# COURSE CURRICULUM FOR THIRD PROFESSIONAL BAMS
# (PRESCRIBED BY NCISM)


## Research Methodology and Medical-statistics

## (SUBJECT CODE : AyUG-RM)

**(Applicable from 2021-22 batch, from the academic year 2024-25 onwards for 5 batches or until further notification by NCISM, whichever is earlier)**

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।। आयुषे सर्वलोकानाम् ।।

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

NCISM

# III Professional Ayurvedacharya (BAMS)

# Subject Code : AyUG-RM

Research Methodology and Medical-statistics

## Summary

| Total number of Teaching hours: 75 | | | |
|---|---|---|---|
| **Lecture (LH) - Theory** | | **25** | **25(LH)** |
| Paper I | 25 | | |
| **Non-Lecture (NLHT)** | | **50** | **50(NLH)** |
| Paper I | 50 | | |
| **Non-Lecture (NLHP)** | | **0** | |
| Paper I | 0 | | |

| Examination (Papers & Mark Distribution) | | | | | |
|---|---|---|---|---|---|
| **Item** | **Theory Component Marks** | **Practical Component Marks** | | | |
| | | **Practical** | **Viva** | **Elective** | **IA** |
| Paper I | 50 | - | - | - | - |
| **Sub-Total** | 50 | - | | | |
| **Total marks** | 50 | | | | |

**Important Note :-** The User Manual III BAMS is a valuable resource that provides comprehensive details about the curriculum file. It will help you understand and implement the curriculum. Please read the User Manual III before reading this curriculum file. The curriculum file has been thoroughly reviewed and verified for accuracy. However, if you find any discrepancies, please note that the contents related to the MSE should be considered authentic. In case of difficulty and questions regarding curriculum write to **syllabus24ayu@ncismindia.org**

# PREFACE

Research is a crucial component of scientific progress, and its inclusion in the undergraduate Ayurveda curriculum strengthens the foundation of evidence-based practice. Ayurveda, as a traditional system of medicine, requires systematic validation through research to align with contemporary healthcare needs. Introducing research methodology at the undergraduate level enables students to critically evaluate classical texts, explore integrative medicine, and develop scientific reasoning. This knowledge helps in hypothesis formulation, data analysis, and meaningful interpretation, ultimately enhancing the credibility of Ayurveda in the global healthcare system.

With the advancement of new Teaching-Learning (TL) methods, such as problem-based learning (PBL), experiential learning, digital tools, and artificial intelligence, students can actively engage with research concepts. Methods like flipped classrooms, case-based discussions, and hands-on practicals allow a deeper understanding of study designs, statistical tools, and critical appraisal techniques. The application of these techniques ensures accuracy and reliability in Ayurvedic research. Furthermore, learning about intellectual property rights (IPR), ethical considerations, and research reporting guidelines prepares students to contribute to academic publications, innovation, and policy-making in Ayurveda.

In the third professional year, research training plays a transformative role by bridging theoretical knowledge with clinical application. At this stage, students are exposed to clinical trials, literary research, preclinical studies, and statistical analysis, enabling them to integrate research findings into patient care. This phase prepares students for advanced clinical decision-making, postgraduate studies, and scientific contributions. By fostering analytical thinking and innovation, research education ensures that Ayurveda remains a dynamic and evolving system of medicine, blending ancient wisdom with modern scientific advancements for holistic and evidence-based healthcare.

# INDEX

**Course Code and Name of Course**

| Course code | Name of Course |
|---|---|
| AyUG-RM | Research Methodology and Medical-statistics |

**Table 1 : Course learning outcomes and mapped PO**

| SR1<br>CO<br>No | A1<br>Course learning Outcomes (CO) AyUG-RM<br>At the end of the course AyUG-RM, the students should be able to- | B1<br>Course learning Outcomes mapped with program learning outcomes. |
|---|---|---|
| CO 1 | Explain and utilize research methods and statistical concepts. | PO1,PO2 |
| CO 2 | Distinguish, analyse and apply research types. Recognize their application in ayurveda. | PO2,PO9 |
| CO 3 | Explore and utilize various databases and guidelines. | PO2,PO8 |
| CO 4 | Distinguish, analyse and apply statistical tests. Recognize their application in ayurveda. | PO2,PO9 |
| CO 5 | Apply ethical aspect in conducting quality research. | PO6,PO9 |

**Table 2 : Contents of Course**

| **Paper 1** (RM-MS) | | | | | | |
|---|---|---|---|---|---|---|
| **Sr. No** | **A2 List of Topics** | **B2 Term** | **C2 Marks** | **D2 Lecture hours** | **E2 Non-Lecture hours Theory** | **E2 Non-Lecture hours Practical** |
| 1 | **Introduction to Research**<br>1. Objectives<br>2. Need and Scope<br>3. Concept of Evidence-Based Medicine and Integrative Medicine | 2 | 30 | 1 | 0 | 0 |
| 2 | **Historical developments in research**<br>1. Describe historical development of Contemporary research.<br>2. Identify evidences of research in ayurveda classical literature. | 2 | | 0 | 1 | 0 |
| 3 | **Research Types**<br>1. Primary and Secondary<br>2. Basic, Applied and Translational<br>3. Qualitative, Quantitative and Mixed<br>4. Observational and Interventional<br>5. Descriptive and Analytical | 2 | | 2 | 2 | 0 |
| 4 | **Research Ethics**<br>1. Need and significance<br>2. Institutional Animal Ethics Committee (IAEC) and Institutional Human Ethics Committee (IHEC/IEC).<br>3. Publications ethics | 2 | | 1 | 1 | 0 |
| 5 | **Research Designs and terminologies**<br>1. Case reports<br>2. Case Series<br>3. Cross sectional and longitudinal<br>4. Cohort studies<br>5. Case Control<br>6. Clinical trials (Randomised controlled trials)<br>7. Literary Research and reviews<br>8. Preclinical Methods (In-silico, In-vitro, In situ and In-vivo). | 2 | | 4 | 8 | 0 |

