

PhD Syllabus for

RASA SHASTRA AND BHAISHAJYA KALPANA

Topic I *Rasa Shastra*

Marks-1

1. **History and Chronological evolution of Rasashastra** - concept of Raseshwara darshan. Fundamental Principles of Rasashastra Technical terminologies (Paribhasha) used in Rasa shastra.

Marks-1

2. **Yantropakarana** - Detailed knowledge of ancient and contemporary Yantropakarana and their accessories used in aushadhikaran and their contemporary modification such as yantras, mushas, putas, Koshtis, bhrashtis, muffle furnaces and other heating appliances, ovens, driers etc. used in manufacturing of Rasaushadhis in small scale and large scale along with their applications.

Marks-1

3. **Study of Samskara** - Role of agni (Heat), jala and other dravas (water and other processing liquids), kala (Time span), paatra (container) etc. and their significance in aushadhikarana.

Marks-1

4. **Concept of Bhavana** - study of Mardana and its significance and knowledge of ancient and contemporary grinding techniques. Detailed Knowledge of different procedures of Shodhana, Jarana, Murchana and Marana,

Marks-1

5. **Concept of Puta** - definition, types and specifications of different Putas. Significance of different Putas in relation to Bhasmikanana and therapeutic efficacy of dravya under process. Bhasma pariksha vidhi and its significance in relation to contemporary testing procedures. Amritikaran and Lohitikarana.

Marks-1

6. **Satvapatan** - Detailed knowledge of Satva and Druti, Satva shodhan, mrudukaran and Maran of Satva, its significance, in relation to therapeutic efficacy of dravya under process.

Marks-1

7. **Concept of Pratinidhi Dravya** - discussion on controversial drugs. Anupalabdha (Not Available): Rasaka, Sauviranjana, Krutrima (Artificial): Sasyaka, Gandhaka, Kasisa, Rasanjana, Hingula.

Marks-1

8. **Parad** - Detailed ancient and contemporary knowledge of Parada and its compounds with reference to source, occurrence, physico-chemical characterization, graahya agraahyatva, Parada dosha, Parada gati, Parada shodhan, Study of Ashta sanskara, ashtadasa sanskara etc., Hingulottha Parada. Concept of Parada jaran, moorcchana, bandhan, pakshaccheda and marana etc. Therapeutic properties and uses of Parada.

Marks-2

9. **Classification of Rasadravyas** - Detailed ancient & contemporary knowledge with Geochemical / mineralogical / biological identification, source, occurrence, physico-chemical characterization, graahya-agraahyatva, Shodhan Maranadi vidhi and therapeutic properties and uses of dravyas etc. included in -
Maharasa, Uparasa, Sadharana rasa, Dhatu, Upadhatu, Ratna, Uparatna, Visha, Upavisha, Sudha varga, Lavana varga, Kshara varga, Sikata varga and other miscellaneous drugs used in Rasashastra.

Marks-3

10. **Bhasma, Dravaka and Pishti** - Detailed knowledge of manufacturing, pharmacopeial standards, storage, shelf life, therapeutic efficacy, dose, anupana, vikarashanti upaya and development of technology with Standard Operating Procedures of processing, standardization, quality control of Bhasmas and Pishtis, current status of Nanomedicine vis-à-vis Bhasma.

Bhasma - Abhraka Bhasma, Svarnamakshika Bhasma, Kasis Bhasma, Svarna Bhasma, Rajata Bhasma, Tamra Bhasma, Loha Bhasma, Mandur Bhasma, Naga Bhasma, Vanga

Bhasma, Yashad Bhasma, Trivanga Bhasma, Pittala, Kamsya and Varthaloha Bhasma, Shankha Bhasma, Shukti Bhasma, Kapardika Bhasma, Godanti Bhasma, Praval Bhasma, Mrigashringa Bhasma, Mayurpiccha Bhasma, Kukkutand twak Bhasma, Hiraka Bhasma, Manikya Bhasma.

Dravaka - Shankha Dravaka.

Pishti - Praval pishti, Manikya Pishti, Mukta pishti, Jahara mohara pishti, Trinakanta mani pishti etc.

