DRAVYAGUNA-CME
6-day CME for Teachers Module

Unit 1 Topic: Fundamental Principles of Dravyaguna

Categories: Fundamentals of Dravyaguna
Course contents:

i. Knowledge based

- Dravya and its Panchabhautika composition.
- Panchabhautika – Samanya vishesha siddhanta with detail Samhita and Teeka vivechana.
- Application of panchamahabhoota theory on understanding Bhoomi, plant parts etc following ayurvedic principles.
- Role of Panchamahabhuta of a dravya in relation to health and disease
- Scientific explanation of fundamental principles of Dravyaguna in understanding the Pramana Chatushtaya- Aptopadesha, Pratyaksha, Anumana and Yukti and its application in four components of Drvayguan Shastra (Nāmarūpa vijñāna, Yoga vijñāna- Guna Karma vijñāna and Prayoga vijñāna & Kalpa vijñāna).

ii. Activity based (Group discussion)

- Knowledge based topics will distributed to each group by the Resource person.
- Each group will propose their objectives, which will be redefined by the resource person.
- Each group will propose methods of achieve respective objectives, which will be designing by the resource person.
- Material for activity: A sheet with listed possible keywords specific to topics. The participants will make a network diagram as 'study design' pertaining to their identified topics.

Unit 2 Topic: Dravya as Ahara (diet)

Categories: Fundamentals of Dravyaguna
Course contents:

i. Knowledge based

- Basis of classification of eatables under Ahara vargas.
- Importance of Ahara in preserving health preventing disease and managing disease conditions.
- Concept of Viruddha Ahara (incompatibility of the Ahara).
- Understanding of the Anupana, Pathya - Apathya in diseased condition and its relevance in clinical practice.
- Nutritive value of Ahara (diet) and Aushadha (drug).

ii. Activity based (Group discussion)

- Prescription writing (Aushadha, Anupana, Pathya & Apathya for a particular disease).
- Software like CDAC – AYUSOFT, AYUT Nidan, Rudra, etc., which can be utilized in prescription writing.
- Material for activity: A sheet with listed possible keywords specific to disease. The participants will make a Prescription writing pertaining to their identified disease. Each participants will use software for Prescription writing using personal laptops or mobile phones.

Unit 3 Topic: Prashasta Bheshaja (Ideal drug)

Categories: Fundamentals of Dravyaguna

Course contents:

i. **Knowledge based**

Basic

- Classical references of Sampanna dravya (Charaka Vimana 8/87; Charaka Sutra 9/7; Susruta Sutra 34/22,23; Astanga Hridaya Sutra 1/28).
- Application of Trividha Dravya (Doshaprashamanam, Dhatupradusanam and Swasthhita) and their clinical relevance.
- Role of drugs of Swasthahita and their importance in maintaining the healthy state of body and mind.

Advanced

- Recent researches to improve bioavailability and palatability of Ayurvedic drugs.
- Basic knowledge of Ayurvedic Excipients used in old era and their substitutes being used currently in Ayurvedic Pharmaceutics
- Ideal Drug, Ideal Drug characteristics, Pharmaceutical Sciences, Nanotechnology, Nanomedicine.
- Current research in Nanotechnology based solution for different type of diseases.

ii. Activity based (Group discussion)

- Application of Trividha Dravya (Doshaprashamanam, Dhatupradusanam and Swasthhita) and their clinical relevance with examples.
- Searching research literature using PubMed, Science Direct, AYUSH Research Portal.
- Material for activity: A sheet with listed possible keywords specific to topics. The participants will make a network diagram as 'study design' pertaining to their identified topics. Each participants will search for literature using personal laptops or mobile phones.

Unit 4 Topic: Pharmaco-therapeutical classification according to Charaka, Sushrut, Vagabhatta and other texts.

Categories: Fundamentals of Dravyaguna

Course contents:

i. **Knowledge based**

- Analysis the actions of drugs explained under the pharmaco-therapeutic classification given by Charak, Sushrut, Vagbhatta and other commonly practiced Nighantu texts.
- WHO HATC System (World Health Organization: Herbal Anatomical-Therapeutic-Chemical Classification).

ii. Activity based (Group discussion)

- Knowledge based topics will distributed to each group by the Resource person.
- Each group will propose their objectives, which will be redefined by the resource person.
- Each group will propose methods of achieve respective objectives, which will be designing by the resource person.
- Material for activity: A sheet with listed possible keywords specific to topics. The participants will make a network diagram as 'study design' pertaining to their identified topics.