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|---|---|---|---|---|---|---|
| | 9. Terminologies: Randomisation, matching, Blinding, and Bias. | | | | | |
| 6 | **Research process**<br><br>1. Selecting a research topic and research problem<br>2. Reviewing of literature.<br>3. Formulating research hypothesis and objectives<br>4. Planning the research (materials and methods)<br>5. Conducting the research (data collection, analysis and interpretation)<br>6. Drawing conclusions.<br>7. Reporting of Research (Scientific writing) | 2 | | 3 | 6 | 0 |
| 7 | **Different Database, portals and Artificial Intelligence.**<br><br>1. Database like PubMed, SCOPUS etc.<br>2. Portals like AYUSH Research Portal, NAMASTE etc.<br>3. Artificial Intelligence. | 2 | | 1 | 3 | 0 |
| 8 | **Different Guidelines to report research**<br><br>Different guidelines like CARE, CONSORT, ARRIVE etc. | 2 | | 0 | 2 | 0 |
| 9 | **Intellectual Property Right (IPR)/Patent/ TKDL**<br><br>Importance Intellectual Property Right (IPR)/Patent/ TKDL | 2 | | 1 | 0 | 0 |
| 10 | **Research Critiquing**<br><br>Different steps involved in critiquing research works | 2 | | 1 | 2 | 0 |
| 11 | **Introduction to Medical statistics**<br><br>1. Objectives<br>2. Types (Descriptive and Inferential)<br>3. Scope and Relevance pertaining to Ayurveda | 2 | 20 | 1 | 1 | 0 |
| 12 | **Data**<br><br>1. Concept of Data in Medical Statistics<br>2. Sources of Data. | 2 | | 1 | 2 | 0 |

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| | 3. Types of Data: Quantitative and Qualitative (categorical), Discrete and continuous.<br>4. Types of Scales: ordinal, nominal, interval and ratio scale. | | | | |
| 13 | **Basic statistical terms**<br><br>1. Population<br>2. Sample and sampling<br>3. Variable (Dependent and Intendent)<br>4. Attributes | 2 | 1 | 1 | 0 |
| 14 | **Collection and Presentation of Data**<br><br>1. Types of Data Collection (Primary and Secondary)<br>2. Types of Presentation of data (Textual, Tabular and Graphical) | 2 | 2 | 4 | 0 |
| 15 | **Measures of Central Tendency**<br><br>1. Arithmetic Mean<br>2. Median<br>3. Mode<br>4. Qualities of Good measure of central tendency | 2 | 1 | 2 | 0 |
| 16 | **Measures of Deviation/Dispersion/Variability**<br><br>1. Range<br>2. Quartile deviation<br>3. Mean deviation<br>4. Standard deviation<br>5. Variance and Co-efficient of Variation.<br>6. Standard error<br>7. Qualities of good measure of variability | 2 | 1 | 4 | 0 |
| 17 | **Probability**<br><br>1. Fundamental of Probability<br>2. Normal Distribution Curve and its properties | 2 | 1 | 3 | 0 |
| 18 | **Hypothesis and Test of Significance**<br><br>Hypothesis and Test of Significance | 2 | 1 | 3 | 0 |
| 19 | **Parametric and non-parametric tests**<br><br>Parametric and non-parametric tests | 2 | 1 | 2 | 0 |

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| 20 | **Concept of Co-relation and Regression**<br><br>**Explain Co-relation and Regression** | 2 | | 1 | 1 | 0 |
| 21 | **Commonly used Statistically software**<br><br>Commonly used Statistically software | 2 | | 0 | 2 | 0 |
| **Total Marks** | | | **50** | **25** | **50** | **0** |

**Table 3 : Learning objectives of Course**

| **Paper 1** (RM-MS) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **A3 Course outcome** | **B3 Learning Objective (At the end of the session, the students should be able to)** | **C3 Domain/sub** | **D3 MK / DK / NK** | **E3 Level** | **F3 T-L method** | **G3 Assessment** | **H3 Assessment Type** | **I3 Term** | **K3 Integration** | **L3 Type** |
| **Topic 1 Introduction to Research (LH :1 NLHT: 0 NLHP: 0)** | | | | | | | | | | |
| **A3** | **B3** | **C3** | **D3** | **E3** | **F3** | **G3** | **H3** | **I3** | **K3** | **L3** |
| CO 1 | Define Research and Research objectivesDescribe Scope of research in ayurveda. Define Evidence based and Integrative medicine | CC | MK | KH | L&PPT | T-OBT,QZ ,PUZ | S | II | - | LH |
| **Non Lecture Hour Theory** | | | | | | | | | | |
| **S.No** | **Name of Activity** | **Description of Theory Activity** | | | | | | | | |
| **Non Lecture Hour Practical** | | | | | | | | | | |
| **S.No** | **Name of Practical** | **Description of Practical Activity** | | | | | | | | |
| **Topic 2 Historical developments in research (LH :0 NLHT: 1 NLHP: 0)** | | | | | | | | | | |
| **A3** | **B3** | **C3** | **D3** | **E3** | **F3** | **G3** | **H3** | **I3** | **K3** | **L3** |
| CO 1,CO 5 | Present historical development of Contemporary research.Identify evidences of research in ayurveda classical literature. | PSY-GUD | MK | KH | BS,L&GD,IBL ,TBL,DIS | M-CHT,QZ ,CL-PR,DEB | S | II | H-Samhita | NLHT2.1 |
| **Non Lecture Hour Theory** | | | | | | | | | | |
| **S.No** | **Name of Activity** | **Description of Theory Activity** | | | | | | | | |
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| NLHT 2.1 | Historical developments in research | Students (5-10) are divided into groups (5-10)<br>They are given task to collect evidences on milestones of researches conducted like Nazi camp, Thalidomide story, syphilis story and also collect evidences of research process in ayurveda classical texts.<br>Later each group is given 5 minutes to present the collected literature and how the different issues were addressed in research methodology. |