Marks-2

11. **Chaturvidha Rasayana** - Detailed knowledge of manufacturing, storage, shelf life, pharmacopeial standards, therapeutic efficacy, dose, anupana and development of technology with Standard Operating Procedures of processing, standardization and quality control of Kharaliya rasa, Parpati, Kupipakva rasa and Pottali rasa. Pharmaceutical Processing & methods of Kupi Pakwa Rasaushadhies & Bhasma by using Electric Muffle Furnace (EMF).

Marks-2

12. **Study of classical texts** - with respective commentaries and special emphasis on Rasarnava, Rasahridaya tantra, Rasa Ratna Samucchaya, Rasendra Chintamani, Rasendra Chudamani, Rasa Ratnakara, Rasadhyaya, Rasa Kamdhenu, Anandkanda, Siddha Bhesaja Manimala, Ayurveda Prakash, Rasatarangini, Bhaishajya Ratnavali, Rasamritam etc. and the books mentioned in the Schedule I of D & C Act – 1940. Relevant portions of Brihatrayi.

Marks-1

13. **Rasachikitsa** - Kshetrikaran, Rasajirna, Lohajirna, Aushadhi Sevana Vikarashanti Upaya. Ashuddha, Apakva, Avidhi Rasadravya Sevanajanya Vikara evam Vikara shanti upaya.

Marks-3

14. **Rasayoga** - Detailed knowledge of Aushadhi patha Nischiti and sanyojan (formulation composition), dose, anupana and method of administration, therapeutic efficacy and uses (indications and contra-indications), probable mode of action etc. of the following Aushadhi yogas

Kharaliya Rasa : Shwasa kuthara Rasa, Tribhuvana kirti Rasa, Higuleshwara Rasa, Ananda bhairava Rasa, Maha Lakshmi vilasa Rasa, Vasnata kusumakara Rasa, Vasanta malti Rasa, Brihat vata chintamani Rasa, Laghu suta shekhar Rasa, Suta shekhara Rasa, Ram ban Rasa, Chandra kala Rasa, Yogendra Rasa, Hridyarnava rasa, Grahani kapata Rasa, Garbha pala Rasa, Jalodarari Rasa, Mrityunjaya Rasa, Madhumalini vasanta Rasa, Arsha kuthara Rasa, Krimi mudgara Rasa, Suchika bharana Rasa, Tri netra Rasa, Smruti sagara Rasa, Vata gajankusha Rasa, Agni kumar Rasa, Ekangavir Rasa, Kama dugha Rasa, Purna chandrodaya Rasa, Pratap lankeshwara Rasa, Maha vata vidhwansaka Rasa, Kasturi bhairava Rasa, Ashwa kanchuki Rasa, Gulma kuthara Rasa, Maha jwarankusha Rasa, Chandra mrita Rasa, Kapha ketu Rasa, Prabhakara Vati, Pravala Panchamrita, Gandhaka Rasayana, Chaturbhuj rasa, Navajivan rasa, Shonitargal rasa, Raktapitta kulakandan rasa, Amavatari Rasa, Kravyada Rasa, Garbha chintamani Rasa, Chintamani Rasa, Trilokya chintamani Rasa, Pradarantaka Rasa, Vangeshwara Rasa, Brihat vangeshwara Rasa, Shwasakasa Chintamani Rasa, Arogya vardhini Vati, Chandra prabha Vati, Agni tundi vati, Shankha Vati.

Kupipakva Rasa: Rasa Sindura, Makaradhwaja, Sidha makaradhwaja, Samira pannaga Swarnavanga, Malla sindura, Rasa karpura, Rasa pushpa, Manikya Rasa.

Parpati Rasa : Rasa Parpati, Loha Parpati, Tamra Parpati, Suwarna Parpati, Gagana Parpati, Vijay Parpati, Panchamrit Parpati, Shwet Parpati, Bola Parpati

Pottali Rasa: Rasagarbha pottali, Hemagarbha pottali, Mallagarbha pottali, Hiranyagarbha pottali, Shankagarbha pottali, Lokanatha rasa, Mriganka Pottali.

