Part -I Paper: 3

I. TITLE OF THE SPECIALITY COURSE, AND ITS ABBREVIATION:

M.D. (Homoeopathy) Research Methodology and Biostatistics (RMB) for all speciality subjects

II. BRIEF DESCRIPTION OF SPECIALITY AND ITS RELEVANCE IN HOMOEOPATHY POST-GRADUATE COURSE:

This curriculum is for MD Hom Part – 1 for teaching & examination for developing a scientific aptitude in the students. Upon completion of the program, the PG students should have a basic understanding of research methodology and biostatistics useful for homoeopathic research; and be able to undertake an ethical research study in their specialization under the supervision of a guide. The course is designed to develop the research competencies of MD Hom Part 1 students and is structured for lectures, group and individual activities, discussions, and journal club, spread over 18 months.

The course is designed to incorporate mechanisms for understanding and encompassing scientific advances in diagnostics, pathogenesis, and its relevance to homoeopathic approaches and therapeutic principles. The management of cases as a clinician or in the community is enhanced with an aptitude for continuous learning and upgrading knowledge and practices. The course is designed as a bridge between traditional principles and practices recorded in the literature with modern approaches for developing and adopting tools for their validation and use in clinical practice.

After studying this subject, it is expected that the Homoeopathic Postgraduate will continue the scientific study of the specific subject demonstrated by undertaking a research study presented in the form of a dissertation and a research publication in a peer-reviewed journal / oral presentation at scientific conferences thus they should be able to communicate the derived knowledge to the scientific and lay community.

III. TOPICS AND TOPICS OBJECTIVES:

Part -1 Paper : 3

RESEARCH METHODOLOGY AND BIOSTATISTICS (HOM-PG-RMB)

I.	**Hom-PG-RMB-01**	FOUNDATION FOR HOMOEOPATHIC RESEARCH
II.	**Hom-PG-RMB-02**	CONCEPT OF STRUCTURED AND CONTINUOUS LITERATURE REVIEW
III.	**Hom-PG-RMB-03**	RESEARCH PROCESS AND PROPOSAL WRITING
IV.	**Hom-PG-RMB-04**	QUANTITATIVE RESEARCH DESIGN FOR HOMOEOPATHIC RESEARCH
V.	**Hom-PG-RMB-05**	QUALITATIVE RESEARCH DESIGN FOR HOMOEOPATHIC RESEARCH
VI.	**Hom-PG-RMB-06**	MIXED RESEARCH DESIGN FOR HOMOEOPATHIC RESEARCH
VII.	**Hom-PG-RMB-07**	DOCUMENTATION OF EVIDENCE
VIII.	**Hom-PG-RMB-08**	ETHICS IN HOMOEOPATHIC RESEARCH
IX.	**Hom-PG-RMB-09**	BASICS CONCEPTS OF BIOSTATISTICS
X.	**Hom-PG-RMB-10**	CONCEPT OF DATA TYPES, COLLECTION & SORTING METHODS
XI.	**Hom-PG-RMB-11**	CONCEPT OF POPULATION, SAMPLE, SAMPLING TECHNIQUES AND SAMPLE SIZE FOR CONDUCTING HOMOEOPATHIC RESEARCH
XII.	**Hom-PG-RMB-12**	BASICS OF DATA ANALYSIS, DESCRIPTIVE STATISTICS & PROBABILITY
XIII.	**Hom-PG-RMB-13**	BASICS OF INFERENTIAL STATISTICS FOR DATA ANALYSIS FOR HOMOEOPATHIC RESEARCH
XIV.	**Hom-PG-RMB-14**	SOFTWARE & AI TOOLS FOR SUPPORTING RESEARCH DATA MANAGEMENT AND ANALYSIS
XV.	**Hom-PG-RMB-15**	COMMUNICATING RESEARCH FINDINGS

TOPICS CONTENTS

Hom-PG-RMB-01 : FOUNDATION FOR HOMOEOPATHIC RESEARCH

a. Importance of Research in Homoeopathy in general
b. Hahnemann as a Researcher and the research qualities of homoeopathic stalwarts
c. The foundation of Homoeopathic principles is based on relevant research methods
d. Relevance of research as per the speciality subject
e. Types of Research in homoeopathy –Basic / Fundamental, Clinical Trials, Agro-Homoeopathy, Veterinary, and Educational Researches.