**Non Lecture Hour Practical**

| S.No | Name of Practical | Description of Practical Activity |
|---|---|---|

**Topic 3 Research Types (LH :2 NLHT: 2 NLHP: 0)**

| A3 | B3 | C3 | D3 | E3 | F3 | G3 | H3 | I3 | K3 | L3 |
|---|---|---|---|---|---|---|---|---|---|---|
| CO 1,CO 2 | Explain Primary and Secondary research and differentiate between them | CC | MK | KH | L&GD | T-OBT | S | II | - | LH |
| CO 1,CO 2 | Explain Basic, Applied and Translational Research and differentiate among them. | CC | MK | K | L&PPT | T-OBT | S | II | - | LH |
| CO 1,CO 2 | Define Qualitative, Quantitative and Mixed Research and differentiate among them | CC | MK | K | L&PPT | T-OBT | S | II | - | LH |
| CO 1,CO 2 | Define Observational and Interventional studies and differentiate between them | CC | MK | K | L&GD | T-OBT | S | II | - | LH |
| CO 1,CO 2 | Describe Descriptive and Analytical studies and differentiate between them | CC | MK | K | L&PPT | T-OBT | S | II | - | LH |

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|---|---|---|---|---|---|---|---|---|---|---|
| CO 1,CO 2 | Describe and differentiate between primary, secondary, descriptive and Analytical research studies.Explain and Differentiate between Basic, Applied and Translational Research | PSY-GUD | MK | KH | CBL,BS,PBL | PRN,S-LAQ | S | II | - | NLHT3.1 |
| CO 1,CO 2 | Illustrate and differentiate between Qualitative, Quantitative and Mixed ResearchDefine Observational and Interventional studies and differentiate between them | PSY-GUD | MK | KH | CBL,BS,PBL,DIS,PER | S-LAQ,CL-PR,PRN | S | II | - | NLHT3.2 |

**Non Lecture Hour Theory**

| S.No | Name of Activity | Description of Theory Activity |
|---|---|---|
| NLHT 3.1 | Different Research types Part I | **Requirements:** A set of cards or case studies with short descriptions of various research studies (some primary, some secondary, some descriptive, some analytical, basic, applied, and translational research.) are archived and used for NHL.<br>**1 hour Activity:**<br>1. Divide students into small groups.<br>2. Distribute the cards/cases randomly.<br>3. Ask each group to classify the research study given to them which may be either primary, secondary, descriptive, analytical, basic, applied and translational research.<br>4. After categorizing, the groups explain their reasoning behind the classification.<br>5. Then later teacher facilitates a discussion to clarify any misunderstandings and to reinforce key concepts |
| NLHT 3.2 | Research Types Part II | **Requirements:** A set of case studies with short description or synopsis which have Qualitative, Quantitate, observational and interventional studies are archived and used as study material.<br>**1 hour Activity:**<br>1. Divide students into small groups.<br>2. Distribute the cards/cases randomly. |

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| | | 3. Ask each group to classify the research study given to them which may be either Qualitative, Quantitate, observational and interventional studies.<br>4. After categorizing, the groups explain their reasoning behind the classification.<br>5. Then later teacher facilitates a discussion to clarify any misunderstandings and to reinforce key concepts |

**Non Lecture Hour Practical**

| S.No | Name of Practical | Description of Practical Activity |
|---|---|---|

**Topic 4 Research Ethics (LH :1 NLHT: 1 NLHP: 0)**

| A3 | B3 | C3 | D3 | E3 | F3 | G3 | H3 | I3 | K3 | L3 |
|---|---|---|---|---|---|---|---|---|---|---|
| CO 5 | Explain the need and significance of ethics in research. | AFT-VAL | MK | KH | L&GD, DIS | INT,CBA | S | II | - | LH |
| CO 5 | Explain the role of IHEC/IEC and IAEC in research | AFT-VAL | DK | K | FC,BS, L&PPT | T-OBT,T-CS | S | II | - | LH |
| CO 5 | Appraise the role and significance of ethics in publication | AFT-RES | MK | KH | BS,L& GD,DIS | T-CS,DEB, CL-PR | S | II | - | LH |
| CO 5 | Explain the need and significance of ethics in research along with structure of Institutional Human and Animal ethical committee. | AFT-VAL | DK | KH | TBL,RP ,DIS,PB L,PSM | PRN,P-MOD,SBA | S | II | - | NLHT4.1 |