Unit 5 Topic: Nomenclature and synonym based identification of classical drugs.

Categories: Fundamentals & Practicals of Dravyaguna

Course contents:

i. Knowledge based

- Importance of basonym, synonyms, homonyms, of drugs in relation to identification, and their importance and characterization, properties, action and therapeutic uses.
- Etymological derivation of Sanskrit and botanical names of drugs with examples.
- Significance of botanical naming with examples.
- Recent botanical nomenclature of medicinal plants used in Ayurveda to be highlighted.
- Importance of series of lexicons (Kosa) which cover terms for classical drugs along with terminology.

ii. Activity based (Practical)

- Presentation of a plant by basonym, synonyms, homonyms, of drugs in relation to identification.
- Searching Ayurvedic Kosa specific to etymological derivation of Sanskrit.
- Searching plant name using The Plant List, USDA Plants etc.
- Material for activity: A sheet with listed possible keywords specific to plant. The participants will make a network diagram as 'study design' pertaining to their identified plant. Each participant will search for literature using personal laptops or mobile phones.

Unit 6 Topic: Botanical Identification of Important plants in current practice

Categories: Fundamentals & Practical of Dravyaguna

Course contents:

i. Knowledge based

Basic

- Knowledge of general taxonomy.
- Plant Nomenclature and Taxonomy with Horticultural and Agronomic Perspective.
- Explain the common and differentiating characteristics of drugs of same family.
- Key identifying characters of Family and species of medicinal plants Used in Ayurveda with examples.
- Macro- and microscopic identification of useful part of plant drugs.
- Latest techniques in identification/differentiation of medicinal plants.

Advanced

- Genetic bar-coding.
- International Code of Botanical Nomenclature (ICBN) and the International Code of Nomenclature for Cultivated Plants (ICNCP).

ii. Activity based (Practical)

- Key identifying characters of Family and species of medicinal plants used in Ayurveda with examples.
- Key identifying common and differentiating characteristics of medicinal plants of same family.
- Material for activity: A sheet and plant/ plant parts with listed possible Key identifying characters specific to plant. The participants will make a network diagram as 'study design' pertaining to their identified plant.

Unit 7 Topic: Rationality of Agryaaushadhi explained texts of Charaka, Sushruta and Vagbhata

Categories: Fundamentals of Dravyaguna

Course contents:

i. **Knowledge based**

Basic

- Explain the basis of Agrya Aushadhi concept with examples along with detail tika vivechan and interpretation.
- Rationality and Applied Aspects of Pharmaco –therapeutic classification and Agrya Aushadhi in Brihadtrayee and other Ayurvedic classical texts.
- Practical and clinical use of single herbs including Agrya Aushadhi.
- Rationality of Agrya-aushadhi substantiating through research outcome, where-so-ever possible.
- Examples of evidence based studies on these drugs (phytochemistry, experimental pharmacology and clinical studies)
- Ekamulika dravya proyoga and relevance.

Advanced

- Knowledge about Pragmatic trials (PT)

ii. Activity based (Group discussion)

- Searching classical literature along with detail tika vivechan and interpretation..
- Prescription writing (Single drug use for a particular disease).
- Participants will visit national Institute of Indian Medical Heritage for online text.
- Material for activity: A sheet with listed possible keywords specific to topics. The participants will make a network diagram as 'study design' pertaining to their identified topics. . Each participant will search for literature using personal laptops or mobile phones.

Unit 8 Topic: Knowledge of market samples including adulterant/alternate / substitute plant drugs

Categories: Fundamentals and practicals of Dravyaguna

Course contents:

i. **Knowledge based**

Basic

- Criteria for selection of alternate/substitute plant drug parts of same/different plants in place of genuine drugs.
- Study of morphological and microscopic characteristics of adulterant/alternate / substitute plant drugs.
- Knowledge about classical references of alternative parts and substitute plant drugs mentioned in Bhavaprakasha, Yogaratnakara, Bhaishajya Ratnavali and other texts.
- Criteria of selection of substitutes.

Advanced

- Market survey and studies of market samples including adulterant/alternate / substitute plant drugs.

