugs.

Module Learning Objectives
(At the end of the module, the students should be able to)

    1. Describe the properties and actions of dietary components of various vargas of plant origin, along with the study of drugs of animal origin

    2. Analyse the conventional and contemporary dietary components and therapeutic uses, as well as the neutraceutical aspects

    3 Identify the preventive and curative aspects of dietary components in various disorders and critically analyse the research updates in neutraceuticals.

M 23 Unit 1 Dhanya, Shaka, Ikshu, taila and Vari varga Guna, Karma Prayoga of dravya mentioned in Dhanya, Shaka, Ikshu, taila and Vari varga

References: 135,136,137,138,139,140,141,142,143,144

3A	3B	3C	3D	3E	3F	3G
CO1,CO2,CO3,CO5	Identify the dravya & learn their Nama Rupa (Nomenclature& Morphology if any) and explain its Guna Karma (Classical properties & Actions) of dravya in Dhanya, Shaka, Ikshu, taila and Vari varga from perspective of industrial applications	5	Lecture	CC	Knows-how	L&PPT , L,L_VC, L&GD
CO1,CO2,CO3,CO5	identify the dravya & learn their Nama Rupa (Nomenclature& Morphology) and explain its Guna Karma (Classical properties & Actions)	10	Practical Training 23.1	PSY-GUD	Shows-how	DL,DIS,FV,DA,L_VC

3A	3B	3C	3D	3E	3F	3G
CO1,CO2,CO3 ,CO5	Categorize the dravya on the basis of their Nama Rupa (Nomenclature& Morphology) and appreciate their Guna Karma (Classical properties & Actions)	10	Experiential-Learning 23.1	PSY-GUD	Shows-how	DL,ML,D ,DIS,PL
CO1,CO2,CO3 ,CO5	Categorize the dravya on the basis of their Nama Rupa (Nomenclature& Morphology) and appreciate their Guna Karma (Classical properties & Actions).	3	Experiential-Learning 23.2	AFT-RES	Shows-how	D

M 23 Unit 2 Dugdha,Dadhi, Takra, Navneet, ghrita, Madhu, Mutra,Mamsa Guna, Karma Prayoga of dravya mentioned in Dugdha,Dadhi, Takra, Navneet, ghrita, Madhu, Mutra,Mamsa

References:

3A	3B	3C	3D	3E	3F	3G
CO1,CO4,CO6	Describe the dravya & learn their Nama Rupa (Nomenclature) and explain its Guna Karma (Classical properties & Actions) of dravya in Dugdha , Dadhi, Takra, Navneet, ghrita, Madhu, Mutra	5	Lecture	CC	Knows-how	L_VC,L, L&GD,L &PPT
CO1,CO2,CO3 ,CO5	Identify the dravya & learn their Nama Rupa (Nomenclature) and explain its Guna Karma (Classical properties & Actions)	10	Practical Training 23.2	PSY-GUD	Shows-how	FV,D,JC, DA,DL
CO1,CO2,CO3 ,CO5	Categorize the dravya on the basis of their Nama Rupa (Nomenclature & Morphology) and appreciate their Guna Karma (Classical properties & Actions)	10	Experiential-Learning 23.3	AFT-RES	Shows-how	DL,D,DA ,ML,PL
CO1,CO2,CO3 ,CO5	Categorize the dravya on the basis of their Nama Rupa (Nomenclature& Morphology) and appreciate their Guna Karma (Classical properties & Actions).	3	Experiential-Learning 23.4	AFT-RES	Shows-how	D,GBL,B L

Practical Training Activity

Practical Training 23.1 :

- Identification of ahara dravya specimens

- Clinical use of single drugs
- Disease specific prayoga of Ahar kalpana in clinical settings

- Learning by visiting the Raw drug museums
- Disease specific use of Ahar kalpana (any ten drugs) in clinical settings

[The teacher may demonstrate some ahar dravya and their kalpana in specific diseases viz. Madhumeha, Sthaulya, Jwara, Atisara, etc.]

Practical Training 23.2 :

- Prayoga of ahara dravya of animal origin

- Survey among patients in OPD.[Teacher in his/her OPD can explain typical cases of apathya due to peculiar dietary items enlisted in samhitas]
- Clinical relevance in dietary indications and contra-indications associated with diseases. [Teacher can demonstrate the dravya and discuss about its kalpana in a particular disease with rationale.]
- Identify the methods of Adulteration in milk, honey, oil and ghee.
- Visit to dairy farm/milk schemes.

Experiential learning Activity

Experiential-Learning 23.1 :

- Prayoga of various ahara dravya of plant origin

- Observe and analyse use of single drugs & their formulations in clinical settings

  [The student may be assinged with a case study and be asked to write dietary recommendations for   the respective condition along with justification]

- Visitation (physical/virtual) to Food research industry/laboratories.(Like understanding their functioning and processing through CFTRI, NIN, Dabur, etc)
- Conducting industry based survey for medicinal plants to study RTE products.
- Visitation to Garden
- Analyse through recent researches available on these dravya, food composition tables, nutritional value assessment,etc.
- Guest lecture

Experiential-Learning 23.2 :

- Prayoga of various ahara dravya of plant origin

- Observe and analyse use of single drugs & their formulations in clinical settings

  [The student may be assinged with a case study and be asked to write dietary recommendations for the   respective condition along with justification]

- Visitation (physical/virtual) to Food research industry/laboratories.(Like understanding their functioning and processing through CFTRI, NIN, Dabur, etc)

- Conducting industry based survey for medicinal plants to study RTE products

Experiential-Learning 23.3 :

- Prayoga of ahara dravya of animal origin

- Analysing the current dairy products and their relevance in either manifesting/ or role in treatment.
- Analyse the traditional utility of milk, honey, takra, oil etc. as anupana, as ingredient in formulations, as a media in shodhana, various kalpana like kshirpaka, basti dravya, nasya dravya with rationale in respective diseases.
- Analyse through recent researches available on these dravya focusing nutraceuticals.
- Visitation to Food industry/lab for having an idea about currently used neutraceuticals comprising dravya from animal origin.

Experiential-Learning 23.4 :

- Prayoga of ahara dravya of animal origin

- Analysing the current dairy products and their relevance in either manifesting/ or role in treatment.
- Analyse the traditional utility of milk, honey, takra, oil etc. as anupana, as ingredient in formulations, as a media in shodhana, various kalpana like kshirpaka, basti dravya, nasya dravya with rationale in respective diseases.
- Analyse through recent researches available on these dravya focusing nutraceuticals.
- Visitation to Food industry/lab for having an idea about currently used neutraceuticals comprising dravya from animal origin.

Modular Assessment	
Assessment method	**Hour**
Instructions- Conduct a structured Modular assessment. Assessment will be for 50 marks. Keep a structured marking pattern. Utilize various assessment methods in each module throughout the semester. Keep a record of the structured pattern used for assessment. Calculate the Modular grade point as per Table 6C. Case study - A dummy case study of a patient with either Madhumeha/Sthaulya/Jwara may be assigned to the student to prescribe the dietary recommendations with justifications. -25 marks and Practical: Practical on preparation of any one Ahara Kalpana with an integrative approach, highlighting classical as well as dietetics requirement,s posing questions (any 1 from each unit)-25 Marks or Project-Based Assessments: Student will be assigned a small project/task on framing a short survey questionnaire to explore the association of faulty dietary habits as per Ayurveda and the manifestation of respective diseases. The pilot testing may be encouraged in any five patients of the respective disease visiting the OPD-25 Marks and Record keeping – Log book verification on documentation of tasks accomplished and meticulous recording of observations-25 Marks or Any practical in converted form can be taken for assessment. (25 Marks) and Any experiential activity, such as a portfolio/reflections/presentations, can be taken as an assessment. (25 Marks)	4

Module 24 : Pharmacotherapeutics of Herbal Cosmetic dravya - Varnya , Keshya, Twachya

Module Learning Objectives
(At the end of the module, the students should be able to)

    1. Describe the pharmacotherapeutics of cosmetic dravyas mentioned in the relevant literature.
    2. Perform classical and innovative formulations of cosmetics

3. Apply and interpret the therapeutic applications mentioned in the classical literature with curent local and global demands.

M 24 Unit 1 Ayurvedic Herbal Cosmetics Ayurvedic Herbal Cosmetics

References: 139,140,141,142,143

3A	3B	3C	3D	3E	3F	3G
CO1	Analyse the pharmacotherapeutics of Herbal cosmetic dravya mentioned in relevant classical literature with contemporary science	5	Lecture	CAN	Knows-how	L_VC,L, L&GD,L &PPT
CO5,CO7,CO9	Demonstrate the clinical application of cosmetic dravyas related to skin and hair	10	Practical Training 24.1	PSY-GUD	Shows-how	EDU,CB L,PBL
CO5,CO7,CO9	Observe the clinical efficacy and safety of cosmetic dravyas	10	Experiential-Learning 24. 1	AFT-REC	Shows-how	CBL,PL, DIS,BS

M 24 Unit 2 Raw materials, essential oil, preservatives, additives used in preparation of Ayurveda Cosmetics Raw materials, essential oil, preservatives, additives used in preparation of Ayurveda Cosmetics

References: 57,144

3A	3B	3C	3D	3E	3F	3G
CO5,CO7,CO9	Summarise the raw materials used in formulating cosmetics of Ayurved	3	Lecture	CC	Knows-how	BL,L,L& PPT ,L& GD,L_V C
CO5,CO7,CO9	Prepare classical and innovative formulations of cosmetics with dravyas of Ayurved	8	Practical	PSY-SET	Shows-	ML,L_V

			Training 24.2		how	C,DL,D
CO4	Appraise the importance of formulating cosmetics mentioned in the classical literature with current, local and global demands	10	Experiential-Learning 24.2	AFT-VAL	Does	LS,DL,IBL,PrBL

M 24 Unit 3 Assays and equipment in cosmetics Assays and equipment in cosmetics

References: 145,146,147,148

3A	3B	3C	3D	3E	3F	3G
CO5,CO7,CO9	Describe the application of instruments and assays to evaluate cosmetics for clinical efficacy and safety	2	Lecture	CC	Knows-how	L,BL,L_VC,L&PPT ,L&GD
CO5,CO7,CO9	Demonstrate the instruments and assays to evaluate cosmetics for clinical efficacy and safety with drugs of Ayurved	2	Practical Training 24.3	PSY-GUD	Shows-how	L_VC,W,Mnt
CO5,CO7,CO9	Appraise the instruments and assays used globally to evaluate cosmetics for clinical efficacy and safety with drugs of Ayurved	8	Experiential-Learning 24.3	AFT-VAL	Does	ML,W,C_L,FV

Practical Training Activity

Practical Training 24.1 :

- Case based scenario of Ekala Dravyas used for cosmetic purposes on skin and hair conditions

- The teacher will present and discuss Case based Scenario of Ekala Dravyas used as Varnya, Keshya ,Twachya .Rasayana and other correlating terms documented in classical texts for cosmetic purposes on clinical efficacy and safety on skin and hair. Demonstrate the clinical application of cosmetic dravyas related to skin and

hair   based on skin and hair type

Practical Training 24.2 :

- Classical and innovative formulations of Herbal cosmetic dravya
- Processes used in manufacture of Cosmetics with the Quality standards ,stability

- The teacher will demonstrate the preparations of single herb formulations for skin and haircare and discuss the limitations on the available formulations with need to have innovative formulations.
- The teacher will demonstrate or refer to online tools on the processes like Emulsification, Mixing, Gelling, Compaction, Moulding ,Packaging, Quality standards of raw material , Packaging material, Intermediate Product and finished product ,Stability of Cosmetics with regulatory provisions

Practical Training 24.3 :

- Principles and techniques used in Cosmetology and Trichology with methods to evaluate safety

- The teacher demonstrates or refers to online tools on available methods of Instrumentation methods of clinical trials in cosmetics like Corneometer, Cuteometer, Tewameter for skin and instruments of Trichology .Methods to evaluate safety like Skin sensitization sensitivity testing, invitro tests for skin irritation. Assays to evaluate cosmetic preparations like antityrosinase ,antielastase

Experiential learning Activity
Experiential-Learning 24.1 : • Case scenarios of Ekala Dravyas as Herbal Cosmetics • Ayurvedic and and explore contemporary principles of cosmetics mentioned in Ayurveda
• The teacher will assign each scholar a Case Scenario and the student is expected to select and justify suitable Ekala Dravyas and discuss for summarization and recommendations by the teacher. • The scholars will be asked to analyse the Ayurvedic and contemporary principles of any dravya with Keshya or Varnya or Tvachya or any other cosmetic associated terminologies through research papers. Also understand the changing dimensions in approach in Cosmetics by Critical reading on principles of Ayurved with current holistic approach of Cosmeceuticals, Nutricosmetics ,eco-friendly organic ingredients etc. Explore research updates on clinical efficacy and safety of herbal cosmetics .After completion of the above experiential exercise have critical discussion and summarization by the teacher.
Experiential-Learning 24.2 : • Classical and innovative formulations of cosmetics • Simple cosmetic formulations available in the market
• The teacher will assign each scholar preparation of any single herb cosmetic formulation towards skin or haircare. The scholar will prepare and discuss the innovation that can be brought into the formulation • Each scholar will conduct Webbased survey on the available market single herb preparations and note down the Raw materials, essential oil, preservatives,

Humectants ,Surfactants ,additives ,aromatics used in preparation of Ayurveda Cosmetics . Explore papers on the Novel approach in cosmetic formulation like Nanoparticulate system, Aromatherapy.Students will then present their findings followed by a class discussion.

Experiential-Learning 24.3 :

- Principles and techniques used in Cosmetology and Trichology
- Methods to evaluate efficacy and safety of cosmetics

- The scholar by screening the research papers or onine tools should observe the available methods of Instrumentation methods of clinical trials in cosmetics like Corneometer, Cuteometer, Tewameter for skin and instruments of Trichology and document the observations.
- Scholars will have to enlist the available methods to evaluate efficacy and safety of cosmetics based on papers or online clips like Skin sensitization sensitivity testing, invitro tests for skin irritation, Assays like antityrosinase ,antielastase

Modular Assessment

Assessment method	Hour
Instructions- Conduct a structured Modular assessment. Assessment will be for 50 marks. Keep a structured marking pattern. Utilize various assessment methods in each module throughout the semester. Keep a record of the structured pattern used for assessment. Calculate the Modular grade point as per Table 6C. Student will present an innovative classical preparation emulating a modern counterpart - Rubrics-based Assessment based on Innovation, application, and skills on presentation (25 Marks) and Preparation of Monograph on any cosmetic herb - Rubrics based Assessment based on information, presentation, research carried out (25 Marks) Or	2

Any two practicals in converted form can be taken for assessment. (25 Marks)
And
Any of the experiential as portfolio/reflections/presentations, can be taken as an assessment. (25 Marks)

Paper No : 4 Regulatory Frameworks in Dravyaguna

Semester No : 3

Module 25 : Evolution of Dravyaguna and Scope of AI applications.

Module Learning Objectives
(At the end of the module, the students should be able to)

1. Describe the evolution of dravyaguna from the Vedic period to the present day.
2. Validate the scientific reasons for changes in ecological factors and flora/ fauna.
3. Understand the scope and challenges of AI in Dravyaguna

M 25 Unit 1 Evolution of Dravyaguna Evolution of Dravyaguna from Vedic period to the present day. It also deals with scientific validation for changes in ecological factors and flora/ fauna.

References: 5,33,39,43,44

3A	3B	3C	3D	3E	3F	3G
CO2,CO4,CO9	Asses the development of Ayurveda pharmacology through the literature found in Vedas, Samhita, Nighantus, Evaluate the causes for changes in ecological factors and flora/ fauna.	6	Lecture	CAN	Knows-how	L_VC,BL ,C_L,L& PPT ,BS
CO2,CO4,CO9	Discuss and demonstrate the availability of medicinal plants found in vedic literature, Samhita, Nighantus and recent databases and their therapeutic efficacy.	10	Practical Training 25.1	PSY-GUD	Shows-how	DL,FV,D, BS,DG
CO2,CO4,CO9	Enlist medicinal plants found in vedic literature, Samhita, Nighantus and recent databases.and evaluate their therapeutic efficacy.	10	Experiential-Learning 25.1	AFT-RES	Shows-how	D-BED,P rBL,CBL, SDL
CO2,CO4,CO9	Discuss and demonstrate the therapeutic efficacy of medicinal plants found in vedic	10	Practical	PSY-	Shows-how	DIS,DG,F

	literature, Samhita, Nighantus		Training 25.2	GUD	how	V
CO2,CO4,CO9	Discuss and evaluate the causes for changes found in biodiversity, habitat, climate change, water quality, soil quality Etc. from vedic period to present day	5	Lecture	PSY-GUD	Shows-how	ML,W,BS ,DL,FV
CO2,CO4,CO9	Search and evaluate the causes for changes found in biodiversity, habitat, climate change, water quality, soil quality.from vedic period to present day.	10	Experiential-Learning 25.2	AFT-REC	Does	D-M,FV, PAL,PBL ,DL
CO2,CO4,CO9	Search and evaluate the causes for changes found in biodiversity, habitat, climate change, water quality, soil quality.from vedic period to present day.	3	Experiential-Learning 25.3	AFT-REC	Does	D-M,DL, FV,BS
CO2,CO4,CO9	Enlist medicinal plants found in vedic literature, Samhita, Nighantus and recent databases.and evaluate their therapeutic efficacy.	3	Experiential-Learning 25.4	AFT-RES	Shows-how	CBL,D-BED

M 25 Unit 2 AI in Dravyaguna Scope and challenges of AI in Dravyaguna

References: 150,151,152

3A	3B	3C	3D	3E	3F	3G
CO2,CO4,CO9	Describe the knowledge of AI based identification of Medicinal plants	4	Lecture	CAP	Knows-how	D,JC,BL, BS
CO2,CO4,CO9	Perform the knowledge of AI based identification of Medicinal plants	10	Practical Training 25.3	PSY-GUD	Shows-how	SDL,Mnt, PAL,W
CO2,CO4,CO9	Practice the knowledge of AI based identification of Medicinal plants	10	Experiential-Learning 25.5	AFT-RES	Does	EDU,D, W,JC,DIS
CO2,CO4,CO9	Practice the knowledge of AI based identification of Medicinal plants	3	Experiential-Learning 25.	AFT-RES	Does	JC,D,DIS, EDU

			6			

Practical Training Activity

Practical Training 25.1 :

- Medicinal plants found in vedic literature, Samhita, Nighantus and recent databases.

- The teacher will demonstrate medicinal plants (museum/field/ photos/video).
- Teacher will try to identify them botanically with databases/Floras.