**Non Lecture Hour Theory**

| S.No | Name of Activity | Description of Theory Activity |
|---|---|---|
| NLHT 4.1 | Ethics Committe Functioning | **1 hour Activity:**<br><br>1. Present a real or hypothetical case study involving ethical dilemmas in animal or human research. |

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| | | 2. The scenario should focus on a situation where ethical approval is needed (e.g., using animals for a new study or involving human participants).<br>3. Divide participants into small groups (10 each group) and ask them to discuss the ethical challenges, the role of IAEC/IHEC in addressing these issues, and how they would resolve the situation.<br>4. Each group discusses and decides whether the research should be approved, ensuring the ethical principles (such as respect for autonomy, beneficence, non-maleficence, and justice) are considered. |

**Non Lecture Hour Practical**

| S.No | Name of Practical | Description of Practical Activity |
|---|---|---|

**Topic 5 Research Designs and terminologies (LH :4 NLHT: 8 NLHP: 0)**

| A3 | B3 | C3 | D3 | E3 | F3 | G3 | H3 | I3 | K3 | L3 |
|---|---|---|---|---|---|---|---|---|---|---|
| CO 1,CO 2 | Describe Case Reports | CC | MK | KH | L&PPT | T-CS | S | II | - | LH |
| CO 1,CO 2 | Explain Case series | CC | DK | K | L&PPT | T-CS,PA | S | II | - | LH |
| CO 1,CO 2 | Describe Cross sectional study | CC | MK | K | L&PPT ,DIS | T-CS,QZ | S | II | - | LH |
| CO 1,CO 2 | Explain COHORT study | CC | DK | K | DIS,BL, L&PPT | T-OBT,QZ | S | II | - | LH |

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| CO 1,CO 2 | Describe Case Control study | CC | DK | K | BS,L&P PT ,DIS | T-CS,PA | S | II | - | LH |
| CO 1,CO 2 | Describe Randomized Controlled Trial | CC | MK | KH | DIS,PL, BS,L&P PT | T-CS,PA,S-LAQ | S | II | - | LH |
| CO 1,CO 2 | Define and identify various steps of Literary research Narrative review, systematic review and meta-analysis and identify the difference among them | CC | NK | K | TBL,DI S,BS,L &PPT | PA,QZ ,CL-PR,T-CS | S | II | - | LH |
| CO 1,CO 2 | Explain Various pre-clinical methods and their utility | CC | NK | K | D-M,BL ,L_VC, BS | QZ ,P-MOD,PA | S | II | - | LH |
| CO 1,CO 2 | Define various terms related to research designs | CC | MK | KH | L&PPT ,DIS | PA,PUZ,Q Z ,T-CS | S | II | - | LH |
| CO 1,CO 2 | Illustrate Literature review under peer learning. | CAP | MK | KH | TBL,BS ,PL,DIS | PA,T-CS,COM | S | II | - | NLHT5.1 |
| CO 1,CO 2 | Present differences between case report and case series.Describe and differentiate between cross sectional, longitudinal, cohort and case control studies. | PSY-GUD | MK | KH | TBL,PE R,PBL, BL | S-LAQ,PR N,CL-PR | S | II | - | NLHT5.2 |
| CO 1,CO 2 | Describe Randomized clinical trial and terminologies related to it (Randomization, matching, blinding and bias) | PSY-GUD | MK | KH | PBL,TB L,BL,B S,PL | COM,CL-P R,PRN,PA, P-MOD | S | II | - | NLHT5.3 |
| CO 1,CO | Describe preclinical research methods (In-silico, In-vitro, In situ and In-vivo). | PSY-GUD | DK | K | D-M,PE R,PL,F | P-MOD,PA ,PRN | S | II | - | NLHT5.4 |

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**Non Lecture Hour Theory**

| S.No | Name of Activity | Description of Theory Activity |
|---|---|---|
| NLHT 5.1 | Literary research | One hour peer learning for Literary research and review with different examples related to concepts of ayurveda. |
| NLHT 5.2 | Research designs | **2-hour Group activity.**<br>Preparation: Prepare a set of cards or slips with scenarios of different medical research questions (e.g., "Does smoking increase the risk of lung cancer?" or "What is the prevalence of hypertension in a population of 40-year-olds?").<br>Instructions: Divide the students into four-five small groups. Assign each group one study type (cross-sectional, longitudinal, cohort, or case-control).<br>Each group will be given a set of research scenarios (with some overlapping between study types).<br>Their task is to categorize each scenario into the correct study type based on the description.<br>After 20 minutes, ask each group to present their study type and rationale for categorizing the research scenarios.<br>**Debrief**: Clarify the key points for each study design, emphasizing differences such as the study direction (retrospective vs. prospective), timeframes, and data types (exposure vs. outcome). Discuss how the study design choice influences the type of questions they can answer (e.g., prevalence, incidence, risk factors). |
| NLHT 5.3 | Randomized clinical trial and terminologies related to it | **2-hour group activity on Randomized control studies**.<br>**Preparation**: Create a list of clinical questions (e.g., effectiveness of a new drug, surgical technique, or lifestyle intervention) that could be investigated via RCT.<br>Divide students into small groups (4-5 students per group).<br>Each group is assigned a clinical question and tasked with designing an RCT to answer it.<br>**Steps**: |