- Recent researches on substitutes with examples of evidence based studies on these drugs (morphological and microscopic characteristics of alternate / substitute plant drugs phytochemistry, experimental pharmacology and clinical studies).
- Knowledge methodologies on selection of alternative parts and substitute plant drugs (textual information, information from living traditions, data from regional literature, data from Ayurvedic Kosa literature, review of recent botanical correlations, trade related studies, lab analysis).

ii. Activity based (Group discussion and Practical)

- Methodologies on selection of alternative parts and substitute plant drugs.
- Material for activity: A sheet and plant drug with listed possible keywords specific to plant drug. The participants will make a network diagram as 'study design' pertaining to their identified plant drug. Each participant will search for literature using personal laptops or mobile phones.

Unit 9 Topic: Pharmacognosy & Knowledge on Quality Standards of Medicinal Plants of Ayurveda

Categories: Practical of Dravyaguna

Course contents:

i. Knowledge based

Basic

- Macroscopic and microscopic description of useful part and powdered drugs.

Advanced

- Chemical constituents (major) and leading biological marker in relation to safety, efficacy and quality.
- Biological markers, Biological standardization scientific evaluation.
- Analytical methods- Thin Layer Chromatography (TLC), High Performance Thin Layer Chromatography (HPTLC), High Performance Liquid Chromatography (HPLC) and Gas Liquid Chromatography (GLC).

ii. Activity based (Practical)

Basic

- Macroscopic and microscopic description of useful part and powdered drugs (Minimum five samples).

Advanced

- TLC identity test (Minimum 5 samples)
- Searching standard, solvent system, estimation procedures of assay/ analytical methods in PubMed, *Science Direct.*
- Material for activity: *Drug Testing Laboratories* of ASU drugs with various sophisticated instruments. Each participant will search for literature using personal laptops or mobile phones.

Unit 10 Topic: Mishraka varga

Categories: Fundamentals of Dravyaguna

Course contents:

i. Knowledge based

- Rationality of Misrakagana in clinical practice.
- Knowledge about Mishrakadi varga in Ayurvedic preparation or as an ingredient of different dosage forms.
- Recent researches on standardization and therapeutic validation of Misrakavarga of Audbhidadi Gana (Vegetable origin), Jangama Gana (Animal origin) and Parthiva Gana (Mineral origin)

ii. Activity based (Group discussion)

- Knowledge based topics will distributed to each group by the Resource person.
- Each group will propose their objectives, which will be redefined by the resource person.
- Each group will propose methods of achieve respective objectives, which will be designing by the resource person.
- Material for activity: A sheet with listed possible keywords specific to topics. The participants will make a network diagram as 'study design' pertaining to their identified topics.

Unit 11 Topic: Rasa, Guna, Virya, Vipaka and Prabhava of drugs

Categories: Fundamentals of Dravyaguna

Course contents:

i. Knowledge based

Basic

- Detail explanation of Rasapanchaka from classical texts along with detail commentaries.
- Scientific understanding of rasa, guna, virya, vipakaand prabhava.
- Clinical and applied aspects of Rasa, Guna, veerya, vipaka and prabhava and their recent research results.
- Explanation of mode of action of the Dravyas mentioned in disease conditions
  Examples: Prameha - Haridra, Shwitra- Bakuchi, Vatarakta- Guduchi etc.

Advanced

- Objective parameters, if any, of determining rasadipanchaka, and their recent research results.

ii. Activity based (Group discussion)

- Knowledge based topics will distributed to each group by the Resource person.
- Each group will propose their objectives, which will be redefined by the resource person.
- Each group will propose methods of achieve respective objectives, which will be designing by the resource person.
- Material for activity: A sheet with listed possible keywords specific to topics. The participants will make a network diagram as 'study design' pertaining to their identified topics.

Unit 12 Topic: Ayurvedic Pharmacology

Categories: Fundamentals of Dravyaguna

Course contents:

i. Knowledge based

- Ayurvedic mode of action by
  - Actions of drugs
  - Potency of drugs
  - Site of action
  - Time of administrations of drugs
  - Mode of action
  - Specific therapeutic action
- Ayurvedic mode of action vis-à-vis modern pharmacology actions drugs.
- Knowledge of Karma mentioned in Samshodhana and Sashamana vargas
- Knowledge about the Karma Sangya for Dosa, Dhatu and Mala mentioned in the classical texts.