Practical Training 25.2 :

- Therapeutic efficacy of medicinal plants found in vedic literature, Samhita, Nighantus

- The teacher will facilitate a group discussion on therapeutic efficacy and safety with researches.
- Case scenario-based discussions would be conducted to interpret the applied aspects of the particular plant (OPD/IPD)

Practical Training 25.3 :

- AI based identification of Medicinal plants

- Group discussion on AI's role in identifying, classifying, and analysing medicinal plants.
- Demonstration of identification of plant with AI tools.
- Demonstration of dataset preparation on selected plant with the help of AI (images, properties, botanical description, uses, formulations etc)

Experiential learning Activity

Experiential-Learning 25.1 :

- Medicinal plants found in vedic literature, Samhita, Nighantus and recent databases.and evaluate their therapeutic efficacy

- Visual representation of Dravyaguna evolution.
- Compilation on one plant (herb descriptions evolved over time)
- Field visit : Collection and preservation
- Experimental Validation: pre-clinical/case study

Experiential-Learning 25.2 :

- Causes for changes found in biodiversity, habitat, climate change, water quality, soil quality.from vedic period to present day.

- Visual representation: Ecological Journey of Plants/Animals from Vedic to Present era
- Prepare a mini-report for awareness on Dravyaguna and ecological sustainability.

Experiential-Learning 25.3 :

- Causes for changes found in biodiversity, habitat, climate change, water quality, soil quality.from vedic period to present day.

- Visual representation: Ecological Journey of Plants/Animals from Vedic to Present era
- Prepare a mini-report for awareness on Dravyaguna and ecological sustainability.

Experiential-Learning 25.4 :

- Medicinal plants found in vedic literature, Samhita, Nighantus and recent databases.and evaluate their therapeutic efficacy

- Visual representation of Dravyaguna evolution.
- Compilation on one plant (herb descriptions evolved over time)
- Field visit : Collection and preservation
- Experimental Validation: pre-clinical/case study

Experiential-Learning 25.5 :

- AI based identification of Medicinal plants

- Regional Medicinal plant Atlas preparation with AI tools.

Experiential-Learning 25.6 :

- AI based identification of Medicinal plants

- Regional Medicinal plant Atlas preparation with AI tools.

Modular Assessment	
Assessment method	**Hour**
Instructions- Conduct a structured Modular assessment. Assessment will be for 75 marks. Keep a structured marking pattern. Utilize various assessment methods in each module throughout the semester. Keep a record of the structured pattern used for assessment. Calculate the Modular grade point as per Table 6C. Case scenario-based assessment. Each student will be presented with a case scenario, and the student has to analyse and interpret the applied aspects of the particular plant with appropriate reasoning- 20 Marks and Demonstration of identification of plant with AI tools- 20 Marks and	6

Compilation on one plant (herb descriptions evolved)- 20 marks
and
Visual representation: Ecological Journey of a given Plant from Vedic to Present era– 15 Marks
Or
Any practical in converted form can be taken for assessment. (50 Marks)
and
Any of the experiential as portfolio/reflections/presentations, can be taken as an assessment. (25 Marks)

Module 26 : Quality Control of selected Formulation ingredients from Sharangadhara, AFI and API.

Module Learning Objectives
(At the end of the module, the students should be able to)

1. Explain the principles of standardization and quality control in Ayurvedic raw drugs and formulations as outlined in Sharangadhara, the Ayurvedic Formulary of India (AFI), and the Ayurvedic Pharmacopoeia of India (API).
2. Conduct quality control tests and standardization procedures for selected Ayurvedic formulations, applying the guidelines from Sharangadhara, AFI, and API.
3. Differentiate between various Ayurvedic raw drugs and formulations, assessing their quality based on specified parameters and standards.

M 26 Unit 1 Panchavidha Kashaya Kalpana, Sneha Kalpana, Sandhana Kalpana Standardization and Quality control of raw drugs/ingredients and formulations of Panchavidha Kashaya Kalpana, Sneha Kalpana, Sandhana Kalpana etc (3 in each category)

References: 153,154,155,156

3A	3B	3C	3D	3E	3F	3G
CO1,CO2,CO4 ,CO9	Practice the WHO guidelines and key principles for assessment of crude drugs and herbal medicine of selected Formulations of Sharangadhara, AFI and API .	3	Experiential-Learning 26. 1	AFT-REC	Shows-how	PAL,SIM, W,ML
CO1,CO2,CO4	Interpret the WHO guidelines and key principles for assessment of crude drugs and	2	Lecture	CE	Shows-	L&PPT ,

,CO9	selected formulations from Sharangadhara, API and AFI				how	C_L,W,L_VC
CO1,CO2,CO4 ,CO9	Apply the WHO guidelines and key principles for assessment of crude drugs and selected formulations from Sharangadhara, API and AFI	3	Practical Training 26.1	PSY-MEC	Shows-how	PSN,DL,SIM,TPW
CO1,CO2,CO4 ,CO9	Apply the WHO guidelines and key principles for assessment of crude drugs and selected formulations from API and AFI	3	Practical Training 26.2	PSY-GUD	Shows-how	ML,DA,Mnt,FV,PAL
CO1,CO2,CO4 ,CO9	Practice modern methods for the standardization and quality control of Ayurvedic ingredients and formulations in terms of purity and efficacy.	5	Experiential-Learning 26.2	AFT-RES	Shows-how	REC,DA,Mnt,FV
CO1,CO2,CO4 ,CO9	Discuss modern methods for the standardization and quality control of Ayurvedic ingredients and formulations in terms of purity and efficacy.	1	Lecture	CAP	Knows-how	W,L_VC,TUT,L&PPT
CO1,CO2,CO4 ,CO9	Demonstrate the rationale behind formulating various Kalpana	4	Practical Training 26.3	PSY-MEC	Shows-how	FV,Mnt,W,D
CO1,CO2,CO4 ,CO9	Illustrate the rationale behind formulating various Kalpana	5	Experiential-Learning 26.3	AFT-REC	Shows-how	ML,SDL,W,IBL,TPW
CO1,CO2,CO4 ,CO9	Explain the rationale behind formulating various Kalpana	1	Lecture	CC	Knows-how	BL,DIS,Mnt
CO1,CO2,CO4 ,CO9	Integrate traditional Ayurvedic knowledge with contemporary quality control standards	1	Lecture	CC	Knows-how	L&PPT ,L&GD,L,EDU,L_VC
Practical Training Activity						

Practical Training 26.1 :

- Quality control (standerdization) of crude drugs from Sharangadhara,

Demonstrate the Standardization parameters (Pharmacognostical, phytochemical) of crude drugs and Formulations as per API and AFI guideline.

- Macroscopic/microscopic analysis
- Physicochemical analysis (moisture content, ash value, extractive values)
- Chromatographic profiling (TLC/HPTLC)
- Microbial limit tests
- Heavy metal & pesticide residue tests
- Hands on training on quality control (standardization) of crude drugs of selected formulations

Practical Training 26.2 :

- Quality control (standerdization) of crude drugs of selected formulations from API and AFI

Demonstrate the Standardization parameters (Pharmacognostical, phytochemical) of crude drugs and Formulations as per API and AFI guideline.

- Macroscopic/microscopic analysis
- Physicochemical analysis (moisture content, ash value, extractive values)
- Chromatographic profiling (TLC/HPTLC)
- Microbial limit tests
- Heavy metal & pesticide residue tests
- Hands on training on quality control (standardization) of crude drugs of selected formulations

Practical Training 26.3 :

- Rationale behind formulating various Kalpana

- Hands-on lab sessions for preparing foundational formulations like Swarasa (juice), Kalka (paste), Kashaya (decoction), Churna (powder), and Vati (tablet), focusing on the reasoning behind each preparation method.
- Practical exercise on selecting or substituting ingredients in formulations based on their properties,
- Discussion on how each choice affects the formulation's efficacy.

Experiential learning Activity

Experiential-Learning 26.1 :

- Crude drugs and herbal medicine of selected Formulations of Sharangadhara, AFI and API .

The scholars should perform the -

- Macroscopic/microscopic analysis
- Physicochemical analysis (moisture content, ash value, extractive values)
- Chromatographic profiling (TLC/HPTLC)
- Microbial limit tests
- Heavy metal & pesticide residue tests

Experiential-Learning 26.2 :

- Modern methods for the standardization and quality control of Ayurvedic ingredients and formulations in terms of purity and efficacy.

The scholars should perform the -

- Macroscopic/microscopic analysis
- Physicochemical analysis (moisture content, ash value, extractive values)
- Chromatographic profiling (TLC/HPTLC)
- Microbial limit tests
- Heavy metal & pesticide residue tests

Experiential-Learning 26.3 :

- Rationale behind formulating various Kalpana

- Presentation on the evolution of Ayurvedic formulations and the reasoning behind the creation of specific Kalpanas.
- Group activity to classify and compare different Kalpanas
- Practical session where students prepare selected Kalpanas
- Analysis of ingredient selection and interactions in specific formulations to understand the synergistic rationale.

Modular Assessment	
Assessment method	**Hour**
Instructions- Conduct a structured Modular assessment. Assessment will be for 25 marks. Keep a structured marking pattern. Utilize various assessment methods in each module throughout the semester. Keep a record of the structured pattern used for assessment. Calculate the Modular grade point as per Table 6C. Perform the quality control tests for the given Kalpana and ingredient (any one among the Panchavidha Kashaya kalpanas can be assigned to students). 25 Marks or Perform the quality control tests for the given Kalpana with ingredients (any one Sneha or sandhana Kalpana can be assigned to students). (25 Marks) Or Any practical in converted form can be taken for assessment. (25 Marks) Or Any of the experiential as portfolio/reflections/presentations, can be taken as an assessment. (25 Marks)	2

Semester No : 4

Module 27 : Plant Extracts

Module Learning Objectives
(At the end of the module, the students should be able to)

1. Discuss the types, Utility, Rationality, and Importance of Plant Extracts
2. Illustrate the concept of compounding of proprietary medicines.

M 27 Unit 1 Plant Extracts Types, Utility, Rationality and Importance of Plant Extracts

References: 157

3A	3B	3C	3D	3E	3F	3G
CO1,CO4,CO5	Identify the various types and methods of preparation of plant extracts	2	Lecture	CC	Knows-how	L_VC
CO1,CO4,CO5	Perform the various types and methods of preparation of plant extracts	6	Practical Training 27.1	PSY-ADT	Shows-how	D
CO1,CO4,CO5	Demonstrate the various types and methods of preparation of plant extracts	6	Experiential-Learning 27.1	AFT-SET	Shows-how	TPW
CO1,CO4,CO5	Interpret the rationality and utility of various plant extracts.	2	Lecture	CAN	Knows-how	PrBL,L_VC
CO1,CO4,CO5	Design the rationality and utility of various plant extracts.	4	Practical Training 27.2	PSY-ADT	Shows-how	W,D
CO1,CO4,CO5	Defend the rationality and utility of various plant extracts.	5	Experiential-Learning 27.2	AFT-VAL	Shows-how	SDL
CO1,CO4,CO5	Elaborate the Importance of Plant Extracts	1	Lecture	CAP	Knows-how	EDU
CO1,CO4,CO5 ,CO9	Identify the Scientific principles guiding the selection and combination of ingredients in proprietary formulations.	1	Lecture	CAN	Knows-how	L&GD

M 27 Unit 2 proprietary medicines Compounding of proprietary medicines

References: 158,159,160,161

3A	3B	3C	3D	3E	3F	3G
CO1,CO4,CO5	Apply the Legal and regulatory framework for compounding proprietary medicines.	1	Lecture	CAP	Knows-how	SY

					how	
CO1,CO4,CO5	Asses the Scientific principles guiding the selection and combination of ingredients in proprietary formulations.	4	Practical Training 27.3	PSY-ADT	Shows-how	TBL
CO1,CO4,CO5	Illustrate the Safety, efficacy, and stability considerations in the formulation process.	1	Lecture	CE	Knows-how	L&GD,JC
CO1,CO4,CO5	Justify the Safety, efficacy, and stability considerations in the formulation process.	4	Practical Training 27.4	PSY-MEC	Shows-how	FV
CO1,CO4,CO5	Evaluate the Safety, efficacy, and stability considerations in the formulation process.	6	Experiential-Learning 27.3	AFT-REC	Shows-how	FV
CO1,CO4,CO5	Elaboratel the concept in preparing and standardizing proprietary medicine formulations based on Ayurvedic and modern guidelines.	2	Lecture	CAP	Knows-how	
CO1,CO4,CO5	Differntiate skills in preparing and standardizing proprietary medicine formulations based on Ayurvedic and modern guidelines.	2	Practical Training 27.5	PSY-ADT	Shows-how	IBL
CO1,CO4,CO5	Acknowledge skills in preparing and standardizing proprietary medicine formulations based on Ayurvedic and modern guidelines.	7	Experiential-Learning 27.4	AFT-RES	Shows-how	IBL,SDL,BS,DIS,FV
CO1,CO4,CO5	Acknowledge a skill in preparing and standardizing proprietary medicine formulations based on Ayurvedic and modern guidelines.	2	Experiential-Learning 27.5	AFT-REC	Shows-how	SDL,IBL

Practical Training Activity

Practical Training 27.1 :

- Various Methods of different plant extracts preparation

- Methods to be demonstrated with suitable solvent:
- Maceration, Percolation, InfusionDecoction, Cold Extraction, Soxhlet Extraction, Ultrasonic Extraction, Supercritical Fluid Extraction (SFE), Steam Distillation, Enfleurage, Tincture Preparation

Practical Training 27.2 :

- Plant extract utility

- Cosmeceutical preparation
- Extracts for vitro/vivo studies

Practical Training 27.3 :

- Selection and combination of ingredients for proprietary formulations for various condions asses on the basis of Scientific principles

- Record keeping: Enlist the ingredients and combination in proprietary formulations for : Diabetese, Psychological conditions, analgesic
- Evaluate the Scientific principles for selection of drug

Practical Training 27.4 : Survey/ Record keeping for Safety, efficacy, and stability in the formulation process.

- Visit to industries
- Record preparation

Practical Training 27.5 :

- Proprietary medicine formulations prparation in industry

Industry Visit:

- Inquiry for rationale behind the preparation of combination/ standardization of proprietary medicine

Experiential learning Activity

Experiential-Learning 27.1 :

- Various Methods of different plant extracts preparation

Methods to be demonstrated with suitable solvent:

- Maceration, Percolation, InfusionDecoction, Cold Extraction, Soxhlet Extraction, Ultrasonic Extraction, Supercritical Fluid Extraction (SFE), Steam Distillation, Enfleurage, Tincture Preparation

Experiential-Learning 27.2 :

- Various plant extract utility

- Cosmeceutical preparation
- Extracts for vitro/vivo studies
- Nutraceuticals preparation from Poshaka aushadhi

Experiential-Learning 27.3 :

- Record keeping for Safety, efficacy, and stability in the formulation process.

- Visit to industries
- Record preparation/Log book

Experiential-Learning 27.4 :

- Preparing and standardizing proprietary medicine formulations based on Ayurvedic and modern guidelines

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- Enlist the proprietary medicine used in institution hospital.
- Industry visit-Check the standerdization parameters
- Creative writeup on information-Packaging and Labelling Compliance

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Experiential-Learning 27.5 :

- Preparing and standardizing proprietary medicine formulations based on Ayurvedic and modern guidelines.

- Enlist the proprietary medicine used in institution hospital.
- Industry visit-Check the standerdization parameters
- Creative writeup on information-Packaging and Labeling Compliance

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Modular Assessment

Assessment method	Hour
Instructions- Conduct a structured Modular assessment. Assessment will be for 50 marks. Keep a structured marking pattern. Utilize various assessment	4

methods in each module throughout the semester. Keep a record of the structured pattern used for assessment. Calculate the Modular grade point as per Table 6C.

Conduct a debate on "Integrating Plant extracts in Ayurveda treatment- pros and cons" OR "Integrating traditional medicines with modern drug delivery system- scope and challenges" OR any other relevant topic suitable to the module content. - (25 Marks)

And

Perform the extraction (hot/ cold) with suitable solvents for the given sample. Find the extractive values and compare. – 25 Marks.

Or

Any practical in converted form can be taken for assessment. (25 Marks)

and

Any of the experiential as portfolio/reflections/presentations, can be taken as an assessment. (25 Marks)

Module 28 : Poshaka Aushadhi -Integrating traditional wisdom with modern Nutraceutical concepts.

Module Learning Objectives
(At the end of the module, the students should be able to)

Discuss Poshaka aushadhi (Nutraceuticals), Knowledge on FSSAI guidelines, related to botanicals and their impacts on Ayurveda, and GRAS as per the FDA.

M 28 Unit 1 Poshaka Aushadhi and Nutraceuticals Knowledge on Poshaka Aushadhi and Nutraceuticals

References:

3A	3B	3C	3D	3E	3F	3G
CO7,CO9	Interpret the role of innovation and product development in building a successful food business. and Understand the GRAS (Generally Recognized As Safe) as per FDA	3	Lecture	CAN	Knows-how	L_VC,W, ML
CO1,CO5	Observe the therapeutic properties of *Poshaka Aushadhi* in nourishment.	10	Experiential-	AFT-RES	Does	LS,EDU,

						FV
CO7,CO9	Recognize the plant used in Poshaka Aushadhi (Nutritional Medicine) and discuss their therapeutic properties for nourishment.	6	Practical Training 28.1	PSY-GUD	Shows-how	LS,JC,DIS
CO1,CO9	Discuss the Concept and role of *Poshaka Aushadhi* in nourishment and identify the key herbs used in Poshaka Aushadhi (Nutritional Medicine) and their therapeutic properties.	2	Lecture	CAN	Knows-how	BL,LS,L&PPT

M 28 Unit 2 FSSAI guidelines, relevant to Botanicals & its impact on Ayurveda and GRAS as per FDA. Knowledge on FSSAI guidelines, relevant to Botanicals & its impact on Ayurveda and GRAS as per FDA.

References: 165

3A	3B	3C	3D	3E	3F	3G
CO1,CO6,CO7,CO9	Asses the FSSAI guidelines for food safety, labelling, quality control, obtaining licenses /certifications for food businesses, Inclusion of Plant or Botanicals in schedule 2 and Opportunities and challenges in the food and nutraceutical sectors.	10	Experiential-Learning 28.2	AFT-RES	Does	PAL,FV,IBL,BL
CO1,CO6,CO7,CO9	Observe the FSSAI guidelines for food safety, labelling, quality control, obtaining licenses /certifications for food businesses, Inclusion of Plant or Botanicals in schedule 2 and Opportunities and challenges in the food and nutraceutical sectors.	7	Practical Training 28.2	PSY-GUD	Shows-how	IBL,C_L,BS,ML,FV
CO1,CO6,CO7,CO9	Explain the FSSAI guidelines for food safety, labelling, quality control, obtaining licenses /certifications for food businesses, Inclusion of Plant or Botanicals in schedule 2 and Opportunities and challenges in the food and nutraceutical sectors	2	Lecture	CC	Knows-how	IBL,BL,EDU

CO1,CO5	Detect the key concepts, Active ingredients, their health benefits, Regulatory frameworks of nutraceuticals and synergy between contemporary science, nutraceuticals and traditional system Ayurveda.	6	Experiential-Learning 28.3	AFT-REC	Does	PL,LS,EDU
CO1,CO5	Detect the synergy between contemporary science, nutraceuticals and traditional system Ayurveda.	7	Practical Training 28.3	PSY-GUD	Shows-how	Mnt,EDU,GBL
CO1,CO5,CO9	Discuss the concepts, active ingredients used in nutraceuticals products, their health benefits and regulatory frameworks in the context of Nutraceuticals. Interpret the synergy between contemporary science, nutraceuticals and traditional system Ayurveda.	3	Lecture	CAN	Knows-how	BL,ML,L&PPT,SDL

Practical Training Activity

Practical Training 28.1 :

- Balya/Bruhana dravya from ayurveda texts
- Criticaly analysed the properties of these dravya for poshana (nourishment) karma

- Journal club/ presentation: Uses of *Poshaka* herbs in clinical or personal care settings and their updated research.