Hom-PG-RMB-02 : CONCEPT OF STRUCTURED AND CONTINUOUS LITERATURE REVIEW

a. Need and Purpose of Review of Literature
b. Sources of Literature – Homoeopathic and other database
c. Types of literature review – Narrative review, critical review, scoping review, systematic review, meta-analysis, realist review, review of reviews, meta-narrative reviews, evidence gap map
d. Developing information search plan – PICOT, SPICE, etc.
e. Medical search engines like PubMed search – word search, field search, Boolean operators, MeSH terms
f. Plagiarism, Bibliography & References – methods (Vancouver, Harvard)
g. Reference management software – Zotero, Mendeley, etc.
h. Recent advances/studies in homoeopathic research in general and discipline-specific

Hom-PG-RMB-03 : RESEARCH PROCESS AND PROPOSAL WRITING

a. Research planning Process
b. Criteria for Selecting a research question / Problem
c. Process for framing of the selected research question/problem
d. Hypothesis – Characteristics and Formation – Null and Alternative
e. Variables – Definition & types
f. Aim and Objectives
g. Format for writing Research Proposal
h. Proposal writing for funding

Hom-PG-RMB-04 : QUANTITATIVE RESEARCH DESIGN FOR HOMOEOPATHIC RESEARCH

a. Research Design: Concept and Importance in Research

b. Quantitative Research design for homoeopathic research – advantage, scope, limitations, utility and applications
c. Descriptive research design – Survey, Case Studies, Case Reports
d. Observational research design – Cohort, Case Control design
e. Experimental research design – Single arm clinical trials, nRCTs, RCTs - parallel arm trials, cross-over trials, cluster randomized trials, factorial trials, field trials, community trials
f. Quasi-Experimental research design

Hom-PG-RMB-05 : QUALITATIVE RESEARCH DESIGN FOR HOMOEOPATHIC RESEARCH

a. Purpose & Philosophy of Qualitative Methods
b. Research Designs – Ethnography, Grounded Theory, Action Research, Phenomenology, Historical research, Narrative analysis, Discourse analysis
c. Data collection and analysis techniques – Thematic analysis, Content analysis, KII, IDI, Exit interviews, social mapping and networking, Root cause analysis, Fishbone analysis, Problem tree analysis

Hom-PG-RMB-06 : MIXED RESEARCH DESIGN FOR HOMOEOPATHIC RESEARCH

a. Purpose & Philosophy of Mixed Methods
b. Mixed methods research design – Morse notation, typologies or models
c. Data Collection techniques – Free listing, Pile sorting, Delphi techniques, Scale development, Validity and reliability
d. Data Analysis methods for mixed research – Data transformation, Joint display, Visualization, Mapping, etc.

Hom-PG-RMB-07 : DOCUMENTATION OF EVIDENCE

a. Evidence-based practice
b. Type and Level of Evidence in Research
c. Data Recording Principles
d. Special case Record
e. Software for creating databases – Epi Info etc.

Hom-PG-RMB-08 : ETHICS IN HOMOEOPATHIC RESEARCH

a. History, Ethical principles & regulations in Research (Declaration of Helsinki, ICMR guidelines, ICH GCP, GCP Homoeopathy, Drugs & Cosmetics Act & Rules relevant

part, NDCT rules, other General and Specific guidelines and legal provisions for research)
b. Categories of anticipated risks
c. Participant information sheet & Informed Consent, Assent, Waiver of consent, re-consent
d. Institutional Ethics Committee/Institutional Review Board, Data Safety Monitoring Board
e. AE, SAE, compensation, interim analysis, trial registration
f. Ethics in Publication

Hom-PG-RMB-09 : BASICS CONCEPTS OF BIOSTATISTICS

a. Introduction to Biostatistics: definition
b. Variability – meaning, types
c. Bias, Chance
d. Clinical significance
e. Validity and Reliability
f. Specificity and Sensitivity

Hom-PG-RMB-10 : CONCEPT OF DATA TYPES, COLLECTION & SORTING METHODS

a. Data Types – Qualitative / Quantitative, Primary / Secondary
b. Measurements: Concept & level (Nominal, Ordinal, Interval, Ratio)
c. Method of collection of data – Interview, Questionnaire
d. Data preparation, Data Tabulation
e. Graphical methods for qualitative and quantitative data