Advanced

- Pharmacology actions of drugs including receptor-pathways.

ii. Activity based (Group discussion)

- Searching literature on Karma Sangya for Dosa, Dhatu and Mala mentioned in the classical texts and Teeka.
- Material for activity: A sheet with listed possible keywords specific to topics. The participants will make a network diagram as 'study design' pertaining to their identified topics.

Unit 13 Topic: Pharmacology

Categories: Fundamentals of Dravyaguna

Course contents:

j. Knowledge based

Basic

- General Pharmacological Principles & Allied Sciences.

Advanced

- Systemic Pharmacology, Chemotherapy and Therapeutics.
- Experimental Pharmacology, Bioassay and Statistics.
- Clinical Pharmacology Recent Advances

ii. Activity based (Group discussion)

- Material for activity: A sheet with listed possible keywords specific to topics. The participants will make a network diagram as 'study design' pertaining to their identified topics. Visit Animal house and clinical departments of the hospital.

Unit 14 Topic: Visha Dravya

Categories: Fundamentals of Dravyaguna

Course contents:

i. **Knowledge based**

Basic

- Ayurvedic methods of shodhana / purification of drugs and recent researches on it.
- Scientific basis of use of media in shodhana of visa dravya.
- Scientific basis of use of Visa dravya, as a medicine, after their Shodhana process.
- Management of Adverse effects due to Visa dravya and latest evidence based researches in this regards

Advanced

- Toxicity studies and their standardization, Therapeutic category and safety aspect.

ii. Activity based (Group discussion)

- Knowledge based points will distributed to each group by the Resource person.
- Each group will propose their objectives, which will be redefined by the resource person.
- Each group will propose methods of achieve respective objectives, which will be designing by the resource person.
- Material for activity: A sheet with listed possible keywords specific to topics. The participants will make a network diagram as 'study design' pertaining to their identified topics.

Unit 15 Topic: Nighantu of Ayurveda & Koṣa related to Dravyaguna

Categories: Fundamentals of Dravyaguna

Course contents:

i. **Knowledge based**

Basic

- Importance of knowledge of Nighantus and Dravyaguna Kosa
- Contribution of Nighantus in the development of Dravyaguna.
- Nighantus of ancient, medieval, and Modern period.
- Specific features of some commonly practised Nighantus.

Advanced

- Recent researches WSR to editing of nightus and dravaygunakosa.

ii. Activity based (Group discussion)

- Knowledge based points will distributed to each group by the Resource person.
- Each group will propose their objectives, which will be redefined by the resource person.
- Each group will propose methods of achieve respective objectives, which will be designing by the resource person.
- Material for activity: A sheet with listed possible keywords specific to topics. The participants will make a network diagram as 'study design' pertaining to their identified topics.

Unit 16 Topic: Controversial drugs

Categories: Fundamentals of Dravyaguna

Course contents:

i. **Knowledge based**

Basic

- Reasons of controversy.
- Means and methods of determination of controversy.
- Discussion and decisions on commonly used controversial drugs.

Advanced

- Knowledge on latest studies and research for controversial drugs.
- Recent development of accepted source and suggested other source of controversial drugs.

ii. Activity based (Group discussion)

- Knowledge based points will distributed to each group by the Resource person.
- Each group will propose their objectives, which will be redefined by the resource person.
- Each group will propose methods of achieve respective objectives, which will be designing by the resource person.
- Material for activity: A sheet with listed possible keywords specific to topics. The participants will make a network diagram as 'study design' pertaining to their identified topics.

Unit 17 Topic: Pharmacopoeias and formularies, Popular publications and IT sources on medicinal plants

Categories: Fundamentals and Practical of Dravyaguna

Course contents:

i. **Knowledge based**

Basic

- Updated Knowledge on AFI, API, and preliminary knowledge of other Pharmacopoeias.

Advanced

- Information Technology sources (popular websites and search engines) on medicinal plants and knowledge on publications of NMPB, CCRAS, CSIR, ICMR, CSIR CIMAP, CSIR IIIM, Jammu and NAMASTE PORTAL etc. International websites dealing with plants (PG)
- List of CARE listed scientific journals publishing articles on medicinal plants
- Knowledge on exclusive web based search engines for nomenclature of plants, flowers, fruits and biodiversity, Endangered species and red list plants etc.
- Important journals and publications related to Dravyaguna and medicinal plants.

ii. Activity based (Group and Practical discussion)

Basic

- Knowledge on updated API and AFI, quality standard books .