Practical Training 28.2 :

- FSSAI guidelines and schedule 2 plants

- Searching the FSSAI guidelines from relevant sources.
- Discussion on relevance of plants included in schedule 2

Practical Training 28.3 :

- Concept of nutraceuticals

Discussion to be included-

- Concepts, Active ingredients, their health benefits, Regulatory frameworks of nutraceuticals
- Synergy between contemporary science, nutraceuticals and traditional system Ayurveda.
- Updated researches.

Experiential learning Activity

Experiential-Learning 28.1 :

- Balya/Bruhana dravya from Herbal garden / department meusium.
- Criticaly analysed the properties of these dravya for poshana (nourishment) karma

- Herbal garden / department meusium visit: selection of dravya
- Visual Representation:
- Diagrams: Create a chart showing the relationship between different herbs, their properties, and the health benefits with updated research.
- 3D Models: create models of key herbs and formulations, their properties, and the health benefits with updated research.

Experiential-Learning 28.2 :

- Concept note writting on FSSAI guidelines and schedule 2 plants

- Food industry visit
- Concept note to be contains:
- FSSAI guidelines benefits and challenges
- Processing the licenses for food businesses.
- Analysis on Inclusion of Plants in schedule 2

Experiential-Learning 28.3 :

- Compilation on Nutraceuticals

Compilation to be included

- key concepts, Active ingredients, their health benefits, Regulatory frameworks of nutraceuticals

- synergy between contemporary science, nutraceuticals and traditional system Ayurveda.
- Review the updated researches.

Modular Assessment	
Assessment method	**Hour**
Instructions- Conduct a structured Modular assessment. Assessment will be for 50 marks. Keep a structured marking pattern. Utilize various assessment methods in each module throughout the semester. Keep a record of the structured pattern used for assessment. Calculate the Modular grade point as per Table 6C. Design a "functional food" or nutraceutical product using natural ingredients. Include: Ingredient list and nutritional info, health benefits, and target consumer group. -25 Marks. Bring in (or research online) 2–3 commercially available nutraceutical products. Students are instructed to analyze the labels to identify: active ingredients, health claims, dosage, and certification or regulatory marks. 25 Marks or Any practical in converted form can be taken for assessment (25 Marks) and Any of the experiential as portfolio/reflections/presentations, can be taken as an assessment (25 Marks)	4

Semester No : 5

Module 29 : Regulatory Framework and Policies for ASU Drugs: Safety, Quality, and Compliance.

Module Learning Objectives
(At the end of the module, the students should be able to)

1. Describe the regulatory framework governing Ayurveda, Siddha, and Unani (ASU) drugs, including relevant laws, guidelines, and standards established by national and international bodies.
2. Evaluate the safety, quality, and efficacy requirements for ASU drugs, discussing how these regulations impact the formulation, manufacturing, and marketing processes.
3. Demonstrate the ability to assess compliance with regulatory requirements in the development and commercialization of ASU drugs, identifying key

considerations for practitioners and manufacturers.

4. Discuss: current challenges and future directions in the regulation of ASU drugs, including the integration of traditional practices with modern regulatory standards.

M 29 Unit 1 Regulatory Bodies and Policies in India and CDSCO Various regulatory Bodies and Policies in India and CDSCO

References: 168,169

3A	3B	3C	3D	3E	3F	3G
CO1,CO7	Asses the Regulatory frameworks and bodies governing different sectors in India	1	Lecture	CAN	Knows-how	L,L&GD
CO1,CO7	Asses the Regulatory frameworks and bodies governing different sectors in India.	2	Practical Training 29.1	PSY-GUD	Shows-how	FV,JC,DIS
CO1,CO7	Analyse Key regulatory issues in pharmaceuticals, ASU drugs, food safety, environmental protection, and healthcare. Challenges in implementing and adhering to regulatory policies.	2	Lecture	CAN	Knows-how	BL,C_L,IBL
CO1,CO7	Create awareness of ethical considerations, compliance challenges, and strategies for navigating regulatory environments	1	Lecture	CK	Knows-how	BL,DIS,C_L
CO1,CO7	Display the Awareness of ethical considerations, compliance challenges, and strategies for navigating regulatory environments	3	Practical Training 29.2	PSY-GUD	Shows-how	GBL,EDU

M 29 Unit 2 Policies and Regulation on manufacture of ASU Drugs Policies and Regulation on manufacture of ASU Drugs and their import & export

References: 170

3A	3B	3C	3D	3E	3F	3G
CO1,CO7	Justify the Regulatory framework governing the manufacture of ASU drugs in India.	1	Lecture	CE	Knows-how	BL

					how	
CO1,CO7	Enlist and discuss the Regulatory framework governing the manufacture of ASU drugs in India.	2	Practical Training 29.3	PSY-GUD	Shows-how	EDU,CBL
CO1,CO7	Discuss the Licensing and compliance requirements for the manufacture and trade of ASU drugs.	1	Lecture	CAN	Knows-how	EDU,BS, L&PPT ,L_VC
CO1,CO7	Share the policies governing the import and export of ASU products	6	Experiential-Learning 29.1	AFT-VAL	Does	LS,DIS,JC
CO1,CO7	Detect the insights into quality control, safety standards, and good manufacturing practices (GMP) for ASU drugs	2	Practical Training 29.4	PSY-ADT	Shows-how	SDL,IBL, LS,PBL
CO1,CO7	Examine the challenges and opportunities in the global market for ASU medicines.	6	Experiential-Learning 29.2	AFT-REC	Does	TBL,SDL
CO1,CO7	Value quality control, safety standards, and good manufacturing practices (GMP) for ASU drugs.	6	Experiential-Learning 29.3	AFT-REC	Does	DIS,BS

M 29 Unit 3 Drug & Cosmetics act and Schedule Z drugs Knowledge on Drug & Cosmetics act and Schedule Z drugs

References: 167,171

3A	3B	3C	3D	3E	3F	3G
CO1,CO7	Asses the Provisions of the Drug & Cosmetics Act related to ASU drugs. and Schedule Z and its importance in ensuring the safety and efficacy of ASU drugs	3	Practical Training 29.5	PSY-GUD	Shows-how	PrBL,RP
CO1,CO7	justify the provisions of the Drug & Cosmetics Act related to ASU drugs.Schedule Z and its importance in ensuring the safety and efficacy of ASU drugs	4	Experiential-Learning 29.	AFT-REC	Does	BS,C_L

		4				
CO1,CO7	Elaborate the regulatory processes for clinical trials and drug approvals for traditional medicines.	3	Practical Training 29.6	PSY-GUD	Shows-how	JC,CBL
CO1,CO7	Discuss the regulatory processes for clinical trials and drug approvals for traditional medicines.	4	Experiential-Learning 29.5	AFT-REC	Does	SDL,SY
CO1,CO7	Elaborate the compliance and legal requirements for manufacturing ASU drugs in India.	2	Lecture	CAN	Knows-how	SDL,SY,L
CO1,CO7	Identify the Impact of the Drug & Cosmetics Act on the quality control and standardization of drugs.	2	Lecture	CAN	Knows-how	L,SY
CO1,CO7	Justify the Licensing and compliance requirements for the manufacture and trade of ASU drugs.	5	Practical Training 29.7	PSY-GUD	Shows-how	TBL,SY

Practical Training Activity

Practical Training 29.1 :

- Regulatory frameworks and bodies governing different sectors in India.

- Industry visit
- Enlist the Regulatory bodies governing different sectors in India related to medicinal plants/crude drugs.
- Asses the constraints that the *Indian herbal drug industry* is facing with respect to production, commercialization, and *regulation.*
- Journal Club

Practical Training 29.2 :

- Ethical considerations, compliance challenges, and strategies for navigating regulatory environments

- Game Based Learning
- Edutainment

Teacher demonstrate the following points with game/ entertainment:

- Key AYUSH regulations, including licensing and advertising norms
- Explore ethical dilemmas in traditional medicine marketing
- Practice risk assessment and decision-making
- Development of strategies for compliance while honoring traditional knowledge

Practical Training 29.3 :

- Regulatory framework governing the manufacture of ASU drugs in India.

- Role play on Execution of the Regulatory framework governing the manufacture of ASU drugs in India.

Practical Training 29.4 :

- Quality control, safety standards, and good manufacturing practices (GMP) for ASU drugs

- Industry visit: Inquiry Based Learning

Formation of Questionnaires before visit

- How are raw herbal ingredients tested for quality or contaminants?
- What measures are taken to prevent cross-contamination?
- How are traditional formulations validated during manufacturing?
- What kind of documentation is maintained to comply with GMP?
- How is batch-wise testing performed?
- Students document these questions for use during the visit.
- Presentations on what they learned (based on their inquiry)

Practical Training 29.5 :

- Drug & Cosmetics Act related to ASU drugs.
- Schedule Z

Role Play should cover the following points

- How the Drugs & Cosmetics Act applicable to ASU drugs
- Interpret the relevance and implications of Schedule Z (clinical trial guidelines for ASU drugs)
- Explore ethical and regulatory responsibilities of stakeholders
- Practice resolving conflicts between traditional practice and legal compliance
- Projects
- Infographic summarizing Schedule Z
- Chart comparing classical vs proprietary ASU drug rules
- A simple flowchart showing how an ASU drug gets approved

Practical Training 29.6 :

- Regulatory processes for clinical trials and drug approvals for traditional medicines.

CBL

- Clinical Trial and Approval Journey of a Traditional ASU Drug

PBL

- How can a new proprietary ASU formulation be ethically and legally approved for human use?”
- Journal Club

Practical Training 29.7 :

- Preparation of Documents for Licensing

- Drafting applications for ASU drug manufacturing licenses as per the Drug & Cosmetic Act.
- Preparing and submitting forms (Form 24-D for Ayurveda, Siddha, and Unani drugs).
- Understanding and drafting GMP (Good Manufacturing Practices) compliance documentation.

Visits to Licensed Manufacturing Units

- Observing how compliance is maintained in terms of equipment, personnel, and production processes.
- Understanding the layout of an ASU drug manufacturing facility

Role-play

- Conducting mock regulatory inspections and preparing for compliance audits

Hands-on Training

- Licensing Software-Introducing students to digital platforms for license applications, such as AYUSH Sanjivani or AYUSH e-portal.

Symposium
Team Based Learning

Experiential learning Activity

Experiential-Learning 29.1 :

- Governing import and export of ASU products

- Class Presentation
- Compilation
- Debate

Experiential-Learning 29.2 :

- Challenges and opportunities in the global market for ASU medicines.

- Self Directed Learning
- Team Based Learning

Experiential-Learning 29.3 :

- Quality control, safety standards, and good manufacturing practices (GMP) for ASU drugs.

- Virtual/Physical Tour of GMP-Certified Units

- Perform physical and chemical tests on raw materials to check purity, quality, and authenticity, following protocols from the Ayurvedic Pharmacopoeia of India (API).
- SOP Development
- Quality Assurance Documentation
- GMP Facility Design and Layout-Understand the importance of facility design in compliance with GMP standards, ensuring the prevention of cross-contamination and maintaining hygiene
- Raw Material Quality Control-Gain insight into the selection, testing, and approval of raw materials for ASU drug production.

Experiential-Learning 29.4 :

- Provisions of the Drug & Cosmetics Act related to ASU drugs
- Drug & Cosmetics Act
- Schedule Z

- Brain Storming
- Co Learning

Experiential-Learning 29.5 :

- Regulatory Frameworks (Regulatory processes for clinical trials)
- Drug approvals for traditional medicines.

- Self directed Learning
- Symposium

Modular Assessment

Assessment method	Hour
Instructions- Conduct a structured Modular assessment. Assessment will be for 50 marks. Keep a structured marking pattern. Utilize various assessment methods in each module throughout the semester. Keep a record of the structured pattern used for assessment. Calculate the Modular grade point as per Table 6C. MCQs on regulatory framework and policies for ASU Drugs, -25 Marks and Assign students the roles representing different stakeholders: Manufacturer, Regulatory Authority (Ministry of AYUSH officials), Quality Control Lab, and Consumer Safety Watchdog. Each shall prepare their requirements/criteria (e.g., manufacturing license, quality tests, labeling requirements, safety claims). Simulate the drug approval process where the manufacturer applies, and the regulatory group evaluates it based on the rules. Discuss challenges and how to address compliance issues. – 25 Marks OR Create a practical tool for manufacturers or quality assurance teams. Students research key regulatory requirements for ASU drug manufacturing, labeling, advertising, and storage. Compile these into a checklist to ensure compliance with: Licensing, Quality standards (e.g., Ayurvedic Pharmacopoeia), Packaging and labeling norms, Advertising rules, Pharmacovigilance (25 Marks) Or Any practical in converted form can be taken for assessment. (25 Marks) and Any of the experiential as portfolio/reflections/presentations, can be taken as an assessment (25 Marks)	4

Module 30 : Regulatory framework for biodiversity for conservation, Traditional Knowledge and Integration of traditional & contemporary medicine.

Module Learning Objectives

(At the end of the module, the students should be able to)

1. Identify the role of various Regulatory acts related to biodiversity for conservation and of medicinal plants.
2. Apply the traditional knowledge in drug discovery and development, highlighting the historical context and significance of ancient remedies in shaping modern pharmaceuticals.
3. Discuss different acts for the use of herbal medicines.

M 30 Unit 1 National legal framework & Law National legal framework & Law pertaining to Ayurvedic drugs

References: 172,173,174,175

3A	3B	3C	3D	3E	3F	3G
CO1,CO7,CO8,CO9	Interpret the Wildlife (Protection) Act 1972 (Section 17 A & 17 D).	1	Lecture	CE	Knows-how	L
CO1,CO7,CO8,CO9	Assess the Wildlife (Protection) Act 1972 (Section 17 A & 17 D).	2	Practical Training 30.1	PSY-GUD	Shows-how	
CO1,CO7,CO8,CO9	Value the Wildlife (Protection) Act 1972 (Section 17 A & 17 D).	2	Experiential-Learning 30.1	AFT-RES	Shows-how	FV
CO1,CO7,CO8,CO9	Describe the Biological Diversity Act 2002 (Section 38) and Rules 2004 (Sec 41(1); Sec 41 (V)).	1	Lecture	CC	Knows-how	L&GD
CO1,CO7,CO8,CO9	Appraise Biological Diversity Act 2002 (Section 38) and Rules 2004 (Sec 41(1); Sec 41 (V)).	2	Practical Training 30.2	PSY-GUD	Shows-how	CBL
CO1,CO7,CO8,CO9	Create awareness of Biological Diversity Act 2002 (Section 38) and Rules 2004 (Sec 41(1); Sec 41 (V)).	2	Experiential-Learning 30.2	AFT-REC	Shows-how	BS

CO1,CO7,CO8 ,CO9	Explore • **Panchayat (Extension to Scheduled Areas) Act, 1996 (PESA).** • **Scheduled Tribes and other Traditional Forest Dwellers (Reorganization of Forest Rights) Act 2006 – Chapter 2** • **Schedule-VI of the Wildlife (Protection) Act, 1972 (Section 17C).**	1	Lecture	CAN	Knows-how	L&GD
CO1,CO7,CO8 ,CO9	Discuss the • **Panchayat (Extension to Scheduled Areas) Act, 1996 (PESA).** • **Scheduled Tribes and other Traditional Forest Dwellers (Reorganization of Forest Rights) Act 2006 – Chapter 2** • **Schedule-VI of the Wildlife (Protection) Act, 1972 (Section 17C).**	3	Practical Training 30.3	PSY-ADT	Shows-how	
CO1,CO7,CO8	Listen the • **Panchayat (Extension to Scheduled Areas) Act, 1996 (PESA).** • **Scheduled Tribes and other Traditional Forest Dwellers (Reorganization of Forest Rights) Act 2006 – Chapter 2** • **Schedule-VI of the Wildlife (Protection) Act, 1972 (Section 17C).**	3	Experiential-Learning 30.3	AFT-RES	Shows-how	BS,LS
CO1,CO7,CO8 ,CO9	Classify the Trade of Plants listed in CITES Appendices (Export of Appendix-I Specimens (Article III.2; Import of Appendix-I Specimens (Article III.3; Re-export of Appendix-I Specimens (Article III.4)	1	Lecture	CAP	Knows-how	L
CO1,CO7,CO8 ,CO9	Identify the Trade of Plants listed in CITES Appendices (Export of Appendix-I Specimens (Article III.2; Import of Appendix-I Specimens (Article III.3; Re-export of Appendix-I Specimens (Article III.4)	3	Practical Training 30.4	PSY-GUD	Shows-how	L&PPT

3A	3B	3C	3D	3E	3F	3G
CO1,CO7,CO8 ,CO9	Categorize the Trade of Plants listed in CITES Appendices (Export of Appendix-I Specimens (Article III.2; Import of Appendix-I Specimens (Article III.3; Re-export of Appendix-I Specimens (Article III.4)	4	Experiential-Learning 30. 4	AFT-SET	Does	LS,BS
CO1,CO7,CO8 ,CO9	Apply the knowledge of 'Certificate of cultivation or "Legal procurement certificate" of species of conservation concern for export	1	Lecture	CC	Knows-how	L&GD
CO1,CO7,CO8 ,CO9	Value'Certificate of cultivation or "Legal procurement certificate" of species of conservation concern for export	4	Experiential-Learning 30. 5	AFT-RES	Does	BS
CO1,CO7,CO8 ,CO9	Summarize the knowledge of export of plants, plant portion and their derivatives and extracts obtained from wild.	1	Lecture	CC	Knows-how	L

M 30 Unit 2 GCTM, NMPB/ RCFC for procurement of genuine raw material, TKDL and Patenting aspects of traditional knowledgeGCTM, NMPB/ RCFC for procurement of genuine raw material, TKDL and Patenting aspects of traditional knowledge

References: 176,177

3A	3B	3C	3D	3E	3F	3G
CO1,CO7,CO8 ,CO9	Describe Drugs and Cosmetic Act 1940 & Rules 1945.	1	Lecture	CC	Knows-how	L
CO1,CO7,CO8 ,CO9	Notice the Drugs and Cosmetic Act 1940 & Rules 1945.	3	Practical Training 30.5	PSY-ADT	Shows-how	
CO1,CO7,CO8 ,CO9	Discuss the Drugs and Cosmetic Act 1940 & Rules 1945.	3	Experiential-Learning 30. 6	AFT-RES	Shows-how	FV
CO1,CO7,CO8 ,CO9	Discuss Drug & Magic Remedies Act, Regulations pertaining to Import and Export of Ayurvedic Drugs	1	Lecture	CC	Knows-how	L
CO1,CO7,CO8	Summarize the Drug & Magic Remedies Act, Regulations pertaining to Import and	3	Practical	PSY-	Shows-	BS,BL

,CO9	Export of Ayurvedic Drugs			Training 30.6	GUD	how	
CO1,CO7,CO8 ,CO9	Attend the Drug & Magic Remedies Act, Regulations pertaining to Import and Export of Ayurvedic Drugs	4	Experiential-Learning 30.7	AFT-REC	Shows-how	CBL,BS

M 30 Unit 3 Ayush products and Entrepreneurship ,Skills towards innovation and entrepreneurship, Funding opportunities for research Value addition of Ayush products and Entrepreneurship ,Skills towards innovation and entrepreneurship, Funding opportunities for research

References:

3A	3B	3C	3D	3E	3F	3G
CO1,CO7,CO8 ,CO9	Describe the Value addition of Ayush products and Entrepreneurship Skills towards innovation and entrepreneurship, Funding opportunities for research	2	Lecture	CC	Knows-how	L&PPT ,DIS
CO1,CO7,CO8 ,CO9	Discuss about the innovation and entrepreneurship, Funding opportunities for research	4	Practical Training 30.7	PSY-GUD	Shows-how	BL,EDU, BS
CO1,CO7,CO8 ,CO9	Explore the ideas about innovation and entrepreneurship, Funding opportunities for research	4	Experiential-Learning 30.8	AFT-RES	Shows-how	BS,CBL, EDU

Practical Training Activity

Practical Training 30.1 :

- Wildlife (Protection) Act 1972 (Section 17 A & 17 D).