Hom-PG-RMB-11 : CONCEPT OF POPULATION, SAMPLE, SAMPLING TECHNIQUES AND SAMPLE SIZE FOR CONDUCTING HOMOEOPATHIC RESEARCH

a. Concept and definition of Population, Sampling frame, Sample
b. Characteristics of a good sample
c. Types of Sampling Methods and Techniques
d. Probability Sampling Methods
e. Non – Probability Sampling Methods
f. Sampling and non-sampling errors
g. Demography Statistics & Measures of Population
h. Factors determining sample size
i. Calculating sample size for various research designs

Hom-PG-RMB-12 : BASICS OF DATA ANALYSIS, DESCRIPTIVE STATISTICS & PROBABILITY

a. Measure of Central Tendency and Location
b. Measures of Dispersion
c. Normal Distribution and estimations
d. Skewness and Kurtosis
e. Confidence Interval
f. Probability concept
g. Laws of Probability
h. Inverse Probability
i. Theoretical Distributions

Hom-PG-RMB-13 : BASICS OF INFERENTIAL STATISTICS FOR DATA ANALYSIS FOR HOMOEOPATHIC RESEARCH

a. Level of Significance
b. Type I and Type II Error
c. Testing of Significance
d. Hypotheses Testing
e. Parametric test (SEM, Z test, t test – Pair, unpaired, F test, ANOVA, SEP), effect size
f. Non-parametric Test (Chi-square test, The Mann-Whitney U test, Wilcoxon matched pair test)
g. F- Test and Analysis of Variance and Covariance
h. Method based on Rank order (Spearman's rank correlation, Pearson's rank correlated coefficients)
i. Regression analysis – linear, logistic, multiple, cox
j. Odds ratio, Risk ratio, Likelihood ratio, Prognostic factor research
k. Interpretation of statistical test results

Hom-PG-RMB-14 : SOFTWARE & AI TOOLS FOR SUPPORTING RESEARCH DATA MANAGEMENT AND ANALYSIS

a. Statistical software – MS Excel, G-Power, R, SPSS, STATA, SAS
b. Software for writing and publication – (reference managers, plagiarism check, language & grammar e.g. Mendeley, iThenticate, Grammarly, etc.)

Hom-PG-RMB-15 : COMMUNICATING RESEARCH FINDINGS

a. Basic principles of scientific writing
b. Dissertation, Thesis Writing

c. Formats for writing article
d. Writing Abstract, Title and Keyword
e. Data Presentation – Textual, Tabular, Graphical (Frequency polygon, frequency curve, line diagram, Scatter plot diagram, Types of Bar graph, types of Pie graph, Pictogram, Map diagram, Box plot graph)
f. Journal – Scientific and peer-reviewed and impact factor
g. Pre-print and Peer Review Process
h. Publication technicalities – flow chart of publication, journal selection, journal and author metrics, open access models, predatory journals and conferences, cloned journals, manuscript preparation, authorship criteria, plagiarism and similarity index, preprint, reprint, retraction
i. Paper Presentation – oral
j. Poster Presentation

Topic Overview	**FOUNDATION FOR HOMOEOPATHIC RESEARCH**
Learning Outcomes	**Competency Hom-PG-RMB-01 :** **FOUNDATION FOR HOMOEOPATHIC RESEARCH** **KNOWLEDGE :** 1. Define Research 2. Discuss Hahnemann as a Researcher 3. Discuss the research qualities of homoeopathic stalwarts 4. Explain the formulation of homoeopathic research principles on the basis of research 5. Explain the importance of research in general for homoeopathic science 6. Discuss current researches conducted in relation with the speciality subject 7. Discuss the logic used in research 8. Understand the concept of time in relation with research 9. Summarise several types of research pertaining to homoeopathy. **SKILLS :** 1. Display the application of research to the specialty subject Reflection 1. Relate the application of research for the growth of knowledge of speciality subject
Learning Methods	Lecture, Problem based, Assignment
Assessments	Written Examinations: SAQ
Prescribed texts	As per list
Domains of competencies	KS, HO, PBL

