**RASA SHASTRA & BHAISHAJYA KALPANA**
**6-day CME for Teachers Module**

| Unit | Topic | Course contents | Duration in Hours |
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| 1. | Mineralogical Analysis of minerals, metals and other source material i.e. Rasa dravyas – | **Metals** - Physico – chemical characteristic features of different metals. Such as Habit, turning, Cleavage, Fracture, etc. Light transmission. Chemical composition M.P. other diagnostic features.<br>**Hg** – Physico – chemical characters of Hg, Knowledge about Purity & adulterants. Brief note on mercury compounds.<br>Assessment of Physical and Optical Characteristics, Spectro-chemical analysis involving Optical absorption, Fluorescence and Atomic Spectroscopy, basics of chemistry | 1 ½ Hour |
| 2. | Mineralogical Analysis of minerals, metals and other source material i.e. Rasa dravyas – | Acute & chronic toxicity study of heavy metals. Pharmaceutical Processes like Shodhana, Maarana etc of Dhatus Upadhatu, Rasoparasas followed as per Rasa- Shastra.<br>Plan for the establishment of an ideal Ayurveda Pharmacy as per GMP norms Vis-à-vis concept of Rasa-shastra as described in this branch of science.<br>Pharmaco – therapeutic properties of metals & minerals. | 1½ Hour |
| 3. | Information Resources in Pharmacy and Pharmaceutical Sciences | Pharmaceutical Databases: What is a Database? Data bases of medicinal plants Published by CCRAS, ICMR, and CDRL etc other organizations.<br>Pharmaceutical Abstracts<br>Pharmacopeias (Ayurvedic and others) and Formularies<br>Resources on Internet – World Wide Web, Search Engines, Search Directories, Major Pharmacy Websites, Electronic Publications<br>Research Journals in Pharmacy and Pharmaceutical Science | 1½ Hour |
| 4. | Research organizations related to research in Ayurveda | *CCRAS,ICMR*, CSIR, ICAR, CDRL, NISCAIR, CIMAP, DROD, C, Information about National research projects in Ayurveda, GTP – Golden Triangle Partnership, TKDL , Research Project under RCH,<br>EMR Schemes under Ayush Deptt. (Extra mural research),<br>Research Schemes under DST (Deptt. of Science & Technology) & CSIR. | 1½ Hour |
| 5. | Principles of Pharmaceutical Processing | **Mixing** – Definition, types, factors affecting mixing process, equipments used for solid & liquid mixing.<br>**Milling** – Pharmaceutical applications of milling, factors to be considered in milling process. Types of mills. Characteristic features of powder.<br>**Drying** –<br>(a) Definition & Purpose of drying.<br>(b) Theory of drying along with information about psychometric, factors to be considered in drying of solids.<br>(c) Information about different types of Dryers.<br>(d) Factors (Solid air interface, mass volume relationship & effect of applied forces) & consolidation of powdered solids. | 1½ Hour |

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| | | (e) Pharmaceutical Rheology. Definition & fundamental concept of 'Rheology'. Properties contributing Rheologic behavior. Types of Rheologic instruments Specialised Pharmaceutical applications of Rheology.<br>(f) Clarification & Filtration – Definition, Aim, Theory & filtration, filter medias, filter materials, factors affecting the rate of filtration and filtering devices. | |
| 6. | Statistical Applications in Pharmaceutical Sciences | Methods of sampling collection, presentation, analysis and interpretation of data. Measures of Central tendency measures of variation. Tests of significance – T test (Paired & unpaired), F-test, chi-square test, ANOVA test, probability, co-relation & regression analysis. | 1½ Hour |
| 7. | Pharmaceutical Dosage Forms | Define and explain the advantages & disadvantages of Tablet, dosage form.<br>Equipments and steps followed (including/coating)<br>Brief note on Abdicative, like diluents, binders, disintigrants, lubricants etc.<br>Explain types of tablets along with their therapeutic utility.<br>Parameters of quality assessment of tablets.<br>Explain the types of capsules, and materials used for their preparation.<br>Information about capsule filling equipments & its operating methodology.<br>Types characteristics of liquid dosage forms. Manufacturing considerations (Raw materials, equipments compounding procedure) of liquid dosage forms. | 1½ Hour |
| 8. | Pharmaceutical Dosage Forms | Types of characteristic features of Semi-solid preparations like ointments, pastern, creams, emulations, gels and rigid foams.<br>Methods of study skin penetration of semi solid preparations.<br>Information about base materials and additives used in semi solid preparations.<br>Definition of suspension & Emulsions.<br>Information about theoretic considerations pertaining to suspension technology.<br>Knowledge of suspension formation and its preparation techniques.<br>Study of evaluation of suspension stability.<br>Theory of emulsification and application & utility of types of emulsions.<br>Equipments used for emulsification and Evaluation parameters of emulsions.<br>Assessment of shelf list of emulsions.<br>Concept of Pre-formulation and its significance in Ayurvedic drug designing.<br>Factors Bulk characterization, solubility and stability and the evaluation if pre formulation studies. | 1½ Hour |