Loha evam Mandura Kalpa: Ayaskriti, Loha Rasayana, Amla pittantaka loha, Chandanadi loha, Dhatri loha, Navayasa loha, Putapakva vishama jwarantaka loha, Shilajatwadi loha, Tapyadi loha, Saptamrita loha, Dhatri loha Amritasara Loha, Shankaramat loha, Pradarantaka loha, Rohitaka loha. Punarnava Mandura, Shatavari Mandura, Tara Mandura, Triphala Mandura, Mandura Vataka etc.

15. **Single drug (Bhasma, Shuddha & Pishti)**

Marks-3

- Single drug/ formulation and its mode of action in different indications
- Chemical/phytochemical composition • Pharmacodynamics and pharmacokinetics as per formulation • Therapeutic properties • Awasthanusara Uses(as applicable) • Matra • Anupana • Pathyapathya • Sevana Kala • Kala maryada (duration of medication as

applicable) • Side effects of medication(as applicable) • Ashuddha apakwa, avidhi sevanajanya vyadhi and their shantyupaya, • Research updates and clinical evidences for each of the following formulations:

Abhraka Bhasma, Swarna Makshika Bhasma, Swarna Bhasma, Rajata Bhasma, Lauha Bhasma, Tamra Bhasma, Vanga Bhasma, Naga Bhasma, Yashada Bhasma, Kasisa Bhasma, Shuddha Shilajatu, Shuddha Gandhaka, Shuddha Gairika, Shuddha Kankshi, Mukta Pishti & Bhasma, Pravala Pishti & Bhasma, Vajra Bhasma, Kaparda Bhasma, Shankh Bhasma, Godanti Bhasma, Shuddha Tankana, Shuddha Kankshi.

Topic II Bhaishajya Kalpana

Marks-1

1. **History and Chronological evolution of Bhaishajya Kalpana** - Concept of Bhaishajya and Aushadh, fundamental principles of Bhaishajya Kalpana. Technical terminologies (Paribhasha) used in Bhaishajya Kalpana.

Marks-1

2. **Basic Principles of Bhaishajya Kalpana** - Classical and Contemporary concepts of Collection, storage, Saviryata Avadhi and preservation methods of different fresh and dry Aushadhi dravyas and their graahya agraahyatva, Detailed knowledge of Aushadha matra, Sahapana, Aushadha Sevana Kala, Kala Avadhi, Pathya, Apathya (Posology).

Marks-2

3. **Anupana Prayoga for Aushadhi Kalpa**

Properties of Anupana Factors to be considered for selection of Anupana •Dosha •Aushadha •Roga/ Rogi •Ahara Purpose of Anupana Contraindications of Anupana Eka Kalpa Vydi anusara aneka Anupana for following yogas

- 1.Kaishore Guggulu: Sarangadhar Samhita , Madhyam khanda- 7/72-81
2. Yogaraj, Guggulu: Sarangadhar Samhita Madhyam khanda- 7/56-69
3. Narayana Churna: Sarangadhar Samhita Madhyam khanda- 7/83-91,
- 4.Rasa Sindoor: RasaTarangini Murcchana vigyaniya Taranga, 6/203-234,
5. Rasa Parpati: Rasa Tarangini Murcchana vigyaniya Taranga, 6/144-153,
- 6.Kankayan Vati : Sarangadhar Samhita Madhyam khanda, 7/50-55.

Marks-2

4. **.Aushadhi Prayoga Marga** – Introduction, Types in ayurveda, Advantages and disadvantages of each aushadhi prayoga marga and probable mode of action after administration of following dosage forms in below mentioned routes
1. **Mukha (Oral Cavity):** Vati, Gutika, Churna, Asava, Arishta, Kashaya, Avaleha, Khanda, Sneha (Ghrita/Taila),
 2. **Nasa(Nasal Route)-** Dosage form used - Churna, taila, swarasa, arka
 3. **Karna (Through Ear)-** Taila, Ghrita
 4. **Akshi (Through Eyes) -** Ghrita, Taila,
 5. **Twak (Through Skin)-** Lepa, Alepa, Pralepa, Malahara, upanaha, pradeha, abhyanga, udvartana.
 6. **Guda (Anal Route)-** Dosage forms - Vartis, taila, ghrita, kalka, churna, kashaya
 7. **Mutra marga (Through urethra)-** Uttara Basti with Dosage forms- Taila, ghrita
 8. **Yoni marga (Through vagina)-** Yoni Dharana, Yoni Dhavana, Yoni Pichu, Yoni Dhoopana