Topic Overview	**CONCEPT OF STRUCTURED AND CONTINUOUS LITERATURE REVIEW**
Learning Outcomes	**Competency Hom-PG-RMB-02 :** **CONCEPT OF STRUCTURED AND CONTINUOUS LITERATURE** **KNOWLEDGE:** 1. Explain the importance of searching existing knowledge 2. Discuss the purpose of the review about the problem at hand 3. Enumerate the sources of literature 4. Discuss the utility of various literature sources 5. Explain the utility of various types of literature review 6. Explain the steps of formulating a search query 7. Describe various steps of using a medical search engine 8. Critically evaluate the searched literature and utilise appropriate material useful for their research 9. Explain the method of critically reviewing a research paper 10. Discuss Plagiarism and reference methods **SKILL:** 1. Analyse the existing body of information i.e. current knowledge on a specific topic in a structured manner 2. Use the appropriate source of literature for answering a specific search query 3. Practice appropriate method of type of literature review for the problem identified for their research work 4. Formulate the literature search query using PICOT, SPICE model 5. Select the appropriate reference style using reference management software **REFLECTION:** 1. Discuss the existing knowledge concerning the observations of their research study for the speciality subject. 2. Evaluating the scientific research paper for updating self 3. Updating self with recent advances in the field of homoeopathic speciality subject
Learning Methods	Lecture, Demonstration, e-learning, Deliberate practice, Assignment
Assessments	Written Examinations: LAQ, SAQ
Prescribed texts	As per list
Domains of competencies	KS, HO, PBL

Topic Overview	**RESEARCH PROCESS AND PROPOSAL WRITING**
Learning Outcomes	**Competency: Hom-PG-RMB-03 :** **RESEARCH PROCESS AND PROPOSAL WRITING** **KNOWLEDGE:** 1. Discuss the steps of the research process 2. Explain the criteria for selecting an appropriate research question 3. Recognize the importance of writing a scientific research proposal 4. Discuss the steps of formulating the research question 5. Define Hypothesis 6. Discuss the types of hypotheses for homoeopathic research 7. Explain the steps of formulating SMART objectives 8. Define variable 9. Classify the variables 10. Describe the format and meaning of various sections of a proposal 11. Comprehend the steps of writing a proposal for the funding **SKILL:** 1. Utilize the day-to-day clinical experience for formulating the potential researchable problem for the research study 2. Construct a logical research question, hypothesis and objectives for a research study related to the subject speciality 3. Manage variables as per the requirement of the study 4. Link the research question to appropriate research design **REFLECTION:** 1. Construct the scientific research proposal for the subject speciality
Learning Methods	Lecture, Problem based, Flipped learning, Library based - Journal Club, Case based, Reflective learning
Assessments	Written Examinations: Application based question, LAQ, SAQ
Prescribed texts	As per list
Domains of competencies	KS, HO, PBL

Topic Overview	**QUANTITATIVE RESEARCH DESIGN FOR HOMOEOPATHIC RESEARCH**
Learning Outcomes	**Competency: Hom-PG-RMB-04 :** **QUANTITATIVE RESEARCH DESIGN FOR HOMOEOPATHIC RESEARCH** **KNOWLEDGE:** 1. Define research design 2. Classify research design 3. Explain the meaning of quantitative research 4. Explain the types of quantitative research 5. Discuss the strengths & limitations of different research designs 6. Explain the type of research question suitable for this research design 7. Discuss the type of homoeopathic research that can be answered through this research design 8. Discuss the type of documentation required for this research design 9. Explain the steps undertaken for selecting the sample for this design 10. Explain various sampling methods used for conducting this research design 11. Explain data collection methods for this research design 12. Explain the data analysis method for this research design 13. Synthesis valid research conclusions as per the scope of this research design **SKILL:** 1. Using random table method for randomization method 2. Formulating appropriate research methodology for this research design **REFLECTION:** Select appropriate research design for selected research problem of specialty subject
Learning Methods	Lecture, Problem based, e-learning, library based - journals, Group discussion, Assignments
Assessments	Written Examinations: Application based questions, LAQ, SAQ
Prescribed texts	As per list
Domains of competencies	KS, HO, PBL

Topic Overview	**QUALITATIVE RESEARCH DESIGN FOR HOMOEOPATHIC RESEARCH**
Learning Outcomes	**Competency: Hom-PG-RMB-05 :** **QUALITATIVE RESEARCH DESIGN FOR HOMOEOPATHIC RESEARCH** **KNOWLEDGE:** 1. Explain the meaning of qualitative research 2. Explain the types of qualitative research 3. Discuss the strengths & limitations of different research designs 4. Explain the type of research question suitable for this research design 5. Discuss the type of homoeopathic research that can be answered through this research design 6. Discuss the type of documentation required for this research design 7. Explain the steps undertaken for selecting the sample for this design 8. Explain various sampling methods used for conducting this research design 9. Explain data collection methods for this research design 10. Explain the data analysis method for this research design 11. Synthesis valid research conclusions as per the scope of this research design **SKILL:** 1. Formulating appropriate research methodology for this research design 2. Interpret the data using appropriate data analysis technique **REFLECTION:** 1. Select appropriate research design for selected research problem of specialty subject 2. Summarise the research conclusions using qualitative method.
Learning Methods	Lecture, Problem based, e-learning, library based - journals, Group discussion, Assignments
Assessments	Written Examinations: Application based questions, LAQ, SAQ
Prescribed texts	As per list
Domains of competencies	KS, HO, PBL