Workshops:

- Ethical Sourcing of Medicinal Plants/animal products

- Community Workshops on Ayurveda

Role play:

- Awareness Campaigns
- Making Poster

Practical Training 30.2 :

- Biological Diversity Act 2002 (Section 38) and Rules 2004 (Sec 41(1); Sec 41 (V)).

- Workshops:
- Ethical Sourcing of Medicinal Plants
- Documentation of Traditional Knowledge
- Community Engagement Programs
- Biodiversity Awareness Campaigns

Practical Training 30.3 :

- Panchayat (Extension to Scheduled Areas) Act, 1996 (PESA).
- Scheduled Tribes and other Traditional Forest Dwellers (Reorganization of Forest Rights) Act 2006 – Chapter 2
- Schedule-VI of the Wildlife (Protection) Act, 1972 (Section 17C).

- Team based learning/IBL:
- Community-Based Herbal Resource Management
- Traditional Knowledge Documentation and Protection
- Workshops on Forest Rights and Sustainable Practices
- Collaboration with Local Governance

Practical Training 30.4 :

- Ethical Sourcing Protocols
- Training on CITES Compliance

- Awareness Workshops
- Role play: Community Conservation Initiatives

Practical Training 30.5 :

- Drugs and Cosmetic Act 1940 & Rules 1945.

Brainstorming / Edutainment:

- Form Filling Exercise
- Simulated Submission
- Label Creation Exercise
- Case Study Analysis
- Practice filling out the relevant application forms, such as Form 24-D (Application for a license to manufacture
- Submit the completed application for review, mimicking the actual submission process to the State Licensing Authority
- Design compliant labels for Ayurvedic formulations, including mandatory information such as batch number, expiry date, ingredients, usage instructions, and license number.
- Case studies of Ayurvedic drugs that were either banned or restricted due to non-compliance with the Act.

Practical Training 30.6 :

- Drug & Magic Remedies Act, Regulations pertaining to Import and Export of Ayurvedic Drugs

Brainstorming/ Mobile learning :

- Advertisement Review Exercise
- Drafting a Compliant Advertisement
- Review real or simulated advertisements for Ayurvedic drugs and identify any violations under the Drug & Magic Remedies Act (e.g., exaggerated health claims, false cures for specific diseases)
- Students create their own advertisement for an Ayurvedic drug, ensuring compliance with the Drug & Magic Remedies Act by avoiding objectionable claims and ensuring ethical promotion of the product

Practical Training 30.7 : Innovation and entrepreneurship, Funding opportunities for research

Each student will individually identify one practical innovation possibility in Dravyaguna—such as improving a classical formulation, developing a stable dosage form, or

proposing a simple authentication method for a raw drug. Students will explore basic prior-art by checking patent databases (IP India / Patentscope) and note only whether similar ideas exist. They will map relevant funding avenues (AYUSH, CCRAS, ICMR, DST-SERB, Startup India) suitable for such innovations. Students will prepare a brief working sheet (checklist-style) noting innovation idea, novelty check result, and matching funding schemes. The activity concludes with a short discussion with the instructor.

Experiential learning Activity

Experiential-Learning 30.1 :

- Wildlife (Protection) Act 1972 (Section 17 A & 17 D).

- Field Trips to Medicinal Plant Nurseries
- Documentary Screenings and Discussions
- Guest Lectures from Experts

Experiential-Learning 30.2 :

- Biological Diversity Act 2002 (Section 38) and Rules 2004 (Sec 41(1); Sec 41 (V)).

- Field Studies on Local Biodiversity
- Participatory Research Projects
- Identification Workshops
- Documentation of Traditional Knowledge
- Community Biodiversity Festivals

Experiential-Learning 30.3 :

- Community Herb Cultivation Projects
- Forest Resource Mapping

- Traditional Knowledge Sharing Workshops
- Awareness Campaigns on Rights and Conservation
- Wildlife and Biodiversity Conservation Programs

Experiential-Learning 30.4 :

- Trade of Plants listed in CITES Appendices (Export of Appendix-I Specimens (Article III.2; Import of Appendix-I Specimens (Article III.3; Re-export of Appendix-I Specimens (Article III.4)

- Field Visits to CITES-Registered Nurseries
- Workshops on Sustainable Harvesting Techniques
- Participatory Research on Alternative Plants
- Organize visits to nurseries that cultivate CITES-listed plants ethically and sustainably.
- Conduct hands-on workshops focused on sustainable harvesting techniques for medicinal plants, particularly those listed in CITES
- Engage participants in research projects aimed at identifying and documenting alternative non-CITES-listed plants that can be used in Ayurveda.

Experiential-Learning 30.5 :

- Certificate of cultivation or "Legal procurement certificate" of species of conservation concern for export

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- Document Compilation Exercise
- Mock Submission & Feedback Session
- Compile the necessary documentation required for obtaining a Certificate of Cultivation, including proof of land ownership or lease, cultivation plan, and species identification.
- Mock Submission & Feedback Session

Experiential-Learning 30.6 :

- Drugs and Cosmetic Act 1940 & Rules 1945.

- Field Visit to a Licensed Ayurvedic Manufacturing Unit
- Mock Licensing Process
- Vsit an Ayurvedic drug manufacturing facility to observe the actual procedures followed for regulatory compliance
- Conduct a simulated licensing process where students act as applicants, filling out necessary forms (Form 24-D, etc.) and preparing documentation (site details, personnel qualifications, product formulations)

Experiential-Learning 30.7 :

- Drug & Magic Remedies Act, Regulations pertaining to Import and Export of Ayurvedic Drugs

- Field Visit to an Ayurvedic Marketing Department
- Case Study on Export of Ayurvedic Drugs
- Visit the marketing or regulatory department of an Ayurvedic drug manufacturer to observe how promotional materials are vetted for compliance with the Drug & Magic Remedies Act
- Students analyze real-life case studies of Ayurvedic drug companies exporting their products to international markets. The case studies focus on the challenges faced in obtaining licenses, meeting international regulatory standards (e.g., WHO-GMP), and ensuring the documentation is complete for customs clearance

Experiential-Learning 30.8 : Innovation and entrepreneurship

Students individually explore a selected medicinal plant or classical formulation to identify one real-world problem in its sourcing, processing, standardization, or clinical use. They then perform hands-on observation or simple experimentation (e.g., comparing organoleptic characters, checking stability changes, evaluating extraction differences, or testing sample variability). Students match their observations with potential innovation opportunities and identify suitable funding bodies (AYUSH, CCRAS, ICMR, DST-SERB) through guided browsing. The session ends with an instructor-led discussion where students reflect on what innovation possibilities they discovered and which funding paths align with them.

Modular Assessment

Assessment method	Hour
Instructions- Conduct a structured Modular assessment. Assessment will be for 50 marks. Keep a structured marking pattern. Utilize various assessment methods in each module throughout the semester. Keep a record of the structured pattern used for assessment. Calculate the Modular grade point as per Table 6C. Campaign/awareness programme on Wildlife and Biodiversity Conservation Programs-25 Marks and	4

Semi-structured Interviews with Stakeholders (biodiversity boards, NMPB, AYUSH, etc (25 Marks)

or

Students analyse real-life case studies of Ayurvedic drug companies exporting their products to international markets. The case studies focus on the challenges faced in obtaining licenses, meeting international regulatory standards (e.g., WHO-GMP), and ensuring the documentation is complete for customs clearance. – 25 Marks

or

Any practical in converted form can be taken for assessment. (25 Marks)

and

Any of the experiential as portfolio/reflections/presentations, can be taken as an assessment (25 Marks)

Semester No : 6

Module 31 : Classical to contemporary aspects of Aushadha Dravya Part 7

Module Learning Objectives
(At the end of the module, the students should be able to)

1. Identify and classify medicinal plants.
2. Understand the pharmacology of Medicinal plants based on Ayurveda and contemporary science.
3. Analyze the traditional and modern uses of medicinal plants.
4. Apply evidence-based research in clinical practice.

M 31 Unit 1 Dravya related to Mukha -Lalaprasekajanana, Trishnanigrahana, Mukhavaishadyakara, Dantashodhana, Dantadardhyakara. Amashaya-Triptighna,Rochana, Deepana, Pachana,Vamana,Vamanopaga. Antra -Purishajanana, Vatanulomana, Vishtambhi,Virechana –Mruduvirechana, Sukhavirechana Karma Mukha

Lalaprasekajanana

1. Lanka (*Capsicum annnum* L.)

Trishnanigrahana

    2. Yavasa (*Alhagi camelorum* Fisch.)

    3. Dhanvayasa (*Fagonia cretica* L.)

    4. Parpata (*Fumaria parviflora* L.)

    5. Dhanyaka (*Coriandrum sativum* L.)

Mukhvaishadyakara

    6. Latakasturi (*Hibiscus abelmoschus* L.)

Dantashodhana

    7. Tejovati (*Zanthoxylum armatum* DC.)

Dantadardhyakara

    8. Bakula (*Mimusops elengi* L.)

Amashaya-Triptighna

    9. Shunthi (*Zingiber officinalis* Roscoe.)

    10. Chavya (*Piper chaba* Hunter.)

Rochana

11. Vrikshamla (*Garcinia indica* Choisy.)

12. Amlavetasa (*Garcinia pedunculata* Roxb.)

13. Dadima (*Punica granatum* L.)

14. Matulunga (*Citrus medica* L.)

15. Jambira (*Citrus limos* Osbeck.)

16. Changeri (*Oxalis corniculata* L.)

17. Tintideeka (*Rhus parviflora* Roxb.)

Deepana

18. Hingu (*Ferula foetida* L.)

19. Ativisha (*Aconitum heterophyllum* Wall.)

20. Kalambaka (*Centaurea kalambakensis* Freyn.)

21. Chitraka (*Plumbago zeylanica* L.)

22. Maricha (*Piper nigrum* L.)

23. Jeeraka (*Cuminum cyminium* L.)

Pachana

24. Musta (*Cyperus rotundus* L.)

25. Erandkarkati (*Carica papaya* L.)

Vamana

26. Madanaphala (*Randia dumetorum* Lamk.)

27. Ikshwaku (*Lagenaria siceraria* Sand.)

28. Dhamargava (*Luffa aegyptiaca* Mill.)

29. Kritavedhana (*Luffa acutangula* Roxb.)

30. Arishtaka (*Sapindus trifoliatus* L.)

Vamanopaga

31. Hijjala (*Baringtonia acutangula* Gaertn.)

32. Shanapushpi (*Crotolaria juncea* L.)

Antra-Purishajanana

33. Masha (*Vigna mungo* Hepper.)

Vatanulomana

34. Putiha (*Mentha piperata* L.)

35. Marubaka (*Origanum majorana* L.)

36. Damanaka (*Artemisia vulgaris* L.)

37. Shatapushpa (*Anethum sowa* L.)

38. Mishreya (*Foeniculum vulgare* Mill.)

39. Nadihingu (*Gardenia gummifera* L.f.)

Vishtambhi

40. Panasa (*Artocarpus integrifolia* L.)

41. Lakucha (*Artocarpus lakoocha* Buch-Ham)

Virechana –Mruduvirechana

42. Phalgu (*Ficus carica* L.)

43. Atasi (*Linum usitatissimum* L.)

44. Ashwagola (*Plantago ovata* Forssk.)

Sukhavirechana

45. Swarnapatri (*Cassia angustifolia* Vahl.)

46. Trivrut (*Operculina turpethum* (L.) Silva Manso)

47. Krishnabeeja (*Annona reticulata* L.)

48. Swarnakshiri (*Argemone mexicana* L.)

References: 1,2,3,5,12,14,29,32,33,34,35,40,41,42,45,47,77

3A	3B	3C	3D	3E	3F	3G
CO1,CO2,CO5 ,CO7	Identify the plant & Elaborate their Nama Rupa (Nomenclature& Morphology) and explain its Guna Karma (Classical properties & Actions)	6	Lecture	CC	Knows-how	L,L&GD, L&PPT ,L_VC
CO1,CO2,CO5 ,CO7	Differentiate the plant & learn their Nama Rupa (Nomenclature& Morphology) and explain its Guna Karma (Classical properties & Actions)	10	Practical Training 31.1	PSY-GUD	Shows-how	DIS,D-M, DL,L_VC ,DG
CO1,CO2,CO5 ,CO7	Conduct the survey of plants & categorize on the basis of their Nama Rupa (Nomenclature& Morphology) and appreciate their Guna Karma (Classical properties & Actions)	10	Experiential-Learning 31. 1	AFT-VAL	Does	PER,RLE ,D-M,DA,DL
CO1,CO2,CO5 ,CO7	Elaborate therapeutic uses & formulations of medicinal plants, apply evidence-based research in clinical practices & pharmaceutical industry.	4	Lecture	CC	Knows-how	L_VC,L& GD,L,L& PPT
CO1,CO2,CO5 ,CO7	Exibit the therapeutic uses & formulations of medicinal plants, apply evidence-based research in clinical practices & pharmaceutical industry.	10	Practical Training 31.2	PSY-MEC	Shows-how	DA,DIS,S DL,RLE, W

CO1,CO2,CO5,CO7	Justify therapeutic uses & formulations of medicinal plants, apply evidence-based research in clinical practices & pharmaceutical industry.	10	Experiential-Learning 31.2	AFT-VAL	Does	DIS,DL,TUT,FV,DG
CO1,CO2,CO5,CO7	Justify therapeutic uses & formulations of medicinal plants, apply evidence-based research in clinical practices & pharmaceutical industry.	3	Experiential-Learning 31.3	AFT-RES	Shows-how	L&GD,L&PPT,L,L_VC
CO1,CO2,CO5,CO7	Conduct the survey of plants & categorize on the basis of their Nama Rupa (Nomenclature& Morphology) and appreciate their Guna Karma (Classical properties & Actions)	3	Experiential-Learning 31.4	AFT-VAL	Does	PL,RLE,FV,DL,D

Practical Training Activity

Practical Training 31.1 :

- Identification of fresh herbs and dry specimens
- Pharmacognostical and Phytochemical analysis
- Preparing digital herbarium
- Clinical use of single drugs

- In campus & Out campus Garden visit under the supervision of the faculty
- Learning by visiting the Raw drug museums
- Collection of photographs
- Learn about Collection of useful parts and preservation

Practical Training 31.2 :

- Preparation of single drug remedies
- Segregating drug based on Grahya Agrahyatva
- Procurement of drug based on quality standards

- Preparing Panchavidha kashaya kalpana in lab
- Practical on Quality control methods in Dravyaguna Lab
- Collection of Dravya and their officinal parts
- Postings in Clinical setup

Experiential learning Activity

Experiential-Learning 31.1 :

- Conducting Field survey
- Visit to Garden
- Identification of fresh herbs and dry specimens

- Case Study presentations
- Group Discussions
- Visit to Ayurveda pharmaceutical industries

Experiential-Learning 31.2 :

- Conducting Field survey
- Visit to Garden
- Visit to pharmacy to identify, observe raw herbs and their formulations

- Identify plants on the basis of key characters
- Observe and analyse use of single drugs & their formulations in clinical settings

Experiential-Learning 31.3 :

- Conducting Field survey
- Visit to Garden
- Visit to pharmacy to identify, observe raw herbs and their formulations

- Identify plants on the basis of key characters
- Observe and analyse use of single drugs & their formulations in clinical settings

Experiential-Learning 31.4 :

- Conducting Field survey
- Visitation to Garden
- Identification of fresh herbs and dry specimens

- Case Study presentations
- Group Discussions
- Visit to Ayurveda pharmaceutical industries

Modular Assessment	

Assessment method	Hour
Instructions- Conduct a structured Modular assessment. Assessment will be for 50 marks. Keep a structured marking pattern. Utilize various assessment methods in each module throughout the semester. Keep a record of the structured pattern used for assessment. Calculate the Modular grade point as per Table 6C. Identification- Customize plant samples based on local flora. Students should identify and classify the plants with a description of their properties and actions. Viva or practical demonstration can be added- 25 Marks and Viva or SAQ - describe its active phytochemicals, mechanism of action, and clinical relevance- 25 Marks Or Case scenario-based assessment- a clinical case scenario of related systemic disease (as in the module) is given, and the students should design treatment with appropriate drugs with justification- 25 marks Or Any practical in converted form can be taken for assessment. (25 Marks) and Any of the experiential as portfolio/ reflections / presentations, can be taken as an assessment (25 Marks)	4

Module 32 : Classical to contemporary aspects of Aushadha Dravya Part 8

Module Learning Objectives
(At the end of the module, the students should be able to)

1. Identify and classify medicinal plants.
2. Illustrate the pharmacology of Medicinal plants based on Ayurveda and contemporary science.
3. Analyze the traditional and modern uses of medicinal plants.
4. Apply evidence-based research in clinical practice.