Advanced

- Searching medicinal plants in popular websites and search engines.
- Searching nomenclature of plants, flowers, fruits and biodiversity, Endangered species and red list plants in mobile applications, popular websites, eflora.
- Material for activity: A sheet with listed possible keywords specific to topics. The participants will make a network diagram as 'study design' pertaining to their identified topics.

Unit 18 Topic: Promotion and preservation of medicinal plants and herbarium.
Categories: Fundamentals and practical of Dravyaguna
Course contents:

i. **Knowledge based (Introductory for UG)**
Basic

- Good Agricultural and collection practices of Medicinal Plants
- Vrikshaayureda and its relevance in medicinal plant cultivation.
- Preservation/storage techniques of medicinal plants,

Advanced

- Effect of various factors (Desa, Kala etc) on quality of herbal drugs.
- Preparation of herbarium and museum specimens.
- Collection and preservation/storage techniques of medicinal plants, Preparation of herbarium and museum specimens. (Dry and green samples)
- Role and responsibilities of National Repository.
- Importance and relevance of E-Herbarium with GPS tagging ,in the current era
- List of best herbaria, museums and gardens all over the country.
- Institutions working on cultivation, conservation and propagation of medicinal plants like , NMPB, FRLHT, PUSA.
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ii. Activity based (Group and Practical discussion)
Basic

- Knowledge on E- herbarium, National Repository and its application procedures.

Advanced

- Searching literature of medicinal plants in Vrikshaayureda.
- Agro-techniques of selected medicinal plants.
- Preparation of Herbarium specimens.
- Material for activity: A sheet with listed possible keywords specific to topics. The participants will make a network diagram as 'study design' pertaining to their identified topics.

Unit 19 Topic: Drugs and Cosmetic Act, 1940 and other information on TKDL, NMPB etc.

Categories: Fundamentals and practical of Dravyaguna
Course contents:

i. **Knowledge based**
Basic

- Drugs & Cosmetics Act, 1940 and Rules 1945.
- Drugs & Magic Remedies (Objectionable Advertisements) Act, 1954 and Rules

- **Advanced**
- Introduction and its importance, Misbranded, adulterated and spurious drugs, various amendments related to drugs in Act.
- Updated information on amendments related to schedule, section and rules,
- Misbranded, adulterated and spurious drugs
- Workable knowledge on IPR and Patent Law
- Ayurveda, Siddha, Unani Drugs Technical Advisory Board (ASUDTAB) and Ayurveda, Siddha, Unani Drugs Consultative Committee (ASUDCC),

- Central Drug Standards Control Organization (CDSCO) and Quality Council of India (QCI)
- Knowledge on Traditional Knowledge Digital Library (TKDL).
- AYUSH PLIM, Lab, PCIMH

ii. Activity based (Group and Practical discussion)

- Searching IPC code using different disease and medicinal plants etc.
- Discussion Drugs & Cosmetics Act, 1940 and Rules 1945 cases of court.
- Material for activity: A sheet with listed possible keywords specific to topics. The participants will make a network diagram as 'study design' pertaining to their identified topics.

Unit 20 Topic: Anukta dravyas

Categories: Fundamentals and practical of Dravyaguna

Course contents:

i. Knowledge based

Basic

- Knowledge on Anukta dravya (Extra Pharmacopoeial drugs) and drugs like stevia, gingko etc.

Advanced

- Methods, ways/means to document them.
- Identification of Anukta Dravya and to assign Ayurvedic name (Basonym) to the Anukta Dravya as per the Ayurvedic nomenclature.
- Recent development on anukta dravya by APC and researches on Anukta dravya
- Ayurvedic Ethno medico Botanical surveys. new leads from tribal medicine and ways to carry out research under anukta dravya. inclusion in Ayurvedic pharmacopeia
- Major concerns about the safety, environmental and ecological risks and health hazards involved with genetically modified medicinal plants commonly used in Ayurveda and recombinant technology.

ii. Activity based (Group and Practical discussion)

- Knowledge on updated Extra Pharmacopoeial drugs.
- Identification of Anukta Dravya and to assign Ayurvedic name (Basonym) to the Anukta Dravya as per the Ayurvedic nomenclature.
- Material for activity: A sheet with listed possible keywords specific to topics. The participants will make a network diagram as 'study design' pertaining to their identified topics.