Topic Overview	**MIXED RESEARCH DESIGN FOR HOMOEOPATHIC RESEARCH**
Learning Outcomes	**Competency: Hom-PG-RMB-06 :** **MIXED RESEARCH DESIGN FOR HOMOEOPATHIC RESEARCH** **KNOWLEDGE:** 1. Explain the meaning of Mixed research 2. Discuss the strengths & limitations of different research designs 3. Explain the type of research question suitable for this research design 4. Discuss the type of homoeopathic research that can be answered through this research design 5. Discuss the type of documentation required for this research design 6. Explain the steps undertaken for selecting the sample for this design 7. Explain various sampling methods used for conducting this research design 8. Explain data collection methods for this research design 9. Explain the data analysis method for this research design 10. Synthesis valid research conclusions as per the scope of this research design **SKILL:** 1. Formulating appropriate research methodology for this research design 2. Interpret the data using appropriate data analysis technique **REFLECTION:** 1. Select appropriate research design for selected research problem of specialty subject 2. Formulate steps for conducting research using mixed research design
Learning Methods	Lecture, Problem based, e-learning, library based - journals, Group discussion, Assignments
Assessments	Written Examinations: Application based questions, LAQ, SAQ
Prescribed texts	As per list
Domains of competencies	KS, HO, PBL

Topic Overview	**DOCUMENTATION OF EVIDENCE**
Learning Outcomes	**Competency: Hom-PG-RMB-07** **DOCUMENTATION OF EVIDENCE** **KNOWLEDGE:** 1. Define evidence in research 2. Explain the concept of evidence-based medicine 3. Classify types and levels of evidence 4. Discuss principles of data recording 5. Discuss the knowledge required for formulating special case record 6. Demonstrate the use of Epi Info **SKILL:** 1. Using special software for recording data as evidence **REFLECTION:** 1. Using the concept of evidence-based medicine for homoeopathic research and practice
Learning Methods	Problem based, Lecture, Demonstration, Reflective learning
Assessments	Written Examinations: SAQ
Prescribed texts	As per list
Domains of competencies	KS, HO, PBL

Topic Overview	**ETHICS IN HOMOEOPATHIC RESEARCH**
Learning Outcomes	**Competency: Hom-PG-RMB-08 :** **ETHICS IN HOMOEOPATHIC RESEARCH** **KNOWLEDGE:** 1. Recall the evolution of ethical principles 2. Discuss the basic ethical principles 3. Enlist the silent features of statutory regulations 4. Discuss the importance of statutory regulations 5. Describe the components of various consents 6. Enumerate the steps of obtaining consent / assents and also situation of consent wavier 7. Explain the importance and content of Patient Information Sheet 8. Outline the structure and function of Institutional Ethical Committee and data safety committee 9. Define Adverse event 10. Enumerate the step of reporting and managing AE 11. Explain the ethical issues in publication of results **SKILL:** 1. Identifythe situations where Ethical issues and statutory laws are applicable 2. Categories the ethical issues for the research work done for the speciality subject 3. Formulate the Inform consent for the research work done for the speciality subject 4. Present the proposal to IEC committee **REFLECTION:** 1. Conduct the study as per the protocols and report the findings with due consideration for ethical principles.
Learning Methods	Role Play, Brainstorming, Flipped learning, Reflective learning, Deliberate practice
Assessments	Written Examinations: SAQ
Prescribed texts	As per list
Domains of competencies	KS, PBL, CS, PRF