M 32 Unit 1 Dravya related to Tikshnavirechana, Virechanopaga, Sanshodhana (Ubhyatobhagahara), Grahi Aamahara (Upshoshanahara), Stambhana, Purishavirajaniya, Shoolaprashamana, Krimighna and Arshoghna Karma Tikshnavirechana

1. Danti (*Baliospermum montanum* Mudl.)

2. Dravanti (*Chlorophytum tuberosum* Baker.)

3. Snuhi (*Euphorbia nerifolia* L.)

4. Arka (*Calotropis procera* W.T. Aiton)

5. Indravaruni (*Citrullus colocynthis* Schrad.)

6. Kankushtha (*Garcinia morella* Desr.)

7. Katuka (*Picrorrhiza kurroa* Royle.)

8. Amlaparni (*Rheum astrale* D.Don)

9. Kumari (*Aloe vera* Burm.f.)

Virechanopaga

10. Peelu (*Salvadora persica* L.)

Samshodhana (Ubhyatobhagahara)

11. Devadali (*Luffa echinata* Roxb.)

Grahi

12. Bilva (*Aegle marmelos* L.)

13. Jatiphala (*Myristica fragrans* Houtt.)

14. Parnayavani (*Coleus aromaticum* Benth.)

Aamahara (Upshoshanahara)

15. Kutaja (*Holarrhena antidysenterica* (L.) Wall.)

16. Aralu (*Ailanthus excelsa* Roxb.)

17. Shyonaka (*Oroxylum indicum* Benth.)

Stambhana

18. Dhataki (*Woodfordia fruticosa* Kutz.)

19. Babbula (*Vachellia nilotica* PJH Hurter.)

20. Avartaki (*Cassia auriculata* Roxb.)

21. Avartani (*Helictres isora* L.)

22. Dhanvana (*Grewia tilaefolia* Vahl.)

23. Shami (*Prosopis cineraria* Druce.)

24. Mayaphala (*Quercus infectoria* Oliv.)

25. Mayurashikha (*Adiantum incisum* Forssk.)

26. Akashavalli (*Cuscuta reflexa* Roxb.)

Purishavirajaniya

27. Shallaki (*Boswellia serrata* Roxb.)

28. Shalmali (*salmalia malabaricum* DC.)

Shoolaprashamana

29. Yavani (*Trachyspermum ammi* Sprague.)

30. Ajamoda (*Carum roxburghianum* DC.)

31. Chandrashoora (*Lepidium sativum* L.)

32. Dhatura (*Datura metel* L.)

Krimighna

33. Vidanga (*Embelia ribes* Burm.)

34. Palasha (*Butea monosperma* Kurtz.)

35. Chouhara (*Artemisia maritima* L.)

36. Ingudi (*Balanites aegyptiaca* Delib.)

37. Barbari (*Ocimum basiliccum* L.)

38. Keetamari (*Aristolochia bracteata* Lam.)

39. Kampillaka (*Mallotus philippinensis* Muell.)

40. Bhandira (*Clerodendrum infortunatum* L.)

41. Akhuparni (*Ipomoea reniformis* Chois.)

Arshoghna

42. Mahanimba (*Melia azadirachta* L.)

43. Karira (*Capparis decidua* Edgew.)

44. Sunishannaka (*Marselia minuata* L.)

References: 5,34,41

3A	3B	3C	3D	3E	3F	3G
CO1,CO2,CO5 ,CO7	Identify the plant & learn their Nama Rupa (Nomenclature& Morphology) and explain its Guna Karma (Classical properties & Actions)	3	Lecture	CC	Knows-how	L_VC,L& GD,L&P PT ,L
CO1,CO2,CO5 ,CO7	Differentiate the plant & learn their Nama Rupa (Nomenclature& Morphology) and explain its Guna Karma (Classical properties & Actions)	6	Practical Training 32.1	PSY-GUD	Shows-how	DSN,DL, DA,D-M,DG
CO1,CO2,CO5 ,CO7	Conduct the survey of the plants & categorize on the basis of their Nama Rupa (Nomenclature& Morphology) and appreciate their Guna Karma (Classical properties & Actions)	7	Experiential-Learning 32.1	AFT-VAL	Does	RP,D-M, DL,L_VC ,RLE
CO1,CO2,CO5 ,CO7	Elaborate therapeutic uses & formulations of medicinal plants, apply evidence-based research in clinical practices & pharmaceutical industry.	2	Lecture	CC	Knows-how	L_VC,L, L&GD,L &PPT
CO1,CO2,CO5 ,CO7	Appraise therapeutic uses & formulations of medicinal plants, apply evidence-based research in clinical practices & pharmaceutical industry.	4	Practical Training 32.2	PSY-MEC	Shows-how	JC,SDL,P SM,DL,R LE
CO1,CO2,CO5 ,CO7	Justify therapeutic uses & formulations of medicinal plants, apply evidence-based research in clinical practices & pharmaceutical industry.	6	Experiential-Learning 32.2	AFT-VAL	Does	TUT,ML, DIS,DL,F V

M 32 Unit 2 Dravya related to Yakrit and Pleeha Karma Yakrit

1. Daruharidra (*Berberis aristata* DC)

2. Kakamachi (*Solanum nigrum* L.)

3. Apamarga (*Achyranthes aspera* L.)

4. Bhunimba (*Andrographis paniculata* Nees.)

5. Dugdhapheni (*Taraxum officinale* Weber.)

6. Kasani (*Cichorium intybus* L.)

7. Parijata (*Nyctanthes arbor-tristis* L.)

Pleeha

8. Rohitaka (*Tecomella undulata* Seem.)

9. Sharapunkha (*Tephrosia purpurea* L.)

References: 2,3,5,12,14,29,32,33,34,39,40,42,50,62,63,77

3A	3B	3C	3D	3E	3F	3G
CO1,CO2,CO5 ,CO7	Identify the plant & learn their Nama Rupa (Nomenclature& Morphology) and explain its Guna Karma (Classical properties & Actions)	3	Lecture	CC	Knows-how	L_VC,L& GD,L,L& PPT
CO1,CO2,CO5 ,CO7	Differentiate the plant & learn their Nama Rupa (Nomenclature& Morphology) and explain its Guna Karma (Classical properties & Actions)	6	Practical Training 32.3	PSY-GUD	Shows-how	DG,DL,D A,TBL,L _VC
CO1,CO2,CO5 ,CO7	Justify the plants & categorize on the basis of their Nama Rupa (Nomenclature& Morphology) and appreciate their Guna Karma (Classical properties & Actions)	7	Experiential-Learning 32. 3	AFT-VAL	Does	L_VC,D, FV,DL,R P
CO1,CO2,CO5 ,CO7	Elaborate therapeutic uses & formulations of medicinal plants, apply evidence-based research in clinical practices & pharmaceutical industry.	2	Lecture	CC	Knows-how	L_VC,L& GD,L&P PT ,L

CO1,CO2,CO5,CO7	Appraise therapeutic uses & formulations of medicinal plants, apply evidence-based research in clinical practices & pharmaceutical industry.	4	Practical Training 32.4	PSY-ADT	Shows-how	DIS,JC,DA,ML,PSM
CO1,CO2,CO5,CO7	Justify therapeutic uses & formulations of medicinal plants, apply evidence-based research in clinical practices & pharmaceutical industry.	6	Experiential-Learning 32.4	AFT-VAL	Does	TUT,DL,DG,FV,ML

Practical Training Activity

Practical Training 32.1 :

- Identification of fresh herbs and dry specimens
- Pharmacognostical and Phytochemical analysis
- Preparing digital herbarium
- Clinical use of single drugs

- In campus & Out campus Garden visit under the supervision of the faculty
- Learning by visiting the Raw drug museums
- Collection of photographs
- Learn about Collection of useful parts and preservation

Practical Training 32.2 :

- Preparation of single drug remedies
- Segregating drug based on Grahya Agrahyatva
- Procurement of drug based on quality standards

- Preparing Panchavidha kashaya kalpana in lab
- Practical on Quality control methods in Dravyaguna Lab
- Collection of Dravya and their officinal parts
- Postings in Clinical setup

Practical Training 32.3 :

- Identification of fresh herbs and dry specimens
- Pharmacognostical and Phytochemical analysis
- Preparing digital herbarium
- Clinical use of single drugs

- In campus & Out campus Garden visit under the supervision of the faculty
- Learning by visiting the Raw drug museums
- Collection of photographs
- Learn about Collection of useful parts and preservation

Practical Training 32.4 :

- Preparation of single drug remedies
- Segregating drug based on Grahya Agrahyatva

- Procurement of drug based on quality standards

- Preparing Panchavidha kashaya kalpana in lab
- Practical on Quality control methods in Dravyaguna Lab
- Collection of Dravya and their officinal parts
- Postings in Clinical setup

Experiential learning Activity

Experiential-Learning 32.1 :

- Preparation of single drug remedies
- Segregating drug based on Grahya Agrahyatva
- Procurement of drug based on quality standards

- Preparing Panchavidha kashaya kalpana in lab
- Practical on Quality control methods in Dravyaguna Lab
- Collection of Dravya and their officinal parts
- Postings in Clinical setup

Experiential-Learning 32.2 :

- Conducting Field survey
- Visit to Garden
- Visit to pharmacy to identify, observe raw herbs and their formulations

- Case Study presentations
- Group Discussions
- Visit to Ayurveda pharmaceutical industries

Experiential-Learning 32.3 :

- Conducting Field survey
- Visit to Garden
- Identification of fresh herbs and dry specimens

- Identify plants on the basis of key characters
- Observe and analyse use of single drugs & their formulations in clinical settings

Experiential-Learning 32.4 :

- Conducting Field survey
- Visit to Garden

- Visit to pharmacy to identify, observe raw herbs and their formulations

- Case Study presentations
- Group Discussions
- Visit to Ayurveda pharmaceutical

Modular Assessment

Assessment method	Hour
Instructions- Conduct a structured Modular assessment. Assessment will be for 50 marks. Keep a structured marking pattern. Utilize various assessment methods in each module throughout the semester. Keep a record of the structured pattern used for assessment. Calculate the Modular grade point as per Table 6C. Identification- Customize plant samples based on local flora. Students should identify and classify the plants with a description of their properties and actions. Viva or practical demonstration can be added- 25 Marks and Viva or SAQ - describe its active phytochemicals, mechanism of action, and clinical relevance- 25 Marks or Case scenario-based assessment- a clinical case scenario of related systemic disease (as in the module) is given, and the students should design treatment with appropriate drugs with justification- 25 marks or Any practical in converted form can be taken for assessment. (25 Marks) and Any of the experiential as portfolio/reflections/presentations, can be taken as an assessment (25 Marks)	4

Table 4 : Practical Training Activity

(*Refer table 3 of similar activity number)		
Practical No*	**Practical name**	**Hours**
1.1	Identification of fresh herbs and dry specimens Pharmacognostical and Phytochemical analysis Preparing digital herbarium Clinical use of single drugs	6
1.2	Preparation of single drug remedies Segregating drug based on Grahya Agrahyatva Procurement of drug based on quality standards	4
1.3	Identification of fresh herbs and dry specimens Pharmacognostical and Phytochemical analysis Preparing a digital herbarium Clinical use of single drugs	6
1.4	Preparation of single drug remedies Segregating drugs based on Grahya Agrahyatva Procurement of drugs based on quality standards	4
2.1	Identification of fresh herbs and dry specimens Pharmacognostical and Phytochemical analysis Preparing digital herbarium Clinical use of single drugs	6
2.2	Preparation of single drug remedies Segregating drug based on Grahya Agrahyatva Procurement of drug based on quality standards	4
2.3	Identification of fresh herbs and dry specimens Pharmacognostical and Phytochemical analysis Preparing digital herbarium Clinical use of single drugs	6
2.4	Preparation of single drug remedies Segregating drug based on Grahya Agrahyatva Procurement of drug based on quality standards	4
3.1	Key points of Vedic taxonomy in classical drug nomenclature	4
3.2	Principles of Vedic taxonomy and their application in classical drug nomenclature.	5
3.3	Importance of understanding basonyms, synonyms, and homonyms in drug identification and characterization.	3
3.4	Relevance of basonyms, synonyms, and homonyms in classical, drug research and practice.	3
3.5	Identification and characterization of stem, stem bark and stem tuber	1
3.6	Etymology of various drug names	2

3.7	Effective use of basonyms and synonyms in drug nomenclature.	2
4.1	Demonstrating classification and nomenclature exercises	6
4.2	Demonstrating the identifying Key Characters of Medicinal Plants	7
4.3	Demonstrate practical exercises in Plant Nomenclature applying ICBN and ICNCP and Digital plant identification by using World Flora Online and DNA Barcoding.	7
5.1	Practical identification (macroscopic, microscopic, chemical characteristics and adulterants) of root, rhizome and underground parts.	5
5.2	Practical identification (macroscopic, microscopic, chemical characteristics and adulterants) of stem, stem bark and heart wood.	5
5.3	Practical identification (macroscopic, microscopic, chemical characteristics and adulterants) of leaves, flowers, fruits, seeds.	5
5.4	Perform the identification (macroscopic, microscopic, chemical characteristics and adulterants) of whole herb, unorganised drugs and insect galls.	5
6.1	Applications of Vrikshayurveda in medicinal plant cultivation.	7
6.2	Techniques for medicinal plant conservation and collection.	7
6.3	Plant tissue culture methods for propagation and conservation of medicinal plants.	6
7.1	Alternative parts and Substitute plant drugs from classical test.	5
7.2	Adulterants and substitutes in medicinal plants.	5
7.3	Medicinal plants: standardization and estimation.	5
7.4	Chromatographic Analysis of Medicinal Plants.	5
8.1	Examination and application of medicinal plants with specific characteristics.	5
8.2	Preparation of different formulations and its application	5
8.3	Ayurvedic medicine administration: Routes and Applications.	5
8.4	Matra and Anupana in Ayurvedic Practice.	5

9.1	Therapeutic Index and margin of safety of Ayurvedic herbs in experimental modules	6
9.2	Orient correlation between Classical Karma with contemporary pharmacological actions with respect to Nadi Sansthana (Nervous System)	6
9.3	Observe about Classification, Mechanism of action, dose & side effects	6
9.4	Orientation on classical and practical implications of Karma of Twacha in the context of Ayurveda & and its nearest euqivalent pharmacological actions in contemporary science	6
9.5	Orient about Classification, Mechanism of action, dose & side effects of relevant drugs mentioned in contemporary science related to Skin	6
10.1	Classical and practical aspects of Prajanana Samsthana Karma (Pharmacological Actions pertaining to Reproductive System) in the context of Ayurveda & and its nearest equivalent pharmacological actions in contemporary science.	5
10.2	Classification, Mechanism of action, dose & side effects of relevant drugs mentioned in contemporary science	5
11.1	Identification of fresh herbs and dry specimens Pharmacognostical and Phytochemical analysis Preparing digital herbarium Clinical use of single drugs	5
11.2	Preparation of single drug remedies Segregating drug based on Grahya Agrahyatva Procurement of drug based on quality standards	5
11.3	Identification of fresh herbs and dry specimens Pharmacognostical and Phytochemical analysis Preparing digital herbarium Clinical use of single drugs	5
11.4	Preparation of single drug remedies Segregating drug based on Grahya Agrahyatva Procurement of drug based on quality standards	5
12.1	Identification of fresh herbs and dry specimens Pharmacognostical and Phytochemical analysis Preparing digital herbarium Clinical use of single drugs	6
12.2	Preparation of single drug remedies Segregating drug based on Grahya Agrahyatva Procurement of drug based on quality standards	4
12.3	Identification of fresh herbs and dry specimens Pharmacognostical and Phytochemical analysis Preparing digital herbarium Clinical use of single drugs	6
12.4	Preparation of single drug remedies Segregating drug based on Grahya Agrahyatva Procurement of drug based on quality standards	4
13.1	Correlation between Classical Karma with contemporary pharmacological actions with respect to Yakrut (liver) and Pleeha (spleen)	4
13.2	Classification, Mechanism of action, dose & side effects of relevant drugs mentioned in contemporary science related to Yakrut (Liver) and Pleeha (Spleen)	6

13.3	Correlation between Classical Karma with contemporary pharmacological actions with respect to Pachan Sansthana (Digestive System)	4
13.4	Classification, Mechanism of action, dose & side effects Making of Charts on mode of actions of drugs	6
14.1	Orient correlation between Classical Karma with contemporary pharmacological actions with respect to Sarvadaihik Karma (Pharmacological Actions affecting whole body)	1
14.2	Observe about Classification, Mechanism of action, dose & side effects Making of Charts on mode of actions of drugs	3
14.3	correlation between Classical Karma with contemporary pharmacological actions with respect to Mutravaha Sansthana (Urinary System)	2
14.4	Classification, Mechanism of action, dose & side effects of relevant drugs mentioned in contemporary science related to Urinary System.	6
14.5	Correlation between Classical Karma with contemporary pharmacological actions with respect t Dhatus (Tissues) and Strotas	2
14.6	Mutravaha Samsthana (Urinary System) of Dhatu Karma, Classification, Mechanism of action, dose & side effects of relevant drugs mentioned in contemporary science related to Dhatus(Tissues) and Strotas.	6
15.1	Correlation between Classical Karma with contemporarypharmacological actions with respect to Raktavaha sansthana(Cardiovascular System)	4
15.2	Classification, Mechanism of action, dose & sideeffects	4
15.3	Correlation between Classical Karma with contemporarypharmacological actions with respect to Rasavaha sansthana (Lymphatic System)	3
15.4	Classification, Mechanism of action, dose & sideeffects	3
15.5	Correlation between Classical Karma with contemporary pharmacological actions with respect to Shwasana samsthana (Respiratory System)	3
15.6	Classification, Mechanism of action, dose & side effects	3
16.1	Animal handling and care Hands on training on handling animals Toxicological studies	3
16.2	Genotoxicity and carcinogenecity	2
16.3	Teratogenecity Activity of single Dravya in animal model.	2
16.4	Conduct or observe the experiment on Diuretic activity of Ayurveda Herbs	3
16.5	Adaptogen & CNS activities and Anti oxidant Activity of single Dravya in animal model.	2