Marks-2

5. **Standard manufacturing Operating Procedures** - Detailed knowledge of manufacturing, standardization, quality control, pharmacopeial standards, storage, shelf life and development of innovative technology with Standard manufacturing Operating Procedures of following dosage forms
- i) **Panchavidha Kashaya and other Kalpa** like Churna, Rasakriya, Ghana, Avaleha, Pramathya, Mantha, Panaka, Sarkara, Kshirapaka, Ushnodaka, Aushadha Siddha Udaka, Sadangodaka, Tandulodaka, Laksharasa, Arka, Satva, Kshara, Lavana, Masi, Gutika, Vatika, Modaka, Guggulu and Varti etc.
 - ii) **Sneha Kalpana:** Concept of accha sneha and sneha pravicharana and Murchhana. Sneha paka, types of sneha paka and sneha siddhi lakshana, Avartana. Sneha kalpa karmukata (Pharmacokinetics and dynamics of sneha kalpa). Role of Sneha in relation to absorption of drug.
 - iii) **Kritanna and Bhesaja Siddha Anna Kalpana,** Aharopayogi varga, concept of medicinal and functional food, dietary supplements and nutraceuticals etc.

iv) Sandhana kalpana: Madya varga and Shukta varga. Asava yoni. Alcoholic and acidic fermentation. Sandhana kalpa karmukata (Pharmacokinetics and dynamics). Advancements in fermentation technology. Knowledge of regulations in relation to alcoholic drug preparations. Latest trends & Technologies adopted for the preparation of Asava & Arishta.

v) Bahya Prayogartha Kalpana : Lepa, Upanaha, Udvartan, Avachurnana / Avadhulana, Abhyanga, Dhupana, Malahara.

vi) Mukha, Karna, Nasa, Netropacharartha Kalpana

vii) Basti Kalpana: Basti Yantra Nirmana, Types of basti. Anuvasana and Asthapana basti. Karma, kala and yoga basti etc. Basti Kalpa (Madhutailika, Piccha basti etc.), Comparison of Asthapana and Anuvasana basti with evacuation and retention enema.

Marks-1

6. **Advance instruments of analysis** - Introduction to advance instruments of analysis like XRD, XRF, SEM-E-Dax, ICP analysis, FTIR, LC-MS, TGA, DTA, Chromatography: TLC, GCMS, HPTLC, concept of Nanotechnology and its relevance to Aushadha-Nirman.

Marks-2

7. **Modern Procedures in Pharmaceutics** - All the following procedures are to be studied in relevance to Ayurvedic Bhaishajya Kalpas.

- **Methods of Expression and Extraction** of different Herbal extracts: Maceration, percolation, distillation, infusion and decoction.
- **Liquids:** Clarified liquid, syrup, elixir, filtration techniques
- **Solid dosage Forms: Powders:** Size reduction, separation techniques, particle size determination, principles of mixing.

Tablets: Methods of tableting, suppositories, pessaries and capsules, sustained release dosage forms. Current trends in developing the coating of Ayurvedic Tablets. Technologies developed for preparing Ayurvedic soft and hard gelatin capsules.

- **Semisolid dosage forms,** emulsions, suspensions, creams and ointments, sterilization of ophthalmic preparations.
- **Cosmetics** - An introduction to various cosmetic preparations such as Toiletries, shampoo, Shaving creams, Hair oils, Face powders (Talcum powder), Vanishing

creams, lotions and Moisturisers, Face pack, Deodourants and Perfumes, Hair Colour, Tooth Paste etc. **Current and emerging trend in Ayurvedic Pharmaceuticals Cosmetics-Formulation, Regulatory Provisions** Brief Introduction to Cosmetics-Formulation, Regulatory Provisions, Plant Layout and other factory requirements, process used in the manufacture of Cosmetics, Most commonly used cosmetic Raw materials, Control of microbial contamination in the manufacture of cosmetics and Quality Control of cosmetics, Skin Sensitization Sensitivity Testing, In vitro-Tests for Skin Irritation, Quality Control of Raw materials, Intermediates and Finished Products, Stability of Cosmetics.