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| | | • **Identify the Research Question**: What hypothesis are they testing? (e.g., "Does a new drug reduce blood pressure more effectively than the standard treatment?")<br>• **Define the Population**: Who is the target population (e.g., adults with hypertension)?<br>• **Randomization Strategy**: How will they randomize participants? Will it be simple randomization, block randomization, or stratified randomization?<br>• **Intervention and Control Groups**: What will be in the intervention group (e.g., new drug) and the control group (e.g., standard treatment or placebo)?<br>• **Blinding**: Will the study be single-blind, double-blind, or open-label? How will they ensure blinding to reduce bias?<br>• **Outcome Measures**: What primary and secondary outcomes will they measure (e.g., blood pressure reduction, adverse effects)?<br>• **Sample Size and Power**: How will they estimate sample size to ensure the study has adequate power?<br>• **Ethical Considerations**: How will they handle patient consent, potential harms, and ethical concerns?<br>• After **20 minutes** of discussion, each group presents their RCT design to the class (5 minutes per group).<br><br>**Debrief**: Discuss strengths and weaknesses of the different designs, and facilitate a conversation about randomization, blinding, and potential biases. |
| NLHT 5.4 | Preclinical methods in research | **3-hour field visit to orient on Preclinical methods in research**.<br>Visit to Research laboratory or academic research institute with preclinical research facilities.<br>After visiting all stations in research facility, bring the students together for a discussion led by a researcher or facilitator.<br>Review each preclinical method and how they complement each other in research.<br>Open the floor to questions about the different methods, their applications, challenges, and ethical considerations.<br>Discuss any real-world case studies where these methods have led to breakthroughs in drug development or disease understanding. Ask students to reflect on which method they found most interesting or challenging and why |

| Non Lecture Hour Practical | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **S.No** | **Name of Practical** | **Description of Practical Activity** | | | | | | | | |
| **Topic 6 Research process (LH :3 NLHT: 6 NLHP: 0)** | | | | | | | | | | |
| **A3** | **B3** | **C3** | **D3** | **E3** | **F3** | **G3** | **H3** | **I3** | **K3** | **L3** |
| CO 1,CO 2,CO 3 | Describe the process for Selection of topic | CC | MK | KH | L&PPT ,BS,DIS | T-CS,PA | S | II | - | LH |
| CO 3 | Access and explain the Literature search in medical database | PSY-MEC | MK | KH | FC,L& GD,BL | T-CS,CL-PR,PA | S | II | - | LH |
| CO 1,CO 2 | Formulate the Hypothesis and Objectives | CC | MK | KH | DIS,BS, L&GD | PA,T-CS | S | II | - | LH |
| CO 1,CO 2 | Select the appropriate materials and methodologies required in research process. | PSY-GUD | MK | KH | FC,L& GD,BL | QZ ,PA,S-LAQ,T-CS | S | II | - | LH |
| CO 2,CO 4 | Explain collection, analysis and Interpretation of data. | CC | MK | K | BS,L& GD,DIS | T-CS,S-LAQ,QZ | S | II | - | LH |
| CO 2,CO 5 | Justiy Research conclusions | CC | MK | K | FC,BL, L&GD | PA,T-CS | S | II | - | LH |
| CO 1,CO 2,CO | Discuss steps of Reporting of Research (IMRAD) | CAP | MK | KH | L&GD, DIS,BS | PA,CL-PR, S-LAQ,T-CS,QZ | S | II | - | LH |

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| 5 | | | | | | | | | | |
| CO 1,CO 2,CO 5 | Identify the research topic, research problem and appraise review of literature.Formulate research hypothesis and objectives. | PSY-GUD | DK | SH | PBL,L&GD,PER,BS,DIS | CBA,CL-PR,S-LAQ,T-CS | S | II | - | NLHT6.1 |
| CO 1,CO 2 | Select the appropriate materials and methods for research study. | PSY-GUD | MK | SH | PBL,TBL,DIS,FC,L&GD | T-CS,PA,QZ , CL-PR,S-LAQ | S | II | - | NLHT6.2 |

**Non Lecture Hour Theory**

| S.No | Name of Activity | Description of Theory Activity |
|---|---|---|
| NLHT 6.1 | Research process: Research question and Hypothesis | **Research topic, problem and hypothesis formulation (3-hour activity)**<br><br>1. Divide the students into four-five small groups.<br>2. Each group will brainstorm possible **research topics** in a medical field of their choice (Vatavyadhi, Madhumeha, Pandu, Bhadirya, srotas etc.)<br>3. Guide the students to ensure their chosen topic is relevant, specific, and manageable for undergraduate research.<br>4. Ask each group to define a research problem based on the topic they selected.<br>5. Example: If the topic is "prameha", the research problem might be, "What are the present day nidan ahara and vihara in causing prameha in urban areas?"<br>6. Give each group a sample abstract or a portion of a research paper (this can be a real article or a fictional example) or<br>7. Alternatively, ask the students to find a research article relevant to their topic using online databases.<br>8. Ask students to Identify key findings, methods, and conclusions from the literature. Assess the gaps or limitations in the existing research. Discuss how this literature review informs their own research problem. |