Unit 21 Topic: Pharmaco-vigilance and drug interactions

Categories: Fundamentals and practical of Dravyaguna

Course contents:

i. **Knowledge based**

Basic

- Introduction of Adverse Drug Reaction
- Introduction of Drug-drug, drug-herb, drug-food and herb-herb reactions with examples.

Advanced

- Need of Pharmacovigilance in Ayurveda
- WHO guidelines on Pharmaco Vigilance.
- National Pharmaco - vigilance council.
- Govt of India initiative for implementation of pharmacovigilance programme for ASU&H drugs and how to report ADR
- Reported Adverse Drug Reaction of certain Ayurvedic Drugs.
- Prevention and management of adverse reactions to Ayurvedic medicines.
- Drug-drug, drug-herb, drug-food and herb-herb reactions with examples.

ii. Activity based (Group and Practical discussion)

- Pharmacovigilance and ADR reporting.
- Material for activity: A sheet with listed possible keywords specific to topics. The participants will make a network diagram as 'study design' pertaining to their identified topics.

Unit 22-25 Topic: Visit to gardens

Categories: Practical of Dravyaguna

Course contents:

i. **Knowledge based**

Basic

- Demonstration of medicinal plants in natural environs.
- Dry specimen Identification with study of characteristics and market samples.
- Emphasis on 20 medicinal plants for household uses to promote, cultivate and creating awareness among local people.(As per NMPB).

Advanced

- ICT enabled teaching modules (preparing model theory and practical class)
- Websites from reputed organization eg. NMPB, BSI, KEW, India Biodiversity portal etc
- Online Flora: IISC (Herbarium JCB), eFlora etc
- Social media platforms : Facebook- Plant wealth of India, Indian Flora etc
- Online databases e.g. ENVIS FRLHT, AYUSH Research portal, IMPAT
- Literature focusing on the conservation and/or sustainable use of medicinal plants in Science Direct, Wiley, Biomed, Springer, Medline, Scopus, Elsevier, Highwire, Mcgill, Cogprints, Emedicine, Nature and Science online.

ii. Activity based (Practical discussion)

- Demonstration of medicinal plants in natural environs.
- Material for activity: Medicinal plant garden/ natural environs, Museum, Herbarium

Unit 26 Topic: Knowledge of Bheshaja Kalpana and drug administration

Categories: Fundamental of Dravyaguna

Course contents:

i. **Knowledge based**

Basic

- Practical and applied aspects of Amayikaprayoga- Matra – Anupana – Bheshaja kalpana vigyana.

Advanced

- Detail explanation of Amayikaprayoga- Matra – Anupana – Bheshajakalpana vigyana along with Samhita and teeka vivechana.

ii. Activity based (Practical discussion)

- Knowledge based topics will distributed to each group by the Resource person.
- Each group will propose their objectives, which will be redefined by the resource person.
- Each group will propose methods of achieve respective objectives, which will be designing by the resource person.
- Material for activity: A sheet with listed possible keywords specific to topics. The participants will make a network diagram as 'study design' pertaining to their identified topics.

Unit 27 Topic: Dravyaguna in Ayurveda

Categories: Fundamental of Dravyaguna

Course contents:

i. **Knowledge based**

- Detail knowledge of Dravyaguna from Samhita and other classical texts along with commentaries and comparative analysis.

ii. Activity based (Group discussion)

- Knowledge based topics will distributed to each group by the Resource person.
- Each group will propose their objectives, which will be redefined by the resource person.
- Each group will propose methods of achieve respective objectives, which will be designing by the resource person.
- Material for activity: A sheet with listed possible keywords specific to topics. The participants will make a network diagram as 'study design' pertaining to their identified topics.

Unit 28 Topic: Scope of research and carrier in Dravyaguna

Categories: Fundamental of Dravyaguna
Course contents:
i. Knowledge based
Basic

- Introduction to scope and carrier in Dravyaguna.

Advanced

- Various area of research in Dravayguna
- Study design on agro techniques, ethnomedicinal survey, market survey etc. or study design emphasizing on medicinal plant research may be discussed
- How one can be shelf dependent through pursuing Dravyaguna
- Role of DG expert in procurement, authentication, decision on plant or part to be taken for classical formulae, research for patents, Concept writing.

Unit 29 Topic: Teaching learning and assessment Methods.