16.6	Understand a basic experimental protocol by using appropriate models with reference to Anti ulcer and Cardioprotective activity on selected herb	2
16.7	Hepato Protective Activity of single Dravya in animal model	2
16.8	Assess the Anti Diabetic activity of Ayurveda Herbs on animal models.	2
16.9	Evaluate Antihypertensive and Anti Hyper li[pidemic activity of Ayurveda Herbs.	2
17.1	Identify and analyse ADRs Demonstrate reporting of ADRs	10
17.2	Demonstrate types of drug interactions Explore Studies on Herb –drug interactions with correlation of concept of Samyoga Viruddha	5
17.3	Illustrations of Drug usage and effects of Ayurvedic drugs	5
18.1	Identifying the reasons behind Sandhigdha (controversies) in medicinal plants and solution to resolve the controversies.	10
18.2	Demonstrate discuss and enlist various Anukta (extra pharmacological) drugs with ethnomedicinal approach used in different clinical conditions. Discuss regulatory framework for study of Anukta Dravya	10
19.1	Document information on ethnomedicine	6
19.2	Concept and application of proteomics and metabolomics	7
19.3	Cheminformatics in drug discovery and drug design Network pharmacology	6
19.4	Concept of Pharmacogenomics and Ayurgenomics.	5
19.5	Tools on Reverse Pharmacology, Clinical pharmacology and evidence based research	6
20.1	Difference between phytopharmaceutical and whole herbal drugs with regulatory aspects	2
20.2	Novel drug Delivery systems and Advanced technology for Drug Delivery Types of extraction techniques and drying methods to enhance shelf life	3
20.3	Dosage forms of Ayurved and conventional along with novel dosage forms	5
21.1	Identification of fresh herbs and dry specimens Pharmacognostical and Phytochemical analysis Preparing digital herbarium Clinical use of single drugs	6

21.2	Preparation of single drug remedies Segregating drug based on Grahya Agrahyatva Procurement of drug based on quality standards	4
21.3	Identification of fresh herbs and dry specimens Pharmacognostical and Phytochemical analysis Preparing digital herbarium Clinical use of single drugs	6
21.4	Preparation of single drug remedies Segregating drug based on Grahya Agrahyatva Procurement of drug based on quality standards	4
22.1	Identification of fresh herbs and dry specimens Pharmacognostical and Phytochemical analysis Preparing digital herbarium Clinical use of single drugs	10
22.2	Preparation of single drug remedies Segregating drug based on Grahya Agrahyatva Procurement of drug based on quality standards	10
23.1	Identification of ahara dravya specimens Clinical use of single drugs Disease specific prayoga of Ahar kalpana in clinical settings	10
23.2	Prayoga of ahara dravya of animal origin	10
24.1	Case based scenario of Ekala Dravyas used for cosmetic purposes on skin and hair conditions	10
24.2	Classical and innovative formulations of Herbal cosmetic dravya Processes used in manufacture of Cosmetics with the Quality standards ,stability	8
24.3	Principles and techniques used in Cosmetology and Trichology with methods to evaluate safety	2
25.1	Medicinal plants found in vedic literature, Samhita, Nighantus and recent databases.	10
25.2	Therapeutic efficacy of medicinal plants found in vedic literature, Samhita, Nighantus	10
25.3	AI based identification of Medicinal plants	10
26.1	Quality control (standerdization) of crude drugs from Sharangadhara,	3
26.2	Quality control (standerdization) of crude drugs of selected formulations from API and AFI	3
26.3	Rationale behind formulating various Kalpana	4
27.1	Various Methods of different plant extracts preparation	6
27.2	Plant extract utility	4
27.3	Selection and combination of ingredients for proprietary formulations for various condions asses on the basis of Scientific principles	4

27.4	Survey/ Record keeping for Safety, efficacy, and stability in the formulation process.	4
27.5	Proprietary medicine formulations prparation in industry	2
28.1	Balya/Bruhana dravya from ayurveda texts Criticaly analysed the properties of these dravya for poshana (nourishment) karma	6
28.2	FSSAI guidelines and schedule 2 plants	7
28.3	Concept of nutraceuticals	7
29.1	Regulatory frameworks and bodies governing different sectors in India.	2
29.2	Ethical considerations, compliance challenges, and strategies for navigating regulatory environments	3
29.3	Regulatory framework governing the manufacture of ASU drugs in India.	2
29.4	Quality control, safety standards, and good manufacturing practices (GMP) for ASU drugs	2
29.5	Drug & Cosmetics Act related to ASU drugs. Schedule Z	3
29.6	Regulatory processes for clinical trials and drug approvals for traditional medicines.	3
29.7	Preparation of Documents for Licensing	5
30.1	Wildlife (Protection) Act 1972 (Section 17 A & 17 D).	2
30.2	Biological Diversity Act 2002 (Section 38) and Rules 2004 (Sec 41(1); Sec 41 (V)).	2
30.3	Panchayat (Extension to Scheduled Areas) Act, 1996 (PESA). Scheduled Tribes and other Traditional Forest Dwellers (Reorganization of Forest Rights) Act 2006 – Chapter 2 Schedule-VI of the Wildlife (Protection) Act, 1972 (Section 17C).	3
30.4	Ethical Sourcing Protocols Training on CITES Compliance	3
30.5	Drugs and Cosmetic Act 1940 & Rules 1945.	3
30.6	Drug & Magic Remedies Act, Regulations pertaining to Import and Export of Ayurvedic Drugs	3
30.7	Innovation and entrepreneurship, Funding opportunities for research	4
31.1	Identification of fresh herbs and dry specimens Pharmacognostical and Phytochemical analysis Preparing digital herbarium Clinical use of single drugs	10

31.2	Preparation of single drug remedies Segregating drug based on Grahya Agrahyatva Procurement of drug based on quality standards	10
32.1	Identification of fresh herbs and dry specimens Pharmacognostical and Phytochemical analysis Preparing digital herbarium Clinical use of single drugs	6
32.2	Preparation of single drug remedies Segregating drug based on Grahya Agrahyatva Procurement of drug based on quality standards	4
32.3	Identification of fresh herbs and dry specimens Pharmacognostical and Phytochemical analysis Preparing digital herbarium Clinical use of single drugs	6
32.4	Preparation of single drug remedies Segregating drug based on Grahya Agrahyatva Procurement of drug based on quality standards	4

Table 5 : Experiential learning Activity

(*Refer table 3 of similar activity number)		
Experiential learning No*	**Experiential name**	**Hours**
1.1	Field survey Visitation to Garden Identification of fresh herbs and dry specimens	6
1.2	Field survey Visitation to Garden Visit to pharmacy to identify, observe raw herbs and their formulations	6
1.3	Field survey Visitation to the Garden Identification of fresh herbs and dry specimens	7
1.4	Field survey Visitation to Garden Visit to pharmacy to identify, observe raw herbs and their formulations	7
2.1	Field survey Visitation to Garden Identification of fresh herbs and dry specimens	7
2.2	Field survey Visitation to Garden Visit to pharmacy to identify, observe raw herbs and their formulations	5
2.3	Field survey Visitation to Garden Identification of fresh herbs and dry specimens	7
2.4	Field survey Visitation to Garden Visit to pharmacy to identify, observe raw herbs and their formulations	7
3.1	Practical applications and significance of Vedic taxonomy.	6
3.2	Descriptive studies of lexicons (Kosa) and its practical applications.	6
3.3	Critical role of basonym, synonyms, and homonyms in ensuring accurate drug identification.	5
3.4	Significance of basonym, synonyms, and homonyms in classical, drug research and practice	4
3.5	Drug Etymology.	3
3.6	Importance of accurate drug nomenclature by participating in hands-on activities.	2
4.1	Exploring plant taxonomy and nomenclature	8
4.2	Exploring Medicinal Plant Identification	9
4.3	Exploring plant nomenclature ICBN, ICNCP, World Flora Online, and DNA Barcoding".	9

5.1	Identification, sourcing, and sustainability of medicinal roots, rhizomes, and underground parts.	7
5.2	Identification, sourcing, and sustainability of medicinal roots, rhizomes, and underground parts.	6
5.3	Identification, sourcing, and sustainability of medicinal leaves, flowers, fruits and seeds.	7
5.4	Identification, sourcing, and sustainability of medicinal whole herb, unorganised drugs and insect galls.	6
6.1	Acquire the knowledge of Vrikshayurveda.	8
6.2	Exploring the knowledge of Medicinal Plant Cultivation and Collection in Practice.	9
6.3	Exploring the knowledge of tissue culture for plant propagation and conservation.	9
7.1	Classical knowledge: alternative parts and substitute plant drugs, in modern practice.	7
7.2	Hands-on approach to identifying adulterants and substitutes.	6
7.3	Analytical methods for medicinal plant Quality Control: A practical experience.	7
7.4	Chromatography: Instrumental analysis of medicinal plants	6
8.1	Appreciating Ayurvedic drug characteristics.	7
8.2	Exploring Ayurvedic Formulations: A Case Study Approach.	6
8.3	Bheshaja Marga and Sevanakala in clinical practice.	7
8.4	Matra and Anupana: A Path to Effective Ayurvedic Practice	6
9.1	Pharmacokinetics - ADME	5
9.2	Studying dose response relationship	5
9.3	Common and differentiating factors between Ayurveda and contemporary science in the context to Nadi Sansthna Karma	7
9.4	Discussion, Mechanism of action, dose & side effects of relevant drugs mentioned in contemporary science	6

9.5	Observe the classical and practical implications of Karma of Twacha in the context of Ayurveda & and its nearest euqivalent pharmacological actions in contemporary science	8
9.6	Observe about Classification, Mechanism of action, dose & side effects of relevant drugs mentioned in contemporary science related to Skin.	8
10.1	Classical and practical Aspect of Prajanana Samsthana Karma (Pharmacological Actions pertaining to Reproductive System) in the context of Ayurveda & and its nearest equivalent pharmacological actions in contemporary science.	7
10.2	Classification, Mechanism of action, dose & side effects of relevant drugs mentioned in contemporary science	6
11.1	Conducting Field survey Visitation to Garden Identification of fresh herbs and dry specimens	7
11.2	Conducting Field survey Visitation to Garden Visit to pharmacy to identify, observe raw herbs and their formulations	6
11.3	Conducting Field survey Visitation to Garden Identification of fresh herbs and dry specimens	7
11.4	Conducting Field survey Visitation to Garden Visit to pharmacy to identify, observe raw herbs and their formulations	6
12.1	Conducting Field survey Visitation to Garden Identification of fresh herbs and dry specimens	6
12.2	Conducting Field survey Visitation to Garden Visit to pharmacy to identify, observe raw herbs and their formulations	5
12.3	Conducting Field survey Visitation to Garden Identification of fresh herbs and dry specimens	8
12.4	Conducting Field survey Visitation to Garden Visit to pharmacy to identify, observe raw herbs and their formulations	7
13.1	Common and differentiating factors between Ayurveda and contemporary science in the context to Yakrut (liver) and Pleeha (spleen)	4
13.2	Classification, Mechanism of action, dose & side effects of relevant drugs mentioned in contemporary science related to Yakrut (Liver) and Pleeha (Spleen).	9
13.3	Common and differentiating factors between Ayurveda and contemporary science in the context to Pachana Sansthna (Digestive System)	4
13.4	Classification, Mechanism of action, dose & side effects of relevant drugs mentioned in contemporary science	9
14.1	Discuss the common and differentiating factors between Ayurveda and contemporary science in the context to Sarvadaihik Karma (Pharmacological Actions affecting whole body)	2

14.2	Discuss and learn about Classification, Mechanism of action, dose & side effects of relevant drugs mentioned in contemporary science	4
14.3	Discuss the common and differentiating factors between Ayurveda and contemporary science in the context to Mutravaha Sansthana (Urinary System)	3
14.4	Discuss about Classification, Mechanism of action, dose & side effects of relevant drugs of Urinary System mentioned in contemporary science	7
14.5	Common and differentiating factors between Ayurveda and contemporary science in the context to Dhatus (Tissue) and Strotas.	3
14.6	Discuss and learn about Classification, Mechanism of action, dose & side effects of relevant drugs mentioned in contemporary science	7
15.1	Common and differentiating factors between Ayurveda and contemporary science in the context to Raktavaha samsthana (Cardiovascular System) Karma	5
15.2	Discuss and learn about Classification, Mechanism of action, dose &side effects of relevant drugs mentioned in contemporary sciencerelated to Cardio Vascular system	5
15.3	Common and differentiating factorsbetween Ayurveda and contemporary science in the context to Rasavaha samsthana (Lymphatic System) Karma	4
15.4	Discuss and learn about Classification, Mechanism of action, dose &side effects of relevant drugs mentioned in contemporary sciencerelated to Lymphatic System	4
15.5	Common and differentiating factors between Ayurveda and contemporary science in the context to Shwasana samsthana (Respiratory System) Karma.	4
15.6	Discuss and learn about Classification, Mechanism of action, dose & side effects of relevant drugs mentioned in contemporary science related to Respiratory System	4
16.1	Animal Behavior Observations: Animal Welfare and Ethics: - Animal handling and techniques	3
16.2	Experimental Design Workshop: Case Study Analysis:	3
16.3	Herb-Drug Interaction Study: Pharmacological Profile Development:	3
16.4	Experimental Design Workshop: Case Study Analysis:	3

16.5	1. Herb-Drug Interaction Study: 2. Pharmacological Profile Development:	3
16.6	1. Experimental Design Workshop: 2. Case Study Analysis:	3
16.7	Herb-Drug Interaction Study: Pharmacological Profile Development:	3
16.8	Experimental Design Workshop: Case Study Analysis:	3
16.9	Herb-Drug Interaction Study: Pharmacological Profile Development:	2
17.1	Identifying and reporting of ADRs Appreciate need of Pharmacovigilance from Ayurveda and contemporary perspective Conduct Sensitization awareness programs on reporting ADRs Establish evidence for clinical safety of drugs Analyse the Influence of misleading advertisements of drugs and products on safety of Ayurvedic drugs	10
17.2	Analyse the types of Drug interactions through databases Impact on Clinical efficacy	8
17.3	Analyse Drug usage and effects of Ayurvedic drugs Analysis of Prescription writing	8
18.1	Appreciate the need and develop skills to identify the reasons for controversies in medicinal plants.	10
18.2	Develop critical thinking regarding the significance of Anukta Dravya (Extra Pharmacopeial Drugs in current clinical practice.	6
18.3	Develop critical thinking regarding the significance of Anukta Dravya (Extra Pharmacopeial Drugs in current clinical practice	10
19.1	Patterns and claims of medicinal plants in various ethnic communities	6
19.2	Concept of omics	10
19.3	Cheminformatics in drug discovery and drug design	9
19.4	Concept of Pharmacogenomics and Ayurgenomics	7
19.5	Applications of Reverse Pharmacology, Clinical pharmacology and evidence based research in Ayurveda	7
20.1	Difference between phytopharmaceutical and whole herbal drugs	4
20.2	Current emerging trends in novel drug delivery systems, advanced technologies for drug delivery Types of extraction techniques and drying methods to enhance shelf life	3

20.3	Prepare dosage forms of Ayurved and conventional along with novel dosage forms Feasibility ,advantages and limitations of different dosage forms. Aquaint with Principles of Ayurved in Compounding formulations of drugs	6
21.1	Conducting Field survey Visit to Garden Identification of fresh herbs and dry specimens	6
21.2	Conducting Field survey Visit to Garden Visit to pharmacy to identify, observe raw herbs and their formulations	6
21.3	Field survey Visit to Garden Identification of fresh herbs and dry specimens	6
21.4	Field survey Visit to Garden Visit to pharmacy to identify, observe raw herbs and their formulations	8
22.1	Conducting Field survey Visit to Garden Identification of fresh herbs and dry specimens	10
22.2	Conducting Field survey Visitt Garden Visit to pharmacy to identify, observe raw herbs and their formulations	10
22.3	Conducting Field survey Visit to Garden Visit to pharmacy to identify, observe raw herbs and their formulations	6
23.1	Prayoga of various ahara dravya of plant origin	10
23.2	Prayoga of various ahara dravya of plant origin	3
23.3	Prayoga of ahara dravya of animal origin	10
23.4	Prayoga of ahara dravya of animal origin	3
24.1	Case scenarios of Ekala Dravyas as Herbal Cosmetics Ayurvedic and and explore contemporary principles of cosmetics mentioned in Ayurveda	10
24.2	Classical and innovative formulations of cosmetics Simple cosmetic formulations available in the market	10
24.3	Principles and techniques used in Cosmetology and Trichology Methods to evaluate efficacy and safety of cosmetics	8
25.1	Medicinal plants found in vedic literature, Samhita, Nighantus and recent databases.and evaluate their therapeutic efficacy	10
25.2	Causes for changes found in biodiversity, habitat, climate change, water quality, soil quality.from vedic period to present day.	10
25.3	Causes for changes found in biodiversity, habitat, climate change, water quality, soil quality.from vedic period to present day.	3

25.4	Medicinal plants found in vedic literature, Samhita, Nighantus and recent databases.and evaluate their therapeutic efficacy	3
25.5	AI based identification of Medicinal plants	10
25.6	AI based identification of Medicinal plants	3
26.1	Crude drugs and herbal medicine of selected Formulations of Sharangadhara, AFI and API .	3
26.2	Modern methods for the standardization and quality control of Ayurvedic ingredients and formulations in terms of purity and efficacy.	5
26.3	Rationale behind formulating various Kalpana	5
27.1	Various Methods of different plant extracts preparation	6
27.2	Various plant extract utility	5
27.3	Record keeping for Safety, efficacy, and stability in the formulation process.	6
27.4	Preparing and standardizing proprietary medicine formulations based on Ayurvedic and modern guidelines	7
27.5	Preparing and standardizing proprietary medicine formulations based on Ayurvedic and modern guidelines.	2
28.1	Balya/Bruhana dravya from Herbal garden / department meusium. Criticaly analysed the properties of these dravya for poshana (nourishment) karma	10
28.2	Concept note writting on FSSAI guidelines and schedule 2 plants	10
28.3	Compilation on Nutraceuticals	6
29.1	Governing import and export of ASU products	6
29.2	Challenges and opportunities in the global market for ASU medicines.	6
29.3	Quality control, safety standards, and good manufacturing practices (GMP) for ASU drugs.	6
29.4	Provisions of the Drug & Cosmetics Act related to ASU drugs Drug & Cosmetics Act Schedule Z	4
29.5	Regulatory Frameworks (Regulatory processes for clinical trials) Drug approvals for traditional medicines.	4

30.1	Wildlife (Protection) Act 1972 (Section 17 A & 17 D).	2
30.2	Biological Diversity Act 2002 (Section 38) and Rules 2004 (Sec 41(1); Sec 41 (V)).	2
30.3	Community Herb Cultivation Projects Forest Resource Mapping	3
30.4	Trade of Plants listed in CITES Appendices (Export of Appendix-I Specimens (Article III.2; Import of Appendix-I Specimens (Article III.3; Re-export of Appendix-I Specimens (Article III.4)	4
30.5	Certificate of cultivation or "Legal procurement certificate" of species of conservation concern for export	4
30.6	Drugs and Cosmetic Act 1940 & Rules 1945.	3
30.7	Drug & Magic Remedies Act, Regulations pertaining to Import and Export of Ayurvedic Drugs	4
30.8	Innovation and entrepreneurship	4
31.1	Conducting Field survey Visit to Garden Identification of fresh herbs and dry specimens	10
31.2	Conducting Field survey Visit to Garden Visit to pharmacy to identify, observe raw herbs and their formulations	10
31.3	Conducting Field survey Visit to Garden Visit to pharmacy to identify, observe raw herbs and their formulations	3
31.4	Conducting Field survey Visitation to Garden Identification of fresh herbs and dry specimens	3
32.1	Preparation of single drug remedies Segregating drug based on Grahya Agrahyatva Procurement of drug based on quality standards	7
32.2	Conducting Field survey Visit to Garden Visit to pharmacy to identify, observe raw herbs and their formulations	6
32.3	Conducting Field survey Visit to Garden Identification of fresh herbs and dry specimens	7
32.4	Conducting Field survey Visit to Garden Visit to pharmacy to identify, observe raw herbs and their formulations	6

Table 6 : Assessment Summary: Assessment is subdivided in A to H points

6 A : Number of Papers and Marks Distribution

Subject Code	Paper	Theory	Practical	Total
AYPG-DG	4	100 x 4 Papers = 400	400	800

6 B : Scheme of Assessment (Formative and Summative Assessment)

Credit frame work

AYPG-DG consists of 32 modules totaling 64 credits, which correspond to 1920 Notional Learning Hours. Each credit comprises 30 Hours of learner engagement, distributed across teaching, practical, and experiential learning in the ratio of 1:2:3. Accordingly, one credit includes 5 hours of teaching, 10 hours of practical training, 13 hours of experiential learning, and 2 hours allocated for modular assessment, which carries 25 marks.