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| | | 9. Guide the students to frame the research question and hypothesis for respective condition chosen by them from the above activity. |
| NLHT 6.2 | Research process: Materials and Methodology | **Planning and conducting the research (3-hour activity)**<br>Start with a brief discussion of the importance of selecting appropriate materials and methods in research.<br>**Materials**: Refers to the tools, instruments, or resources required for the study (e.g., surveys, medical equipment, software).<br>**Methods**: Refers to the overall approach to collecting and analysing data (e.g., qualitative vs. quantitative methods, observational studies, experimental designs).<br>**Group Formation**: Divide students into groups of 4–6.<br>**Research Topic and materials**: Each group selects or is assigned a general research topic (e.g., hypertension in children, antibiotic resistance in hospital settings, mental health in medical students) and Formulating a Research Problem.<br>Depending on their chosen topic and problem ask the groups to decide on the materials they will need<br><br>1. Surveys and Questionnaires: Tools for collecting self-reported data.<br>2. Medical Equipment: Devices like blood pressure cuffs, thermometers, glucose meters.<br>3. Software: Statistical tools (SPSS, R, Excel) or qualitative analysis software (NVivo).<br>4. Data Sources: Databases, medical records, or patient registries.<br>5. Ethical Considerations: Ensure that the materials selected are ethically sound (e.g., consent forms, patient confidentiality).<br><br>**Research design:**<br>Ask each group to decide on the data collection methods that best suit their research problem.<br>Guide the groups to choose between quantitative or qualitative methods based on their research problem and objectives.<br>Study Population: Have the groups identify their target population and sampling method. Discuss factors like sample size, inclusion/exclusion criteria, and sampling bias.<br>Data Analysis Approach: Ask the groups to select the statistical or qualitative analysis techniques they |

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| | | will use to interpret their data. |

| Non Lecture Hour Practical | | |
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| **S.No** | **Name of Practical** | **Description of Practical Activity** |

**Topic 7 Different Database, portals and Artificial Intelligence. (LH :1 NLHT: 3 NLHP: 0)**

| A3 | B3 | C3 | D3 | E3 | F3 | G3 | H3 | I3 | K3 | L3 |
|---|---|---|---|---|---|---|---|---|---|---|
| CO 3 | Illustrate use of different Research portals, database (DHARA, AYUSH Research Portal, PubMed, SCOPUS, UGC-CARE, Web of Science, etc) and explore Artificial Intelligence in research. | CC | MK | KH | L_VC,DIS | PA,S-LAQ,QZ | S | II | - | LH |
| CO 3 | Demonstrate use of Research portals, database (DHARA, AYUSH Research Portal, PubMed, SCOPUS, UGC-CARE, Web of Science, etc) and Artificial intelligence in ayurveda | PSY-GUD | DK | KH | TBL,FC,L&GD,BS,W | QZ ,DOAP,PA,CL-PR | S | II | - | NLHT7.1 |

| Non Lecture Hour Theory | | |
|---|---|---|
| **S.No** | **Name of Activity** | **Description of Theory Activity** |
| NLHT 7.1 | Demonstrate use of Research portals, database and Artificial intelligence in ayurveda | **Demonstration of Databases and Research Portals (2 hours)**<br>• **PubMed**: Introduction to searching for medical literature, using MeSH (Medical Subject Headings) terms, and filters.<br>• **Cochrane Library**: Discuss systematic reviews, meta-analyses, and evidence-based medicine.<br>• **Google Scholar**: Overview of how to search academic articles and set up alerts for ongoing research.<br>• **ClinicalTrials.gov**: Discuss how to access information about ongoing clinical trials and their results.<br>**Demonstration of AI for Diagnostics (1 hour)** |

| | | |
|---|---|---|
| | | • **Show how AI** is being used to detect diseases from medical imaging or patient data (e.g., AI-assisted dermatology tools for skin cancer detection).<br>• **Chatbots and Virtual Assistants**: Introduce AI-powered chatbots (e.g., **Babylon Health**, **Your.MD**) that provide preliminary diagnoses or health advice.<br><br>Divide the students into small groups (3-4 students per group). Assign each group a research topic (e.g., "Antibiotic resistance in hospitals", "AI in diagnosing cancer", "Mental health in medical students"). Prepare a brief presentation (5-10 minutes) on what they found, the usefulness of the resources, and any challenges they encountered. |

**Non Lecture Hour Practical**

| S.No | Name of Practical | Description of Practical Activity |
|---|---|---|

**Topic 8 Different Guidelines to report research (LH :0 NLHT: 2 NLHP: 0)**

| A3 | B3 | C3 | D3 | E3 | F3 | G3 | H3 | I3 | K3 | L3 |
|---|---|---|---|---|---|---|---|---|---|---|
| CO 3 | Differentiate various guidelines to report researchs like CARE, PRISMA, ARRIVE, CONSORT, STROBE. | CC | DK | KH | L_VC | CHK,QZ ,CL-PR,PA | S | II | - | LH |
| CO 3 | Recommend specific guidlines for various research studies | PSY-GUD | DK | KH | BL,L_VC,FC,TBL,LS | S-LAQ,P-ID,CL-PR,PRN,CHK | S | II | - | NLHT8.1 |

**Non Lecture Hour Theory**

| S.No | Name of Activity | Description of Theory Activity |
|---|---|---|
| NLHT 8.1 | Different Guidelines to report research | Introduce the different reporting guidelines, focusing on their purposes and key components (e.g., |

| | | |
|---|---|---|
| | | CONSORT for clinical trials, STROBE for observational studies, PRISMA for systematic reviews, CARE for case reports).<br>**Divide students into small groups (10-15 students per group).**<br><br>1. Assign each group a specific research study (either real or hypothetical) and provide them with the corresponding guideline checklist (e.g., CONSORT for clinical trial studies).<br>2. Ask the groups to review the study using the reporting guideline checklist, identifying elements of the research that are missing or not clearly reported.<br>3. Groups should note their findings on a whiteboard or in a shared document.<br>4. After the review, each group presents their findings, focusing on the areas where the study complied with the reporting guidelines and where it fell short.<br>5. Ask students to reflect on the activity and share any insights they gained about the importance of adhering to research reporting guidelines. |
| **Non Lecture Hour Practical** | | |
| **S.No** | **Name of Practical** | **Description of Practical Activity** |