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| | | Kshara – Definition, types and pharmaceutical procedure of Kshara and Kshara Sutras. | |
| 9. | Product Processing, Packaging, Evaluation and Regulations | Information about scale-up techniques for Ayurvedic drug processing and packaging.<br>Describe the Type of packaging techniques & materials used for Ayurvedic drug storage & distribution.<br>Information about good manufacturing practices (GMP), applicable to Ayurvedic drugs.<br>Importance of Materials Management for Ayurvedic drug manufacturing.<br>Describe the concept of quality control & assurance.<br>Monograph of Raw material quality assurance.<br>Methods of in-process items control.<br>Methods of finished product control.<br>Concept of statistical quality control. | 1½ Hour |
| 10. | Product Processing, Packaging, Evaluation and Regulations | Information about sampling & sampling plans.<br>Knowledge about Drugs& Cosmetics Act-1940 and Drugs & cosmetic Rules 1945; related to Ayurvedic drugs.<br>Definitions different of Technical terms coming under D&C Act 1940 & ruler 1945.<br>Licensing procedures of manufacturing and sale of Ayurvedic drugs.<br>Knowledge of "Prevention of food adulteration Act (PFA)" in relation to Ayurvedic drug manufacturing. | 1½ Hour |
| 11. | Pharmaceutical testing, Analysis and control | Describe the methods of analysis of vedic preparations.<br>A brief note on instruments used in Ayurvedic drug analysis (qualitative & quantities)<br>Envisage the physical & chemical assay methods.<br>Bio-assay (Animal & microbial assay) for ayurvedic drugs.<br>Brief note on OECD (Organisation for economic cooperation development) and its guide lines for toxicity studies.<br>Knowledge about composition and functioning of Ethical committees.<br>What are the types of clinical trials and their significance in drug research. | 1½ Hour |
| 12. | Pharmaceutical testing, Analysis and control | Write the definition and principles of chromatography. Types of chromatography and their significance in Ayurvedic drug Standardisation.<br>Explain the different types of spectrometry like Mass Spectrometry Nuclear magnetic Resources, Ultra violet and visible absorption spectro photometry, Infra red spetro photo metry, Atomic absorption spectro photometry, Flame photometry and emission photometry. X-ray powder diffraction, thermo-qravifnetric analysis (TGA).<br>Definition of Shelf – list, Methods of evaluation of shelf list of | 1½ Hour |