Formative Assessment : Module wise Assessment: will be done at the end of each module. Evaluation includes learners active participation to get Credits and Marks. Each Module may contain one or more credits.

Summative Assessment: Summative Assessment (University examination) will be carried out at the end of Semester VI.

6 C : Calculation Method for Modular Grade Points (MGP)

Module Number & Name (a)	Credits (b)	Actual No. of Notional Learning Hours (c)	Attended Number of notional Learning hours (d)	Maximum Marks of assessment of modules (e)	Obtained Marks per module (f)	MGP =d* f/c*e*100
Semester No : 3						
Paper No : 1 (Pharmacognostical Applications in Dravyaguna)						
M1 Classical to contemporary aspects of Aushadha Dravya Part 1	2	60		50		
M2 Classical to contemporary aspects of Aushadha Dravya Part 2	2	60		50		
Paper No : 2 (Applied Pharmacology in Dravyaguna)						
M9 Pharmacology & Karma of Nadi and Twacha with contemporary correlation.	3	90		75		
M10 Karmas of the Prajanana Sansthana	1	30		25		
Paper No : 3 (Industrial Applications in Dravyaguna)						
M17 Drug and Patient Safety	2	60		50		
M18 Sandigdha (Controversy) & Anukta Dravya in perspective of identification	2	60		50		

Paper No : 4 (Regulatory Frameworks in Dravyaguna)						
M25 Evolution of Dravyaguna and Scope of AI applications.	3	90		75		
M26 Quality Control of selected Formulation ingredients from Sharangadhara, AFI and API.	1	30		25		
	16	480		400		
Semester No : 4						
Paper No : 1 (Pharmacognostical Applications in Dravyaguna)						
M3 Nomenclature and basonym, synonyms, homonyms-based identification of classical drugs.	2	60		50		
M4 Botanical Identification of plants used in current practice	2	60		50		
Paper No : 2 (Applied Pharmacology in Dravyaguna)						
M11 Classical to contemporary aspects of Aushadha Dravya Part 3	2	60		50		
M12 Classical to contemporary aspects of Aushadha Dravya Part 4	2	60		50		
Paper No : 3 (Industrial Applications in Dravyaguna)						
M19 Leads to Drug discovery & new drug development	3	90		75		
M20 Novelty and Principles in compounding dosage forms	1	30		25		
Paper No : 4 (Regulatory Frameworks in Dravyaguna)						
M27 Plant Extracts	2	60		50		
M28 Poshaka Aushadhi -Integrating traditional wisdom with modern Nutraceutical concepts.	2	60		50		
	16	480		400		
Semester No : 5						
Paper No : 1 (Pharmacognostical Applications in Dravyaguna)						
M5 Identification, source & availability of plant-based Raw Drugs.	2	60		50		
M6 Vrikshayurveda, Cultivation, Conservation and, Tissue Culture of medicinal plants.	2	60		50		

Paper No : 2 (Applied Pharmacology in Dravyaguna)						
M13 Karmas of the Pachana samsthana, Yakrit and Pliha.	2	60		50		
M14 Karmas related to Sarvadehika, Mutrvaha samsthana and Dhatu karma.	2	60		50		
Paper No : 3 (Industrial Applications in Dravyaguna)						
M21 Classical to contemporary aspects of Aushadha Dravya Part 5	2	60		50		
M22 Classical to contemporary aspects of Aushadha Dravya Part 6	2	60		50		
Paper No : 4 (Regulatory Frameworks in Dravyaguna)						
M29 Regulatory Framework and Policies for ASU Drugs: Safety, Quality, and Compliance.	2	60		50		
M30 Regulatory framework for biodiversity for conservation, Traditional Knowledge and Integration of traditional & contemporary medicine.	2	60		50		
	16	480		400		

Semester No : 6

Paper No : 1 (Pharmacognostical Applications in Dravyaguna)						
M7 Pharmacognosy & Quality Standards of Ayurvedic Medicinal Plants.	2	60		50		
M8 Applied aspects of Bheshaja Pariksha, Prashasta Bheshaja and Bheshaja Prayoga	2	60		50		
Paper No : 2 (Applied Pharmacology in Dravyaguna)						
M15 Karmas of the Raktavaha Sansthana,Rasavahsansthana, Shwasansansthana	2	60		50		
M16 Experimental models for evaluation of various pharmacological actions.	2	60		50		
Paper No : 3 (Industrial Applications in Dravyaguna)						
M23 Study of plant-based dietary components and Animal-origin Drugs.	2	60		50		
M24 Pharmacotherapeutics of Herbal Cosmetic dravya - Varnya , Keshya, Twachya	2	60		50		
Paper No : 4 (Regulatory Frameworks in Dravyaguna)						

M31 Classical to contemporary aspects of Aushadha Dravya Part 7	2	60		50		
M32 Classical to contemporary aspects of Aushadha Dravya Part 8	2	60		50		
	16	480		400		
MGP = ((Number of Notional learning hours attended in a module) X (Marks obtained in the modular assessment) / (Total number of Notional learning hours in the module) X (Maximum marks of the module)) X 100						

6 D : Semester Evaluation Methods for Semester Grade point Average (SGPA)

SGPA will be calculated at the end of the semester as an average of all Module MGPs. Average of MGPS of the Semester For becoming eligible for Summative assessment of the semester, student should get minimum of 60% of SGPA

SGPA = Average of MGP of all modules of all papers = add all MGPs in the semester/ no. of modules in the semester
Evaluation Methods for Modular Assessment

Semester No : 3		
Paper No : 1 Pharmacognostical Applications in Dravyaguna		
A **S.No**	**B** **Module number and Name**	**C** **MGP**
1	M1.Classical to contemporary aspects of Aushadha Dravya Part 1	C1
2	M2.Classical to contemporary aspects of Aushadha Dravya Part 2	C2
Paper No : 2 Applied Pharmacology in Dravyaguna		
A **S.No**	**B** **Module number and Name**	**C** **MGP**
3	M9.Pharmacology & Karma of Nadi and Twacha with contemporary correlation.	C3
4	M10.Karmas of the Prajanana Sansthana	C4
Paper No : 3 Industrial Applications in Dravyaguna		
A **S.No**	**B** **Module number and Name**	**C** **MGP**
5	M17.Drug and Patient Safety	C5
6	M18.Sandigdha (Controversy) & Anukta Dravya in perspective of identification	C6
Paper No : 4 Regulatory Frameworks in Dravyaguna		
A **S.No**	**B** **Module number and Name**	**C** **MGP**
7	M25.Evolution of Dravyaguna and Scope of AI applications.	C7
8	M26.Quality Control of selected Formulation ingredients from Sharangadhara, AFI and API.	C8
	Semester Grade point Average (SGPA)	(C1+C2+C3+C4+C5+C6+C7+C8) / Number of modules(8)
Semester No : 4		
Paper No : 1 Pharmacognostical Applications in Dravyaguna		
A	**B**	**C**

S.No	Module number and Name	MGP
1	M3.Nomenclature and basonym, synonyms, homonyms-based identification of classical drugs.	C1
2	M4.Botanical Identification of plants used in current practice	C2

Paper No : 2 Applied Pharmacology in Dravyaguna

A S.No	B Module number and Name	C MGP
3	M11.Classical to contemporary aspects of Aushadha Dravya Part 3	C3
4	M12.Classical to contemporary aspects of Aushadha Dravya Part 4	C4

Paper No : 3 Industrial Applications in Dravyaguna

A S.No	B Module number and Name	C MGP
5	M19.Leads to Drug discovery & new drug development	C5
6	M20.Novelty and Principles in compounding dosage forms	C6

Paper No : 4 Regulatory Frameworks in Dravyaguna

A S.No	B Module number and Name	C MGP
7	M27.Plant Extracts	C7
8	M28.Poshaka Aushadhi -Integrating traditional wisdom with modern Nutraceutical concepts.	C8
	Semester Grade point Average (SGPA)	(C1+C2+C3+C4+C5+C6+C7+C8) / Number of modules(8)

Semester No : 5

Paper No : 1 Pharmacognostical Applications in Dravyaguna

A S.No	B Module number and Name	C MGP
1	M5.Identification, source & availability of plant-based Raw Drugs.	C1
2	M6.Vrikshayurveda, Cultivation, Conservation and, Tissue Culture of medicinal plants.	C2

Paper No : 2 Applied Pharmacology in Dravyaguna

A S.No	B Module number and Name	C MGP

A S.N o	B Module number and Name	C MGP
3	M13.Karmas of the Pachana samsthana, Yakrit and Pliha.	C3
4	M14.Karmas related to Sarvadehika, Mutrvaha samsthana and Dhatu karma.	C4

Paper No : 3 Industrial Applications in Dravyaguna

A S.N o	B Module number and Name	C MGP
5	M21.Classical to contemporary aspects of Aushadha Dravya Part 5	C5
6	M22.Classical to contemporary aspects of Aushadha Dravya Part 6	C6

Paper No : 4 Regulatory Frameworks in Dravyaguna

A S.N o	B Module number and Name	C MGP
7	M29.Regulatory Framework and Policies for ASU Drugs: Safety, Quality, and Compliance.	C7
8	M30.Regulatory framework for biodiversity for conservation, Traditional Knowledge and Integration of traditional & contemporary medicine.	C8
	Semester Grade point Average (SGPA)	(C1+C2+C3+C4+C5+ C6+C7+C8) / Number of modules(8)

Semester No : 6

Paper No : 1 Pharmacognostical Applications in Dravyaguna

A S.N o	B Module number and Name	C MGP
1	M7.Pharmacognosy & Quality Standards of Ayurvedic Medicinal Plants.	C1
2	M8.Applied aspects of Bheshaja Pariksha, Prashasta Bheshaja and Bheshaja Prayoga	C2

Paper No : 2 Applied Pharmacology in Dravyaguna

A S.N o	B Module number and Name	C MGP
3	M15.Karmas of the Raktavaha Sansthana,Rasavahsansthana, Shwasansansthana	C3
4	M16.Experimental models for evaluation of various pharmacological actions.	C4

Paper No : 3 Industrial Applications in Dravyaguna

A S.N o	B Module number and Name	C MGP
5	M23.Study of plant-based dietary components and Animal-origin Drugs.	C5

| 6 | M24.Pharmacotherapeutics of Herbal Cosmetic dravya - Varnya , Keshya, Twachya | C6 |

Paper No : 4 Regulatory Frameworks in Dravyaguna

A S.No	B Module number and Name	C MGP
7	M31.Classical to contemporary aspects of Aushadha Dravya Part 7	C7
8	M32.Classical to contemporary aspects of Aushadha Dravya Part 8	C8
	Semester Grade point Average (SGPA)	(C1+C2+C3+C4+C5+ C6+C7+C8) / Number of modules(8)

S. No	Evaluation Methods
1.	Method explained in the Assessment of the module or similar to the objectives of the module.

6 E : Question Paper Pattern

MD/MS Ayurveda Examination
AYPG-DG
Sem VI
Time: 3 Hours ,**Maximum Marks:** 100
INSTRUCTIONS: All questions compulsory

		Number of Questions	Marks per Question	Total Marks
Q 1	Application-based Questions (ABQ)	1	20	20
Q 2	Short answer questions (SAQ)	8	5	40
Q 3	Analytical based structured Long answer question (LAQ)	4	10	40
				100

6 F : Distribution for summative assessment (University examination)

S.No	List of Module/Unit	ABQ	SAQ	LAQ
Paper No : 1 (Pharmacognostical Applications in Dravyaguna)				
(M-1)Classical to contemporary aspects of Aushadha Dravya Part 1 (Marks: Range 5-20)				
1	(U-1) Dravya related to Medhya,Madakari,Sanjnasthapana,Nidrajanana,Vedanasthapana,Akshepajanana and Akshepashamana Karmas	Yes	Yes	Yes
2	(U-2) Dravya related to Netra-Chakshushya,Rasya, Twacha-Swedjanana, -Swedopaga and Swedapanayana karmas	Yes	Yes	Yes
(M-2)Classical to contemporary aspects of Aushadha Dravya Part 2 (Marks: Range 5-20)				
1	(U-1) Dravya related to Keshya, Varnya,Vranropana,Snehopaga,Kandughna,Kusthagnha and Udardaprashamana Karmas	Yes	Yes	Yes
2	(U-2) Dravya related to Hridya and Raktabharashamaka Karmas	Yes	Yes	Yes
3	(U-3) Dravya related to Shothahara,Gandamalanashaka Karma	Yes	Yes	Yes
(M-3)Nomenclature and basonym, synonyms, homonyms-based identification of classical drugs. (Marks: Range 5-15)				
1	(U-1) Vedic taxonomy & lexicons	No	Yes	Yes
2	(U-2) Basonym, Synonyms and Homonyms of drugs	No	Yes	Yes
3	(U-3) Etymological derivation of Basonyms and Synonyms	No	Yes	Yes
(M-4)Botanical Identification of plants used in current practice (Marks: Range 5-15)				
1	(U-1) Taxonomy & Plant Nomenclature.	No	Yes	No
2	(U-2) Key identifying characters of Plants	No	Yes	No
3	(U-3) International Code of Botanical Nomenclature for Cultivated Plants , World Flora online & DNA bar coding.	No	Yes	Yes
(M-5)Identification, source & availability of plant-based Raw Drugs. (Marks: Range 5-10)				
1	(U-1) Root, rhizome and underground parts	No	Yes	Yes
2	(U-2) Stem, stem bark and heart wood	No	Yes	Yes
3	(U-3) Leaves, flowers, fruits, seeds	No	Yes	Yes
4	(U-4) Whole herb,unorganised drugs and insect galls.	No	Yes	Yes
(M-6)Vrikshayurveda, Cultivation, Conservation and, Tissue Culture of medicinal plants. (Marks: Range 5-10)				
1	(U-1) Principles of Vrikshayurveda	No	Yes	No
2	(U-2) Cultivation, Conservation and Collection of useful parts of plants	No	Yes	No

3	(U-3) Tissue culture techniques.	No	Yes	No
(M-7)Pharmacognosy & Quality Standards of Ayurvedic Medicinal Plants. (Marks: Range 5-20)				
1	(U-1) Alternative parts and substitute plant drugs	No	Yes	Yes
2	(U-2) Morphological, macroscopic and microscopic characteristics of adulterant/alternate / substitute plant drugs.	Yes	Yes	Yes
3	(U-3) Solvent system, estimation procedures of assay/ analytical methods of chemical constituents (major) and leading biological marker in relation to safety, efficacy and quality.	No	Yes	Yes
4	(U-4) Analytical methods	Yes	Yes	Yes
(M-8)Applied aspects of Bheshaja Pariksha, Prashasta Bheshaja and Bheshaja Prayoga (Marks: Range 5-15)				
1	(U-1) Bheshaja Parikshavidhi.	No	Yes	Yes
2	(U-2) Prashasthabheshaja	No	Yes	Yes
3	(U-3) Bheshaja Marga and Sevanakala	No	Yes	Yes
4	(U-4) Matra, Anupana	No	Yes	No

S.No	List of Module/Unit	ABQ	SAQ	LAQ
Paper No : 2 (Applied Pharmacology in Dravyaguna)				
(M-9)Pharmacology & Karma of Nadi and Twacha with contemporary correlation. (Marks: Range 5-20)				
1	(U-1) Basic Prinicples of Pharmacology and Drug action in convetntional medicine	No	Yes	Yes
2	(U-2) Karmas of Nadi Samsthana (Nervous system).	Yes	Yes	Yes
3	(U-3) Karma related to Twacha	Yes	Yes	Yes
(M-10)Karmas of the Prajanana Sansthana (Marks: Range 5-15)				
1	(U-1) Karmas of the Prajanan Sansthan	No	Yes	Yes
(M-11)Classical to contemporary aspects of Aushadha Dravya Part 3 (Marks: Range 5-20)				
1	(U-1) Dravya related to Sleshmahara (Chedana),Kasahara,Shwasahara and Kanthya karma	Yes	Yes	Yes
2	(U-2) Dravya related to Prajasthapana, Garbharodhaka, Garbhashayasankochaka, Artavajanana, Artavasangrahaniya, Stanyajanana, Stanyasangrahaniya and Stanyashodhana karma	Yes	Yes	Yes
(M-12)Classical to contemporary aspects of Aushadha Dravya Part 4 (Marks: Range 5-20)				
1	(U-1) Dravya related to Shukrajanan,Shukrashodhana and Shukrastambhana karma	Yes	Yes	Yes
2	(U-2) Dravya related to Mutravirechaniya, Mutrasangrahniya, Ashmaribhedana and Madhumehahara karma	Yes	Yes	Yes
(M-13)Karmas of the Pachana samsthana, Yakrit and Pliha. (Marks: Range 5-20)				
1	(U-1) Karmas of the Yakrit and Pliha	No	Yes	Yes
2	(U-2) Karmas of the Pachansansthana	Yes	Yes	Yes
(M-14)Karmas related to Sarvadehika, Mutrvaha samsthana and Dhatu karma. (Marks: Range 5-15)				
1	(U-1) Sarvadehika Karmas	No	Yes	Yes
2	(U-2) Karmas of Mutrvahsansthana	No	Yes	Yes
3	(U-3) Dhatu karmas, Srotas	No	Yes	Yes
(M-15)Karmas of the Raktavaha Sansthana,Rasavahsansthana, Shwasansansthana (Marks: Range 5-20)				
1	(U-1) Karmas of the Raktavaha Sansthana	Yes	Yes	Yes
2	(U-2) Karmas of Rasavahsansthana	Yes	Yes	Yes
3	(U-3) Karmas of Shwasansansthana	Yes	Yes	Yes