Topic Overview	BASIC CONCEPTS OF BIOSTATISTICS
Learning Outcomes	**Competency: Hom-PG-RMB-09 :** **BASIC CONCEPTS OF BIOSTATISTICS** **KNOWLEDGE:** 1. Define Biostatistics 2. Discuss the importance of Biostatistics in homoeopathic research 3. Define Variability 4. Discuss the types of variability 5. Define Clinical significance 6. Discuss the concept of validity and reliability 7. Discuss the concept of Specificity and Sensitivity **SKILL:** 1. Demonstrate the use of Specificity and Sensitivity during homoeopathic drug trials **REFLECTION:** 1. Value the basic concept of Bio-statistics while doing homoeopathic research
Learning Methods	Lecture, Library based
Assessments	Written Examinations: SAQ
Prescribed texts	As per list
Domains of competencies	KS

Topic Overview	**CONCEPT OF DATA TYPES, COLLECTION & SORTING METHODS**
Learning Outcomes	**Competency Hom-PG-RMB-10 :** **CONCEPT OF DATA TYPES, COLLECTION & SORTING METHODS** **KNOWLEDGE:** 1. Define Data 2. Define Primary and Secondary Data 3. Define Qualitative and Quantitative Data types with medical examples 4. Define the Data Level of Measurements 5. Enumerate the Nominal, Ordinal, Interval, and Ratio with medical examples 6. Discuss the process of Data collection methods; Interview and Questionnaire. 7. Enumerate the types of Questions used for the Questionnaire design. 8. Discuss the guidelines for data tabulation for Quantitative and Qualitative Data 9. Discuss the guidelines for the graphical presentation of Quantitative Data (Histogram Graph, Frequency polygon, frequency curve, line diagram, Scatter plot diagram, Box Plot graph) 10. Discuss the guidelines for the graphical presentation of Qualitative Data (Types of Bar graph, types of Pie graph, Pictogram, Map diagram) **SKILLS :** 1. Display the application of data to categorize the data into types and data levels of measurements while reading research articles on the subject's speciality. 2. Display the application of data presentation principles while reading the research article of the subject speciality **REFLECTION :** 1. Relate the application of Data types, Data Level of Measurements, and Data Presentation while writing the synopsis or protocol.
Learning Methods	Lecture, Demonstration, Case based, e-learning
Assessments	Written Examinations: SAQ, LAQ, Case-Based Questions
Prescribed texts	As per list
Domains of competencies	KS, HO, PBL

Topic Overview	**CONCEPT OF POPULATION, SAMPLE, SAMPLING TECHNIQUES AND SAMPLE SIZE FOR CONDUCTING HOMOEOPATHIC RESEARCH**
Learning Outcomes	**Competency Hom-PG-RMB-11 :** **CONCEPT OF POPULATION, SAMPLE, SAMPLING TECHNIQUES AND SAMPLE SIZE FOR CONDUCTING HOMOEOPATHIC RESEARCH** **KNOWLEDGE :** 1. Define Population 2. Define Sampling Frame 3. Define Sample 4. Discuss the difference between Census and Sample 5. Enumerate the characteristics of a good sample 6. Define the classification of Sampling Probability and Non – probability Sampling 7. Discuss the difference between Probability and Non – Probability Sampling 8. Discuss the types of Probability Sampling with medical examples (Simple random, Systemic random, Stratified random, Multiphase, Multistage, Cluster, Replicate) 9. Discuss the types of Non – Probability Sampling with medical examples (Quota, Purposive, Accidental, Snowball) 10. Discuss the sampling and non–sampling errors 11. Define the Demography Statistics 12. Discuss the types of Demography statistics with medical examples (Vital, Morbidity, Mortality, Hospital & life table) 13. Enumerating the factors to be considered for calculating the sample size 14. Enlisting the steps to calculate the sample size for Observational Analytical Studies 15. Enlisting the steps to calculate the sample size for Survey Design 16. Enlisting the steps to calculate the sample size for the Experimental study design **SKILLS :** 1. Display the application of Sampling and Non-Sampling errors while reading the research article of

	the subject speciality 2. Display the application of Types of Sampling methods and Techniques while reading the research article of the subject speciality 3. Display the application of the Sample size concepts while reading the research article of the subject speciality 4. Demonstrate the calculation of sample size on sample size calculator software. **REFLECTION :** 1. Relate the application of Sample size, Sampling frame, and Sampling methods and techniques while writing the synopsis or protocol.
Learning Methods	Lecture, Case based, Assignment, Spaced repetition
Assessments	Written Examinations: SAQ, LAQ, Case-Based Questions
Prescribed texts	As per list
Domains of competencies	KS, HO, PBL