- Drying, open and closed air drying, freeze drying, vacuum drying and other drying methods pharmaceutical excipients.

Marks-1

8. **Study of classical texts** - with special emphasis on Chakradatta, Sharangadhara Samhita, Bhaishajya Ratnavali, Bhava Prakasha, Yogaratnakara, relevant portions of Brihatrayi etc.

Marks-2

9. **Detailed knowledge of Aushadhi yogas** - Aushadhi patha Nischiti and sanyojan (formulation composition), dose, anupana and method of administration, therapeutic efficacy and uses (indications and contra-indications), probable mode of action etc. of the following Aushadhi yogas

- a. **Panchavidha Kashayas and their Upakalpa:** Ardraka swarasa, Tulasi swarasa, Vasa putapaka swarasa, Nimba kalka, Rasona kalka, Kulattha Kwath, Punarnavasthaka kwatha, Rasna saptaka kwatha, Dhanyak hima, Sarivadi hima, Panchakola phanta, Tandulodaka, Mustadi pramathya, Kharjuradi mantha, Shadanga paniya, Laksha rasa, Arjuna kshirapaka, Rasona kshirapaka, Chinchapanaka, Candanapanaka, Banapsha sharkara, Nimbu sharkara, Amrita satva, Ardraka satva, Ajamoda arka, Yavanyadi arka
- b. **Kritanna and Bhesajya Siddha Ahara Kalpana:** Yavagu, (Krita and Akrita), Ashtaguna manda, Laja manda, Peya, Vilepi, Krishara, Yusha, Mudga yusha, Kulattha yusha, Saptamushtika yusha, Khada, Kambalika, Raga, Shadava,

Mamsarasa, Veshavara, Dadhi, Katvar Dadhi, Dadhi Mastu, Takra, Ghola, Udasvita, Mathita, Chhacchika etc.

- c. **Churna:** Sitopaladi Churna, Talisadi Churna, Triphala Churna, Hingvashtaka Churna, Avipattikara Churna, Swadishta Virechana Churna, Bhaskar Lavana Churna, Sudarshana Churna, Maha Sudarshana Churna, Gandharva Haritaki Churna, Pushyanuga Churna, Ajamodadi Churna, Hingvadi Churna, Eladi Churna, Dadimashtaka Churna, Trikatu Churna, Vaishwanara Churna, Gangadhara Churna, Jati phaladi Churna, Narayana Churna etc.
- d. **Gutika:** Arogya vardhani vati, Chandra prabha vati, Chitrakadi Gutika, Sanjivani Vati, Lasunadi vati, Lavangadi Vati, Vyoshadi vati, Khadiradi Vati, Kankayana Vati, Abhayadi modaka, Marichyadi gutika, Amalakyadi gutika, Samshamini Vati, Kutaja Ghana vati, Amarasundari Vati, Shiva Gutika, Eladi Vati, Kasturyadi Gutika, Arshoghni Vati.
- e. **Guggulu:** Yogaraja Guggulu, Maha yogaraja Guggulu, Trayodashanga Guggulu, Kanchanara Guggulu, Rasnadi Guggulu, Triphala Guggulu, Simhanada Guggulu, Gokshuradi Guggulu, Kaishora Guggulu, Panchatikta Guggulu, Amritadi Guggulu, Vatari Guggulu, Lakshadi Guggulu, Abha Guggulu, Navaka Guggulu, Nava Karshika Guggulu.

f. **Sneha Kalpa**

Sneha Moorchhana - Ghrita Murchana, Taila Murchhana

Siddha Ghrita - Shatavari Ghrita, Jatyadi Ghrita, Phala Ghrita, Dadimadi Ghrita, Kshirashatpala Ghrita, Mahatriphala Ghrita, Dhanvantari Ghrita, Amritaprasha Ghrita, Kalyanaka Ghrita, Brahmi Ghrita, Changeri Ghrita, Panchatikta Ghrita, Sukumara Ghrita, Panchagavya Ghrita