(M-16)Experimental models for evaluation of various pharmacological actions. (Marks: Range 5-15)				
1	(U-1) Toxicological Studies for Drug Risk and Safety	No	Yes	No
2	(U-2) Genotoxicity, teratogenicity, carcinogenicity	No	Yes	No
3	(U-3) Diuretics, Adaptogens & CNS activities & Anti oxidant Activity	No	Yes	Yes
4	(U-4) Anti ulcer, Cardio protective & Hepatoprotective Activity.	No	Yes	Yes
5	(U-5) Anti diabetic, Anti hypertensive, Anti hyper lipidemic Activity.	No	Yes	Yes

S.No	List of Module/Unit	ABQ	SAQ	LAQ
Paper No : 3 (Industrial Applications in Dravyaguna)				
(M-17)Drug and Patient Safety (Marks: Range 5-15)				
1	(U-1) Pharmacovigilance	No	Yes	Yes
2	(U-2) Samyoga Viruddha Siddhant in perspective of incompatibility	No	Yes	No
3	(U-3) Pharmacoepidemiology	No	Yes	No
(M-18)Sandigdha (Controversy) & Anukta Dravya in perspective of identification (Marks: Range 5-20)				
1	(U-1) Sandigdha	No	Yes	Yes
2	(U-2) Anukta dravya	Yes	Yes	Yes
(M-19)Leads to Drug discovery & new drug development (Marks: Range 5-15)				
1	(U-1) Ethnomedicinal studies in drug discovery	No	Yes	Yes
2	(U-2) Omics	No	Yes	No
3	(U-3) Cheminformatics in drug discovery and drug design, Computer aided Drug design (CADD), network pharmacology	No	Yes	No
4	(U-4) Pharmacogenomics and Ayurgenomics,	No	Yes	No
5	(U-5) Reverse Pharmacology, Clinical pharmacology and evidence based research	No	Yes	Yes
(M-20)Novelty and Principles in compounding dosage forms (Marks: Range 5-15)				
1	(U-1) NDCT,2019	No	Yes	No
2	(U-2) Novel drug delivery systems	No	Yes	Yes
3	(U-3) Dosage forms	No	Yes	No
(M-21)Classical to contemporary aspects of Aushadha Dravya Part 5 (Marks: Range 5-20)				
1	(U-1) Dravya related to Jwaraghna,Vishamajwaraghna,Dahaprashamanaand Sheetaprashamana karma	Yes	Yes	Yes
2	(U-2) Dravya related to Balya,Jeevaniya,Sandhaniya and Rasayana karma	Yes	Yes	Yes
(M-22)Classical to contemporary aspects of Aushadha Dravya Part 6 (Marks: Range 5-20)				
1	(U-1) Dravya related to Vishaghna, Upavisha, Angamardaprashamana, Bruhana, Lekhana, Raktastambhana, Raktaprasadaka, Asthisandhaniya,Shoshahara and Raktaarbudanashaka Karma	Yes	Yes	Yes

(M-23)Study of plant-based dietary components and Animal-origin Drugs. (Marks: Range 5-15)				
1	(U-1) Dhanya, Shaka, Ikshu, taila and Vari varga	No	Yes	Yes
2	(U-2) Dugdha,Dadhi, Takra, Navneet, ghrita, Madhu, Mutra,Mamsa	No	Yes	Yes
(M-24)Pharmacotherapeutics of Herbal Cosmetic dravya - Varnya , Keshya, Twachya (Marks: Range 5-20)				
1	(U-1) Ayurvedic Herbal Cosmetics	Yes	Yes	Yes
2	(U-2) Raw materials, essential oil, preservatives, additives used in preparation of Ayurveda Cosmetics	No	Yes	No
3	(U-3) Assays and equipment in cosmetics	No	Yes	No

S.No	List of Module/Unit	ABQ	SAQ	LAQ
Paper No : 4 (Regulatory Frameworks in Dravyaguna)				
(M-25)Evolution of Dravyaguna and Scope of AI applications. (Marks: Range 5-20)				
1	(U-1) Evolution of Dravyaguna	Yes	Yes	Yes
2	(U-3) AI in Dravyaguna	Yes	Yes	Yes
(M-26)Quality Control of selected Formulation ingredients from Sharangadhara, AFI and API. (Marks: Range 5-20)				
1	(U-1) Panchavidha Kashaya Kalpana, Sneha Kalpana, Sandhana Kalpana	Yes	Yes	Yes
(M-27)Plant Extracts (Marks: Range 5-20)				
1	(U-1) Plant Extracts	Yes	Yes	Yes
2	(U-2) proprietary medicines	Yes	Yes	Yes
(M-28)Poshaka Aushadhi -Integrating traditional wisdom with modern Nutraceutical concepts. (Marks: Range 5-20)				
1	(U-1) Poshaka Aushadhi and Nutraceuticals	No	Yes	Yes
2	(U-2) FSSAI guidelines, relevant to Botanicals & its impact on Ayurveda and GRAS as per FDA.	Yes	Yes	Yes
(M-29)Regulatory Framework and Policies for ASU Drugs: Safety, Quality, and Compliance. (Marks: Range 5-20)				
1	(U-1) Regulatory Bodies and Policies in India and CDSCO	Yes	Yes	Yes
2	(U-2) Policies and Regulation on manufacture of ASU Drugs	Yes	Yes	Yes
3	(U-3) Drug & Cosmetics act and Schedule Z drugs	Yes	Yes	Yes
(M-30)Regulatory framework for biodiversity for conservation, Traditional Knowledge and Integration of traditional & contemporary medicine. (Marks: Range 5-20)				
1	(U-1) National legal framework & Law	Yes	Yes	Yes
2	(U-2) GCTM, NMPB/ RCFC for procurement of genuine raw material, TKDL and Patenting aspects of traditional knowledge	Yes	Yes	Yes
3	(U-3) Ayush products and Entrepreneurship ,Skills towards innovation and entrepreneurship, Funding opportunities for research	No	Yes	Yes
(M-31)Classical to contemporary aspects of Aushadha Dravya Part 7 (Marks: Range 5-20)				
1	(U-1) Dravya related to Mukha -Lalaprasekajanana, Trishnanigrahana, Mukhavaishadyakara, Dantashodhana, Dantadardhyakara. Amashaya-Triptighna,Rochana, Deepana,	Yes	Yes	Yes

	Pachana,Vamana,Vamanopaga. Antra -Purishajanana, Vatanulomana, Vishtambhi,Virechana –Mruduvirechana, Sukhavirechana Karma			
(M-32)Classical to contemporary aspects of Aushadha Dravya Part 8 (Marks: Range 5-20)				
1	(U-1) Dravya related to Tikshnavirechana, Virechanopaga, Sanshodhana (Ubhyatobhagahara), Grahi Aamahara (Upshoshanahara), Stambhana, Purishavirajaniya, Shoolaprashamana, Krimighna and Arshoghna Karma	Yes	Yes	Yes
2	(U-2) Dravya related to Yakrit and Pleeha Karma	Yes	Yes	Yes

6 G : Instruction for the paper setting & Blue Print for Summative assessment (University Examination)

Instructions for the paper setting.
 1. University examination shall have 4 papers of 100 marks.
 Each 100 marks question paper shall contain:-
 • Application Based Question: 1 No (carries 20 marks)
 • Short Answer Questions: 8 Nos (each question carries 05 marks)
 • Long Answer Questions: 4 Nos (each question carries 10 marks)
 2. Questions should be drawn based on the table 6F.
 3. Marks assigned for the module in 6F should be considered as the maximum marks. No question shall be asked beyond the maximum marks.
 4. Refer table 6F before setting the questions. Questions should not be framed on the particular unit if indicated "NO".
 5. There will be a single application-based question (ABQ) worth 20 marks. No other questions should be asked from the same module where the ABQ is framed.
 6. Except the module on which ABQ is framed, at least one Short Answer Question should be framed from each module.
 7. Long Answer Question should be analytical based structured questions assessing the higher cognitive ability.
 8. Create Blueprint based on instructions 1 to 7

6 H : Distribution of Practical Exam (University Examination)

S.No	Heads	Marks
1	**Long Procedure/Major practical-** • Analyse the given case scenario and write the suitable single/ compound drugs with Matra and Anupana- Marks :40 • Analyse Grahya-Agrahyatwa of Ingredients of given Kalpana and prepare the same in laboratory- Marks :30 • Demonstrate searching information in Databases and internet resources about plants, their therapeutic effects, names of phytoconstituents and their structures.(IMPPAT, Dukes, etc),Demonstration in searching data of medicinal plants in freely available software for prediction of biological activity, docking, generation of descriptors and QSAR modelling. - Marks :30	100
2	**Short Procedure/Minor practical-** • Perform Physico-chemical analysis- one sample- Marks :15 • Perform Phytochemical analysis- one sample- Marks :15 • Perform TLC- Marks :20	50
3	**Spotters-**Identify plants on the basis of key characters- Fresh Samples and Dry Samples (Total 25 samples- Each carries 2 marks)	50
4	Assessing Teaching ability	20
5	Assessing Presentation skills	20
6	Viva- 4 examiners (20 Marks / each examiner)	80
7	Dissertation Viva	40
8	Log book/ Activity record	20
9	Practical/ Clinical record	20
Total Marks		**400**

Reference Books/ Resources

S.No	References
1	Namarupajnanam, Chaukhambha Visvabharti,-Sharma PV,
2	Studies on Medicinal Plants and Drugs in Bhavaprakasha Nighantu,Kamat SD. Chaukhamba Sanskrit Pratishthan; New Delhi.
3	Ausadhinamarupa vijnanam (Vol. 1 and 2). Dr Sanjeev Kumar Lale, Mr. Hemraj Lale, Indore.
4	Shaligrama Aushadha Shabdasagara (A Dictionary of Ayurvedic Medicine) ,Khemraj Shrikrishnadass
5	Bhavaprakasha Nighantu with Hindi commentary. Chunekar KC, editor. , Varanasi: Chaukhamba Bharati Academy (reprint); 2002.
6	Botany of commonly used medicinal Plants with Diagnostic keys, Dr. Hema Sane and Dr. Yogini Kulkarni. Vision Publication Pune
7	Plant taxonomy and Systematics by Gateschew Mekonnen, Yilma Dessalegn. AP Lambert Academic Publishing
8	Plant taxonomy theory, principles & practices, D A Patil, Scientific Publishers
9	Internet-based compendium of the world's plant species-https://www.worldfloraonline.org/
10	DNA Barcoding Methods and Protocols, Editors: Robert DeSalle, Humana New York, NY
11	Plant Names: A Guide to Botanical Nomenclature, by Roger Spencer , Rob Cross, CSIRO Publishing
12	Microscopic Profile of Powdered Drugs Used in Indian Systems of Medicine. Vol 1 (Bark Drugs), Vol. 2 (Leaf Drugs), Vol. 3 Part I & II (Seed Drugs). Malati G Chauhan, A.P.G. Pillai. Institute of P.G. Teaching & Research in Ayurveda. Gujarat Ayurveda University, Jamnagar.
13	Ayurvedic Pharmacopoeia of India, Part I (Single Drugs) Part 1, Vol: I ((Revised) to VI, VIII, IX., Ministry of Ayush, Government of India
14	"Principal Crude Herbal Drugs of India: An Illustrated Guide to Important Largely Used and Traded Medicinal Raw Material".Y.K. Sarin , Bishen Singh Mahendra Pal Singh.
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17	Introduction to Plant Tissue Culture, Razdan, M.K., Oxford & IBH Publishers, Delhi
18	Plant Tissue Culture: Theory and Practical (a revised edition). Bhojwani, S.S. , Elsevier Science Publishers, New York, USA
19	Conservation, Cultivation and Exploration of Therapeutic potential of Medicinal Plants Central Council for Research in Ayurvedic Sciences, New Delhi.
20	Guidelines On Good Field Collection Practices For Indian Medicinal Plants National Medicinal Plants Board, New Delhi
21	WHO Guidelines on Good Agricultural and Collection Practices (GACP) for Medicinal Plants World Health Organization,World Health Organization, Geneva

22	Cultivation Of Medicinal And Aromatic Crops Azhar Ali Farooqi, B. S. Sreeramu, Universities Press (India) Pvt. Ltd. Hyderabad
23	Vasudevan, C. N.; Neerakkal, Ima Compilation of Herbal Drug Substitutes Suggested in Selected Classical Ayurvedic Texts. Journal of Ayurveda 15(3):p 198-207, Jul–Sep 2021.
24	Joshi PR, Patel BR, Shukla VJ. An overview of the causes of current practices in Pratinidhi Dravyas (substitution of drugs) in Ayurveda including newer techniques for their evaluation. Ayu. 2012 Oct;33(4):481-5.
25	Unnikrishnan R, Dev SA, Jayaraj R. Pitfalls and promises of raw drug identification techniques in the ayurvedic industry: an overview. 3 Biotech. 2020 Nov;10(11):497.
26	Some Controversial Drugs in Indian Medicine Bapalal Vaidya, Chaukhambha Orientalia, Varanasi
27	Quality Control of Herbal Drugs: An Approach to Evaluation of Botanicals Pulok K Mukharjee, Elsevier
28	Practical Pharmacognosy Dr. K. R.. Khandelwal and Dr. Vrunda Sethi , Nirali Prakashan Pune
29	Quality Standards of Indian Medicinal Plants (Vol. 1-17) Indian Council Of Medical Research, New Delhi
30	Charakasamhita with Cakrapani Commentary Yadavji Trikamji, editor. Agnivesha. Charaka Samhita. Ayurveda Dipika. Chakrapanidatta (Sanskrit) Varanasi: Chaukambha Sanskrit Sansthan
31	Charak Samhita (Hindi commentary) Harishchandra Singh Kushvaha, editor and translator. Charak Samhita (Hindi Commentary): Varanasi: Chaukambha Orientalia
32	Ayurvedic Pharmacology & Therapeutic Uses of Medicinal Plants Dravyagunavignyan Vaidya V M Gogte, Chaukhambha Publications, New Delhi
33	Dravyaguna Vigyana (Vol. 1-5) Acharya Priyavrata Sharma, Chaukhambha Bharti Academy, Varanasi
34	Dravyaguna Vigyana (Vol. 1-2) Acharya Yadavji Tikramji,Baidyanath Ayurved Bhavan Ltd
35	Handbook of Anupana Pathya and Apathya - Adjuvant Wholesome and Unwholesome Regimen, National Institute Of Indian Medical Heritage, Hyderabad
36	Sushruta samhita, with Dalhana commentry Acharya Yadava ji trikamji and & Acharya Narayana ram, reprint edition, Chaukhambha surbharati prakashana, Varanasi.
37	Vriddha Jeevaka. Kashyapa Samhita, Revised by Vatsya, Pandit Hemaraja Sharma and Satyapala Bhishagacharya. Varanasi: Chaukhambha Sanskrit Samsthana
38	Acharya Sharangadhara Bhisagvar Sarangadhara Samhita by Adhamalla Virachita Deepika Commentary, Dr Brahmananda Tripathi, Chaukhambha Surbharti Prakashan
39	Kaideva Nighantu, Pathyapthya -Vibodhakah. Priyavrata Sharma, Guru Prasada Sharma, Chaukhambha Orientalia, Varanasi
40	Vaidya Banavarilal Mishra, Dravyaguna Hastamalaka, 3rd ed, Jaipur: Premalatha Natani Publication Scheme;1995.
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46	Prof Priyavrata Sharma, Priyanighantu,2nd ed, Varanasi:Chaukhambha Surabharati Prakashan;1995
47	Prof K C Chunekar & Dr Khadanand Pondel, Plants of Sharangadhara Samhita, New Delhi: Director, Rashtriya Ayurveda Vidyapeeth;1999
48	Prof K C Chunekar & Dr N P Hota, Plants of Bhavaprakash, New Delhi: Director, Rashtriya Ayurveda Vidyapeeth;1999
49	Dr J. L. N. Sastry, Ayurvedokta Oushadha Niruktamala, Varanasi: Chaukhambha Orientalia.
50	Y.K. Sarin, Illustrated Manual of Herbal Drugs used in Ayurveda, Council of Scientific & Industrial research & Indian Council of Medical research;1996
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55	K Raghunathan & Miss Roma Mitra, Pharmacognosy of Indigenous Drugs, Vol I & Vol II, Reprint, New Delhi: Central Council for Research in Ayurveda & Siddha;1999
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59	N S Subrahmanyam, Laboratory Manual of Plant Taxonomy,2nd ed, New Delhi: Vikas Publishing House Pvt Ltd;1999
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Abbreviations

Domain		T L Method		Level	
CK	Cognitive/Knowledge	L	Lecture	K	Know
CC	Cognitive/Comprehension	L&PPT	Lecture with PowerPoint presentation	KH	Knows how
CAP	Cognitive/Application	L&GD	Lecture & Group Discussion	SH	Shows how
CAN	Cognitive/Analysis	L_VC	Lecture with Video clips	D	Does
CS	Cognitive/Synthesis	REC	Recitation		
CE	Cognitive/Evaluation	SY	Symposium		
PSY-SET	Psychomotor/Set	TUT	Tutorial		
PSY-GUD	Psychomotor/Guided response	DIS	Discussions		
PSY-MEC	Psychomotor/Mechanism	BS	Brainstorming		
PSY-ADT	Psychomotor Adaptation	IBL	Inquiry-Based Learning		
PSY-ORG	Psychomotor/Origination	PBL	Problem-Based Learning		
AFT-REC	Affective/ Receiving	CBL	Case-Based Learning		
AFT-RES	Affective/Responding	PrBL	Project-Based Learning		
AFT-VAL	Affective/Valuing	TBL	Team-Based Learning		
AFT-SET	Affective/Organization	TPW	Team Project Work		
AFT-CHR	Affective/ characterization	FC	Flipped Classroom		
		BL	Blended Learning		
		EDU	Edutainment		
		ML	Mobile Learning		
		ECE	Early Clinical Exposure		
		SIM	Simulation		
		RP	Role Plays		
		SDL	Self-directed learning		
		PSM	Problem-Solving Method		
		KL	Kinaesthetic Learning		
		W	Workshops		
		GBL	Game-Based Learning		
		LS	Library Session		
		PL	Peer Learning		
		RLE	Real-Life Experience		
		PER	Presentations		
		D-M	Demonstration on Model		
		PT	Practical		
		X-Ray	X-ray Identification		
		CD	Case Diagnosis		

		LRI	Lab Report Interpretation		
		DA	Drug Analysis		
		D	Demonstration		
		D-BED	Demonstration Bedside		
		DL	Demonstration Lab		
		DG	Demonstration Garden		
		FV	Field Visit		
		JC	Journal Club		
		Mnt	Mentoring		
		PAL	Peer Assisted Learning		
		C_L	Co Learning		
		DSN	Dissection		
		PSN	Prosection		

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