Topic Overview	**BASICS OF DATA ANALYSIS, DESCRIPTIVE STATISTICS & PROBABILITY**
Learning Outcomes	**Competency Hom-PG-RMB-12 :** **BASICS OF DATA ANALYSIS, DESCRIPTIVE STATISTICS & PROBABILITY** **KNOWLEDGE :** 1. Define Central Tendency (Mean, Median, Mode) 2. Discuss the application of Mean, Median, Mode with the medical examples 3. Define the Percentile 4. Discuss the application of Percentile with the medical example 5. Enlisting the steps for calculating Central Tendency and Percentile (Location) 6. Discuss the concept of Dispersion in the statistics 7. Enlisting the steps for range, quartile, semi-quartile, interquartile, range, Mean Deviation, Standard Deviation, Standard Error, and coefficient of Variation 8. Discuss the application of measures of Dispersion (range, quartile, semi-quartile, interquartile, range, Mean Deviation, Standard Deviation, Standard Error, Coefficient of Variation) 9. Define Normal Distribution 10. Enlisting the characteristics of Normal Curve 11. Discuss the Standard Normal Distribution properties for Quantitative and Qualitative Data 12. Define Skewness and Kurtosis 13. Discuss the positively and negatively skewed distribution 14. Define Confidence Interval 15. Discuss the application of Confidence Interval with Medical Examples 16. Enlisting the steps for calculating Confidence Interval 17. Explain the Probability concept 18. Discuss the Laws of Probability (addition, multiplication, binomial probability law, probability law explained z table) 19. Discuss the types of Probability (Marginal, Joint,

	Conditional probability) 20. Explain the Baye's Theorem and its application to understand the Inverse Probability 21. Discuss the application of Probability laws to Likelihood Ratio and Predictive (False Positive, False Negative, True Positive, True Negative, Sensitivity, Specificity, Accuracy, Predictive Value Positive and Predictive Value Negative) 22. Explain the theoretical distributions with medical examples (Binomial and Poisson Distributions) 23. Explain the zone of acceptance and rejection in Normal distribution 24. Explain the Type I and Type II errors with medical Examples 25. Explain the significance of Type I and Type II errors in the medical field **SKILLS :** 1. Display the application of likelihood Ratio while reading the research article on Likelihood Ratio in Homoeopathy 2. Demonstrate the calculation of Descriptive Statistics (Mean, Mode, Median, SD, and Normal Distribution) on statistics software or MS Excel. **REFLECTION:** 1. Relate the application of Descriptive statistics while writing the synopsis or protocol. 2. Relate the application of Descriptive statistics while reading the articles of the subject speciality.
Learning Methods	Lecture, Case based, Library based, Spaced repetition, Self-regulated learning
Assessments	Written Examinations: SAQ, LAQ, Case-Based Questions
Prescribed texts	As per list
Domains of competencies	KS, HO, PBL

Topic Overview	**BASICS OF INFERENTIAL STATISTICS FOR DATA ANALYSIS FOR HOMOEOPATHIC RESEARCH**
Learning Outcomes	**Competency: Hom-PG-RMB-13 :** **BASICS OF INFERENTIAL STATISTICS FOR DATA ANALYSIS FOR HOMOEOPATHIC RESEARCH** **KNOWLEDGE:** 1. Define Inferential Statistics 2. Explain the meaning of level of significance 3. Discuss the test used for hypothesis testing 4. Enlist Parametric test 5. Explain the concept and operation of parametric tests 6. Enlist non-parametric test 7. Explain the concept and operation of non-parametric tests 8. Discuss the concept of Variance and covariance 9. Explain the concept and operations of test for analysis of variance and covariance 10. Enlist the rank-based test 11. Explain the concept and operations of rank-based test 12. Discuss the concept of regression analysis 13. Define Odds ratio 14. Define risk ration 15. Define Likelihood ratio 16. Define Prognostic factors 17. Explain the concept of test used for Odds ratio, risk ratio, likelihood ratio **SKILL:** 1. Interpret the outcome of statistical test 2. Derive valid conclusions on the basis of outcome of statistical tests **REFLECTION:** 1. Use statistical test for correct data analysis and making valid conclusions
Learning Methods	Lecture, Case based, Library based, Spaced repetition, Self-regulated learning
Assessments	Written Examinations: LAQ, SAQ
Prescribed texts	As per list
Domains of competencies	KS, HO