Siddha Taila - Maha Narayana Taila, Maha Masha Taila, Bala Taila, Nirgundi Taila, Shadbindu Taila, Vishagarbha Taila, Sahacharadi Taila, Jatyadi Taila, Apamarga Kshara Taila, Tuvaraka Taila, Kshirabala Taila (Avartita), Lakshadi Taila, Anu Taila, Kumkumadi Taila, Hingutriguna Taila, Kottumchukadi Taila, Prasarinyadi Taila, Dhanwantari Taila, Balashwagandhadi Taila, Balaguduchyadi Taila, Nilibhringyadi Taila, Brihadavadi Taila, Irimedadi

Taila, Chandanadi Taila, Panchaguna taila, Arka taila, Pinda Taila, Kasisadya Taila

- g. **Rasakriya, Avaleha, Khanda etc.:** Darvi Rasakriya, Vasa Avaleha, Brahma rasayana, Chyavanprasha Avaleha, Kushmanda Avaleha, Dadima Avaleha, Bilvadi Avaleha, Kantakaryavaleha, Haridra Khanda, Narikela khanda, Saubhagya shunthi paka, Amrita Bhallataka, Kamsa Haritaki, Chitraka Haritaki, Vyaghri Haritaki, Bahushala Guda, Kalyana Guda
- h. **Sandhana Kalpa:** Lodhrasava, Kumaryasava, Ushirasava, Chandanasava, Kanakasava, Sarivadyasava, Pippalyasava, Lohasava, Vasakasava, Kutajarishta, Draksharishta, Raktamitrarka, Dashamularishta, Abhayarishta, Amritarishta, Ashokarishta, Sarasvatarishta, Arjunarishta, Khadirarishta, Ashwagandha Arishta, Vidangarishta, Takrarishta, Mahadrakshasava, Mritasanjivani sura, Maireya, Varuni, Sidhu, Kanji, Dhanyamla, Madhu Shukta, Pindasava.
- i. **Any Kalpa :** Phala varti, Chandrodaya varti, Arka lavana, Narikela lavana, Triphala masi, Apamarga kshara, Snuhi kshara, Ksharasutra, Atasi upanaha, Sarjarasa malahara, Gandhaka malahara, Sindhuradi Malahara, Shatadhouta Ghrita, Sahasra Dhouta Ghrita, Siktha taila, Dashanga lepa, Doshaghna lepa, Bhallataka taila patana, Jyotishmati Taila, Bakuchi Taila, Dashanga dhupa, Arshoghna dhupa, Nishadi Netra bindu, Madhutailika Basti, Piccha Basti, Yapana Basti.
- j. **Modern Pharmaceutical products** – Pharmaceutical processing & methods of Preparing Eye drops, Soaps, Herbal Biscuits, Jams, Candy, Ayurvedic granules & Health drinks etc.

Marks-1

10. **Nutraceuticals** – Introduction, Types, Non-Indian nutraceuticals and their uses
Ayurvedic Perspective of Nutraceuticals with special reference to dietetic preparation, rasayana with one examples for each category , mode of action, nutritional value calculation, research updates and case studies on below mentioned category
General Health : Kushmanda avaleha
Pediatric Health: Preenana Modaka(Kashyapa)

Geriatric Health: Chavanaprasha avaleha

Reproductive Health: Phala Grita

Women's health: Soubhagya shuntipaka, Shatavari grita

Cardio-protective: Arjuna Ksheerapaka & Rasana ksheera paka

Sports endeavor: Kharjuradi mantha

Mental health: Brahma Rasayana

Marks-1

11. Single drug (Herbal & Mineral)

Single drug its variety of formulations and their different indications

• Chemical/phytochemical composition • Pharmacodynamics and pharmacokinetics as per formulation • Therapeutic properties • Awasthanusara Uses(as applicable) • Matra • Anupana • Pathyapathya • Sevana Kala • Kala maryada (duration of medication as applicable) • Side effects of medication (as applicable) • Research updates and clinical evidences for each of the following formulations

A. **Guduchi** - Guduchi Swarasa (Sha.Sam.Ma. Kh. Chp1/7) Guduchyadi Churna (B.R. Pleehayakrut Rogdhikara) Guduchi Kwatha (B.R. Jwaradhikara) Guduchi Hima (B.R. Chardi Rogadhikara) Guduchi Ghana- Samshamani Vati (AFI Part II) Guduchi Satva (AFI-Part I) Amrutadi Guggulu (AFI-Part III) Amritarishta (AFI Part I)