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| | | Ayurvedic drugs, Factors influencing shelf life of an Ayurvedic drug. | |
| 13. | General Principles of Pharmacodynamics and Pharmacokinetics including receptor theories | Define and describe the basics of pharmaco kinetics and pharmaco dynamics related to Ayurvedic and modern pharmacology.<br>Describe the factors involving in drug absorption, action and disposition.<br>Give a brief description of 'Drug receptors and other therapies'. | 1½ Hour |
| 14. | Pharmaco-vigilance and Drug Interactions | What is Pharmaco-vigilance? And its significance in therapeutic practice.<br>Ways and means of observing pharmaco-vigilance.<br>Status of Pharmaco-vigilance in Ayurvedic practice.<br>WHO guidelines on Pharmaco Vigilance.<br>National Pharmaco - vigilance council.<br>Concept importance of knowledge of drug interaction in Ayurveda with its Practical utility. | 1½ Hour |
| 15. | Review of Bhasma and its Processing & latest development | Define the concept of HkLe<br>Steps involved in the process of HkLedj.k including various 'kks/ku of procedures.<br>Instruments/equipments (Ancient & modern) used in process of HkLedj.k<br>Importance of Standardization with respect bhasmas. Quality control procedures of Bhasma according to Ayurveda & Modern Science.<br>Brief description about phsico-chemical analytical techniques & the equipments used for the same. | 1½ Hour |
| 16. | Review of Rasakalpas – Khalvi Rasa, Parpati rasa, Kupipakwa Rasa, Pottali Rasa & latest development | What is the concept behind having different Rasa Kalpas?<br>Enumerate these with a brief description?<br>Method of preparation of Rasa Kalpas along with the description of different equipments used therein.<br>Enumerate methods of stand of Rasa Kalpas with brief description of physico-chemical tests & their techniques. | 1½ Hour |
| 17. | Visha dravyas | Give a brief note on different visha dravyas enumerated in R.S. along with shodhana procedures and updated knowledge about toxicological therapeutic studies. | 1½ Hour |
| 18. | Review of Ratna, Uparatna and their Pharmaceutical Processing & latest development | Enumerate Ratnas & Upanatnas along with mineralogical characteristic features.<br>Explain the pharmaceutical processes involved in 'kks/ku & ekj.k] fi"Vhdj.k of jRuksinUukn<br>Envisage the merits & demerits of Bhasmikarana with respect to jRuksinUukn | 1½ Hour |
| 19. | Concept of Panchavidha Kashaya and other Kashaya kalpanas prepared from them | Explain the concept iapfr/kd dYiu that of "kM~fo/k d"kk; dYiuk of lqJqr<br>Explain the concept of iapfo/k d"kk; ;ksfu<br>Scope & limits of iapfo/k d"kk;<br>Enlist give a note on the preparation procedure of different UP | 1½ Hour |

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| | | kalpanas coming under each of the kashaya kalpana.<br>Explain the standardization procedures of kashaya & Kalpanas. | |
| 20. | Review of Sandhan Kalpana with reference to Anaerobic and Aerobic Fermentation & latest development | Define the concept of ^lU/kku* vis-à-vis and fermentation and classify the sandhana Kalpana.<br>Give a brief note on different S. Kalpanas along with their preparation procedures.<br>Describe the fermentation (Aerobic & An-aerobic) process in detail.<br>Describe the factors influencing the fermentations process along the description of modern equipments like Bio-transformers, ferments etc.<br>Write the methods of standardization of Asavarishtav, Kanji etc. | 1½ Hour |
| 21. | Review of Snehapaka Kalpana & latest development | What is concept of Sneha Kalpana?<br>Describe the method of Preparation of Taila & Ghrita Kalpanas.<br>Explain the concept of importance of Sneha murcchana.<br>Describe the tests of end point determination of sneha paka with respect to different sneha pakan.<br>Methods (Ayurvedic & Modern) of standardization of Sneha Kalpas | 1½ Hour |
| 22. | Review of Basti-dravya nirman & latest development | Define & classify Basthi – Kalpas.<br>Explain the methods of Preparation of different basthis Kalpas.<br>Explain the mechanism of action of Basthi Kalpas.<br>Describe the Standardisation procedure of Basthi Kalpas. | 1½ Hour |
| 23. | Review of Kriyakalpas used in Ophthalmic diseases and other dosage forms used for external application & latest development<br><br>Topical cream. | Explain the concept of Netra roga chikitsa (Kriya Kalpas) Kalpas.<br>Brief description of different kriya kalpas.<br>Write the mechanism of action Kriya – Kalpas.<br>A Brief review of ophthalmic dosage forms, use in the present day practice.<br>Concept of topically used Ayurvedic dosage forms along with a brief review of eye creams, ointment lotions, Jellies, pastes etc.<br>Mechanism of action of topically used dosage forms. | 1½ Hour |
| 24. | Kritanna Vargiya Kalpana and their Role in disease and<br>Health management Neutraceuticals and Food Supplements | Describe the concept of Pathya Kalpana.<br>Explain different pathya kalpanas along with their pharmaco-therapeutic values.<br>Roles of Pathya/Ahara Kalpanas in disease & health management.<br>Define Neutraceuticals & food supplements.<br>What are Neutraceuticals & their regulatory concerns?<br>Give a brief note on Global regulatory standards for Neutraceuticals. | 1½ Hour |
| | **Pre and Post training assessment** | Assessment and Feedback forms may be given to participants before the commencement of sessions, so that they fill the forms at the end of each session/day and put them in sealed envelops. | 01 hour |
| | | **TOTAL** | **37 Hours** |