Topic Overview	**SOFTWARE & AI TOOLS FOR SUPPORTING RESEARCH DATA MANAGEMENT AND ANALYSIS**
Learning Outcomes	**Competency: Hom-PG-RMB-14 :** **SOFTWARE & AI TOOLS FOR SUPPORTING RESEARCH DATA MANAGEMENT AND ANALYSIS** **KNOWLEDGE:** 1. Discuss the utility of Statistical Software 2. Discuss the utility of software for writing and publications 3. Discuss the scope of R, SPSS, SAS software for statistical analysis **SKILL:** 1. Demonstrate the use of MS-Exe l for data organizing and basic statistical calculations 2. Demonstrate the use of G -Power for sample size calculation 3. Illustrate the use of reference management software 4. Illustrate the use of language-enhancing software **REFLECTION:** 1. Using various AI tools for data organizing, analysis and presenting the research findings.
Learning Methods	Demonstration, Self-regulated learning, e-Learning
Assessments	Written Examinations: SAQ
Prescribed texts	As per list
Domains of competencies	KS

Topic Overview	**COMMUNICATING RESEARCH FINDINGS**
Learning Outcomes	**Competency: Hom-PG-RMB-15 :** **COMMUNICATING RESEARCH FINDINGS** **KNOWLEDGE:** 1. Discuss the basic principles of scientific writing 2. Explain the meaning of each section of the dissertation and thesis 3. Explain the basic formats IMRAD for writing a scientific article 4. Indicate various categories of journals and the meaning of the impact factor 5. Explain the process of the peer review process 6. Explain the meaning of various publication technicalities **SKILL:** 1. Formulate the data presentation Textual format 2. Formulate the data presentation in Tabular format 3. Formulate the data presentation in a graphical format 4. Creating a poster for a scientific presentation 5. Demonstrating skills in oral presentation of a scientific paper **REFLECTION:** 1. Dissemination of the knowledge gained through research in an appropriate forum and medium
Learning Methods	Lecture,Demonstration, Flipped learning, Deliberate practice
Assessments	Written Examinations: LAQ, SAQ
Prescribed texts	As per list
Domains of competencies	KS, CS,PRF

Assessment Method:

PART 1 – PAPER 3. COURSE NUMBERS

Hom-PG-RMB-01	Foundation for Homoeopathic Research
Hom-PG-RMB-02	Concept of Structured and Continuous Literature Review
Hom-PG-RMB-03	Research Process and Proposal Writing
Hom-PG-RMB-04	Quantitative Research Design for Homoeopathic Research
Hom-PG-RMB-05	Qualitative Research Design for Homoeopathic Research
Hom-PG-RMB-06	Mixed Research Design for Homoeopathic Research
Hom-PG-RMB-07	Documentation of Evidence
Hom-PG-RMB-08	Ethics in Homoeopathic Research
Hom-PG-RMB-09	Basics concepts of Biostatistics
Hom-PG-RMB-10	Concept of Data types, Collection & Sorting methods
Hom-PG-RMB-11	Concept of Population, Sample, Sampling Techniques and Sample Size for Conducting Homoeopathic Research
Hom-PG-RMB-12	Basics of Data Analysis, Descriptive Statistics& Probability
Hom-PG-RMB-13	Basics of Inferential Statistics for Data Analysis for Homoeopathic Research
Hom-PG-RMB-14	Software & AI tools for supporting Research Data Management and Analysis
Hom-PG-RMB-15	Communicating Research Findings

VII (2b). QUESTION PAPER LAYOUT

Q. No.	Type of Question	Content	Marks
1	Problem Based	Hom-PG-RMB-03,04,05,06	20
2	LAQ	Hom-PG-RMB-02,04	10
3	LAQ	Hom-PG-RMB- 05,13	10
4	LAQ	Hom-PG-RMB-06,15	10
5	LAQ	Hom-PG-RMB-11,12	10
6	SAQ	Hom-PG-RMB-01	5
7	SAQ	Hom-PG-RMB-07	5
8	SAQ	Hom-PG-RMB-08	5
9	SAQ	Hom-PG-RMB-09	5
10	SAQ	Hom-PG-RMB-10,11	5
11	SAQ	Hom-PG-RMB-12	5
12	SAQ	Hom-PG-RMB-13	5
13	SAQ	Hom-PG-RMB-14	5
Total			**100**

Abbreviations:

Long Answer Question: LAQ
Short Answer Question: SAQ

VIII. *Reference:*

RESEARCH METHODOLOGY:

Author, Initial, Year, *Book Title,* City of Publication Country/ state: Publisher

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WEB RESOURCES :

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