B. **Amalaki** - Amalaki Swarasa (Sha.Sam.Ma.Kha.) Amalakyadi Churna (Sha.Sam.M.Kha. Churna kalpana) Triphala Rasayana (Cha.Chi. Rasayana Adhyaya) Chyavanaprasha (AFI Part I) Dhatri Lauha (AFI Part I) Amalakyadi Gutika (Sha.Sam.Ma.Kha.Vati Kalpana) Phalatrikadi Kwatha (Sha.Sam.Ma. Kha.Kwatha Kalpana) Triphala Ghrita (Sha.Sam.Ma.Kha. Ghrita Kalpana)

C. **Bhallataka** - Bhallataka Modaka (B.R. Pleeha-Yakrit Rogadhikara) Bhallataka Ghrita (B.R. Gulma Rogadhikara) Bhallataka Guda (B.R. Arsha Rogadhikara) Bhallatakadi Taila (B.R. Nadvirina Rogadhikara) Bhallataka Avaleha (B.R. Arsha Rogadhikara)

Topic III - *Pharmacology and Pharmacy Management*

Marks-1

1. General Pharmacology:

- a. Principles of Pharmacology, Pharmacodynamics & Pharmacokinetics: Absorption, distribution, Metabolism & excretion, mechanism of action, dose determination and dose response, structure activity relationship.
- b. Routes of drug administration.
- c. Factors modifying drug effect, Bioavailability and Bioequivalence, drug interactions, adverse drug reaction and drug toxicity.
- d. Preclinical evaluation: experimental pharmacology [bioassay, in vitro, in vivo, in silico, cell line studies] animal ethics, Network Pharmacology, Molecular docking and molecular dynamics.

Marks-1

2. Clinical pharmacology: Evaluation of New Chemical Entity – phases and methods of clinical research. Ethics involved in human research.

Marks-1

3. Micro-nutrients - Elemental constituents of human body and its physiological importance. Deficiencies and excess of various elements.

Marks-1

4. Toxicity of heavy metals and chelation therapy and safety of Ayurveda Formulations. Knowledge of toxicity and pharmacological activities of herbo-mineral compounds.

Marks-1

5. Pharmacovigilance for Ayurveda drugs - Pharmacovigilance and Adverse Drug Reactions (ADR) Pharmacovigilance Programme of Ayurveda, Siddha, Unani and Homeopathy (ASU & H) Drugs Central Sector Scheme and Centers of Pharmacovigilance of ASU & H Drug

Marks-1

6. Scope and evolution of pharmacy. Information resources in pharmacy and pharmaceutical Science. Management of pharmacy, store and inventory management, personnel management, Good Manufacturing Practices related to Ayurvedic drug industry.

7. Pre-formulation - Pharmaceutical dosage form design.

Marks-1

8. Packaging materials and Labeling, Pharmaceutical Marketing, product release and withdrawals.

Marks-1

9. Hospital, Dispensing and Community pharmacy - Rational prescription along with safe dispensing of Ayurvedic formulations as per NABH guideline. Knowledge of Essential Ayurvedic drug list as prescribed by Department of AYUSH (Govt. of India) and its significance.

Marks-1

10. Patenting and Intellectual Property Rights.

11. Laws Governing Ayurvedic drugs

- i. Relevant regulatory provisions of Ayurvedic drugs in Drug and Cosmetics Act - 1940 and Rules - 1945
- ii. Laws pertaining to Drugs and Magic remedies (Objectionable Advertisement) Act - 1954.
- iii. Prevention of Food Adulteration (PFA) act.
- iv. Food Standards and Safety Act – 2006.
- v. Laws pertaining to Narcotics
- vi. Factory and Pharmacy Acts
- vii. Consumer Protection Act -1986

Marks-1

12. Regulatory Affairs related to International Trade and Practices of Ayurvedic Drugs

13. Pharmacopeia and Database - Introduction to Ayurvedic Pharmacopeia of India, Ayurvedic Formulary of India. Introduction to Indian Pharmacopeia, British and United States Pharmacopeia, Pharmacopoeial Codex, Introduction to Traditional Knowledge Digital Library. Introduction to databases of medicinal plants published by CCRAS, ICMR and others.

14. Publication Ethics.