**Topic 9 Intellectual Property Right (IPR)/Patent/ TKDL (LH :1 NLHT: 0 NLHP: 0)**

| A3 | B3 | C3 | D3 | E3 | F3 | G3 | H3 | I3 | K3 | L3 |
|---|---|---|---|---|---|---|---|---|---|---|
| CO 3,CO 5 | Explain importance and different aspects of Intellectual property Rights/Patents and TKDL | AFT-VAL | NK | KH | BS,L&GD,DIS,PBL | PRN,CL-PR,PA,QZ | S | II | - | LH |

| | | |
|---|---|---|
| **Non Lecture Hour Theory** | | |
| **S.No** | **Name of Activity** | **Description of Theory Activity** |
| **Non Lecture Hour Practical** | | |
| **S.No** | **Name of Practical** | **Description of Practical Activity** |

| Topic 10 Research Critiquing (LH :1 NLHT: 2 NLHP: 0) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **A3** | **B3** | **C3** | **D3** | **E3** | **F3** | **G3** | **H3** | **I3** | **K3** | **L3** |
| CO 5 | Explain Research critiquing and identify various steps involved in critiquing | CC | DK | K | L&PPT | CL-PR,T-CS,QZ | S | II | - | LH |
| CO 5 | Illustrate Research critiquing and identify various steps involved in critiquing | PSY-GUD | DK | KH | FC,TBL,L&GD,BL,CBL | CL-PR,QZ,PRN | S | II | - | NLHT10.1 |

**Non Lecture Hour Theory**

| S.No | Name of Activity | Description of Theory Activity |
|---|---|---|
| NLHT 10.1 | Research Critiquing | Select 3-4 research papers related to the topic at hand. Ensure these papers have a variety of strengths and weaknesses for discussion.<br>Create critique sheets that participants can fill out for each study. Include questions like:<br>What is the main research question or hypothesis, what are the key findings, what are the strengths of the study, what are the weaknesses or limitations of the study, how could the study be improved?<br><br>Then divide participants into groups (ideally 10-15 people per group). If the group is large, you can have multiple sets of critique sheets and rotate the groups.<br>Assign each group one research paper to start with. They'll spend 20-30 minutes reading the paper and completing the critique sheet.<br>After 30 minutes, have each group rotate to the next research paper. They should review the critique sheet filled out by the previous group, read the paper again (or parts of it), and add any additional comments, thoughts, or suggestions.<br>Repeat the process until each group has reviewed all the papers (1 hour).<br>Final Reflection (30 minutes): Once the above activity is complete, come together as a whole group to discuss insights and the overall critiques. What were common strengths and weaknesses across the studies? How can these insights be applied to future research? |

| Non Lecture Hour Practical | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **S.No** | **Name of Practical** | **Description of Practical Activity** | | | | | | | | |
| **Topic 11 Introduction to Medical statistics (LH :1 NLHT: 1 NLHP: 0)** | | | | | | | | | | |
| **A3** | **B3** | **C3** | **D3** | **E3** | **F3** | **G3** | **H3** | **I3** | **K3** | **L3** |
| CO 1 | Define Statistics | CK | MK | K | DIS,L&PPT | Log book | S | II | - | LH |
| CO 1 | Explain Objectives of Medical Statistics | CAP | MK | K | L&GD, L&PPT | Log book | S | II | - | LH |
| CO 1,CO 4 | Differentiate between Descriptive and Inferential Statistics | CAP | MK | K | L&GD, PBL,TBL | Log book | S | II | - | LH |
| CO 1,CO 4 | Explain Scope and Relevance of Medical Statistics in Ayurveda | CC | MK | K | L&GD, BS,L&PPT ,TBL | Log book | S | II | - | LH |
| CO 1,CO 4 | Differentiate between Descriptive and Inferential Statistics | CAP | MK | KH | FC,L&PPT | Log book | S | II | - | NLHT11.1 |
| CO 1 | Explain Evidence Based Medicine | CK | DK | K | FC,IBL, L&PPT | PRN,INT | S | II | - | LH |
| CO 1 | Describe Integrative Medicine | CK | DK | K | FC,DIS, L&PPT | PRN | S | II | - | LH |
| **Non Lecture Hour Theory** | | | | | | | | | | |
| **S.No** | **Name of Activity** | **Description of Theory Activity** | | | | | | | | |

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|---|---|---|
| NLHT 11.1 | Differentiating descriptive and inferential statistics | Demonstration by teacher: Using a simple data set the teacher demonstrates and clarifies the concepts of descriptive and inferential statistics.<br>Hands-on training: The students are grouped into three or four or more, with a maximum of 20 students in each group. Then, they are asked to collect basic information regarding each student in their respective groups, like name, native place, height, and weight, and record the details in writing. The teacher helps the students to summarize the data using descriptive statistics and infer from the collected information. The students are to present their findings in the class.<br>Conclusion and summarization: The teacher then discusses the key aspects and provides inputs for further application of the concepts. |
| **Non Lecture Hour Practical** | | |
| **S.No** | **Name of Practical** | **Description of Practical Activity** |