Categories: Teaching Technology
Course contents:
i. Knowledge based

- Principles of Teaching learning,
- Learning Domains and Taxonomy. Bloom's Taxonomy, SMART and competency bases educational objectives. Introduction to curriculum.
- Various teaching learning methods,
- Problem based learning, Case Bases Learning, Interactive teaching Methods, Use of ICT in Teaching, Clinical/ Practical teaching bedside teaching, OMP, etc. Introduction to Methods of assessment like Structured oral, OSCE/ OSPE, Mini CEX, DOPS, etc,.

Unit 30 Topic: Introduction to AYUSH Research

Categories: Research Methodology
Course contents:
i. Knowledge based
Basic

- Introduction to research & methodology.

Advanced

- Foundations of cause - effects / associations (e.g. Charaka's framework of causality), Areas of research (literary, drug, laboratory, clinical, epidemiological etc),
- Types of research (e.g. fundamental/applied, experimental/observational, qualitative/quantitative, conceptual/empirical), research lifecycle,
- Need for AYUSH research (जिज्ञासा versus Evidence), approaches of research (e.g. Reverse Pharmacology, Ayurveda Biology).

ii. Activity based
Advanced

- Reading and classification of research summaries according to types/areas
- Material for activity: Set of published abstracts/project summaries of AYUSH research projects and a template for classification of reported research.

Unit 32 Topic: Fundamentals of Study Design

Categories: Research Methodology
Course contents:
i. Knowledge based

Advanced

- The process of ideation, defining research question/hypothesis/objectives.
- Overview of study methods: literature research, clinical research (case reports, case series, cohort studies, clinical trials), laboratory research (*in-vitro, in-vivo, in-silico* etc), epidemiological designs (descriptive, analytical).
- How to design a study (concepts of confounders, bias / हेत्वाभास).

ii. Activity based

Advanced

- Defining objectives, proposing methods for relevant objectives. The participants will propose their objectives, which will be refined by the resource person. Then the participants will propose methods to achieve respective objectives. The resource person will help in designing study for their objectives.
- Material for activity: A sheet with listed possible keywords specific to various methods. The participants will make a network diagram as 'study design' pertaining to their identified topics.

Unit 33 Topic: Overview of Scientific Publications

Categories: Research Methodology
Course contents:
i. Knowledge based Introduction for UG

Basic

- Overview of scientific publications, popular and scientific literature.

Advanced

- Overview of scientific publications, popular and scientific literature,
- Types of papers, peer review and editorial process, research journals (predatory publications and assessing the authenticity of journals), indexing and online databases,
- Guidelines for publications and reporting standards, introduction to publication ethics

ii. Activity based

Advanced

- Searching research literature specific to objectives (as defined in session 2), using PubMed/Scopus, mobile apps related to scientific literature. Each participant will also create PubMed alert related to areas of research / clinical interests.
- Material for activity: Every participant will search for literature using personal laptops or mobile phones. A sheet of important links of web-sources will be provided to the participants.

Unit 34 **Topic: Getting Ready for Research**

Categories: Research Methodology
Course contents:
i. Knowledge based

- Transforming idea into a proposal, research infrastructure, and funding agencies.
- Schemes of AYUSH Ministry,
- Introduction to AYUSH online platforms research infrastructure, AYUSH Informatics Grid

ii. Activity based

- The participants will visit the NAMASTE (National AYUSH Morbidity and Standardized Terminologies Electronic) Portal, National Institute of Indian Medical Heritage for online texts, AYUSH Research Portal, SVAYAM platform, and online sources related to research funding.
- Material for activity: The participants will search respective portals using personal laptops or mobile phones. A sheet of important links of web-sources related to research funding and online courses will be provided to the participants.

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.
Suggestions:

- Online assessment may be arranged
- Outcome Based Learning (prepare module based on learning outcome)
- Online education – MOOCs (demo with example)
- Structured Evaluation – Formative and summative
- Activity based Learning/Problem based learning – model demo and hands on.

Instructions:
Basic points- For Faculties of UG College.
Advanced points- For faculties of PG College.

- **The 'Unit', which not contain Basic & Advanced, is common for UG & PG Faculties.**

Total Duration of Hours-37 Hours (Fundamentals 15 hours+ Practical 11 Hours+10 Hours Research Methodology & Teaching Technology+ 01 Hour Pre and post training assessment).