**Topic 12 Data (LH :1 NLHT: 2 NLHP: 0)**

| A3 | B3 | C3 | D3 | E3 | F3 | G3 | H3 | I3 | K3 | L3 |
|---|---|---|---|---|---|---|---|---|---|---|
| CO 1 | Define Data | CK | MK | K | PBL,DIS,L&PPT | Log book | S | II | - | LH |
| CO 1,CO 4 | Describe and classify different types of Data [Quantitative, Qualitative (categorical), Discrete and Continuous | CAP | MK | K | TBL,L&PPT,DIS,FC | Log book | S | II | - | LH |
| CO 1,CO 4 | Define and classify different types of Scales: Ordinal, Nominal, Interval, Ratio | CAP | MK | K | PBL,L&PPT,DIS,IBL | Log book | S | II | - | LH |
| CO 1,CO | Demonstrate types and sets of Data | PSY-GUD | MK | SH | L&PPT,PBL,T | Log book | S | II | - | NLHT12.1 |

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**Non Lecture Hour Theory**

| S.No | Name of Activity | Description of Theory Activity |
|---|---|---|
| NLHT 12.1 | Data types and scales | Demonstration by teacher: Using a simple data set, the teacher demonstrates various data types and scales.<br>Hands-on training: The students are grouped into three or four groups, with a maximum of 20 students in each group. The teacher then presents a data set that contains different types of data. The students are then allowed to discuss and determine the correct data types and scales for the given data. The activity is repeated with two, three, or more data sets.<br>Conclusion and summarization: The teacher then discusses the key aspects of data classification and measuring scales. |

**Non Lecture Hour Practical**

| S.No | Name of Practical | Description of Practical Activity |
|---|---|---|

**Topic 13 Basic statistical terms (LH :1 NLHT: 1 NLHP: 0)**

| A3 | B3 | C3 | D3 | E3 | F3 | G3 | H3 | I3 | K3 | L3 |
|---|---|---|---|---|---|---|---|---|---|---|
| CO 1 | Define Population with examples | CC | MK | K | L&PPT ,BS | Log book | S | II | - | LH |
| CO 1,CO 4 | Define Sample and basic understanding of Sampling and sampling methods. Differentiate between Population and sample | CAP | MK | K | DIS,L& PPT ,T BL,PBL | Log book | S | II | - | LH |
| CO 1,CO 4 | Define Variable and differentiate various types of variables | CAP | MK | K | TBL,IB L,L&PP T | Log book | S | II | - | LH |
| CO | Define Attributes and differentiate various types of attributes | CAP | MK | K | TBL,L | Log book | S | II | - | LH |

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|---|---|---|---|---|---|---|---|---|---|---|
| 1,CO 4 | | | | | &PPT ,PBL | | | | | |
| CO 1,CO 4 | Demonstrate Basic Statistical terms. | PSY-GUD | MK | SH | L&PPT ,D,TBL, DIS,PBL | Log book | S | II | - | NLHT13.1 |

**Non Lecture Hour Theory**

| S.No | Name of Activity | Description of Theory Activity |
|---|---|---|
| NLHT 13.1 | Statistical terms | Demonstration by teacher: Using scientific articles the teacher identifies the population, sample, variables and attributes appearing in the study.<br>Hands-on training: The students are grouped into three or four groups, with a maximum of 20 students in each group. The teacher gives two or three scientific articles to each group. The students in the groups discuss, identify, and record the population, sample, variables, and attributes appearing in each article and present the findings in class.<br>Conclusion and summarization: The teacher then concludes and summarizes key aspects and provides additional inputs for improvisation. |

**Non Lecture Hour Practical**

| S.No | Name of Practical | Description of Practical Activity |
|---|---|---|

**Topic 14 Collection and Presentation of Data (LH :2 NLHT: 4 NLHP: 0)**

| A3 | B3 | C3 | D3 | E3 | F3 | G3 | H3 | I3 | K3 | L3 |
|---|---|---|---|---|---|---|---|---|---|---|
| CO 1,CO 4 | Differentiate types of Data [Primary, Secondary] and understand basic data collection methods. | CAP | MK | K | TBL,PSM,FC,PBL | Log book | S | II | - | LH |
| CO | Demonstrate different types of Presentation of data (Textual, | PSY- | MK | SH | L&PPT | Log book | S | II | - | LH |

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|---|---|---|---|---|---|---|---|---|---|---|
| 1,CO 4 | Tabular and Graphical) | MEC | | | ,PSM,TBL,PBL,D | | | | | |
| CO 1,CO 4 | Demonstrate Collection and Presentation of Data. | PSY-MEC | MK | SH | L&PPT,PBL,TBL,D | Log book | S | II | - | NLHT14.1 |
| CO 1,CO 4 | Demonstrate Collection and Presentation of Data. | PSY-MEC | MK | SH | PBL,D,TBL,PSM,L&PPT | Log book | S | II | - | NLHT14.2 |

**Non Lecture Hour Theory**

| S.No | Name of Activity | Description of Theory Activity |
|---|---|---|
| NLHT 14.1 | Data collection | Demonstration by teacher: The teacher elaborates on practical aspects of data collection methods using various patient scenarios.<br>Hands-on training: The students are grouped into three or four groups, with a maximum of 20 students in each group. Each group collects basic demographic, anthropometric, and clinical data of a minimum of 20 patients using specific data collection methods and records the data with the teacher's help within the allocated time.<br>Conclusion and summarization: The teacher then concludes and summarizes the key aspects of data collection and their applicability in different scenarios. |
| NLHT 14.2 | Data presentation | Demonstration by teacher: The teacher demonstrates various methods of data presentation, highlighting the key components.<br>Hands-on training: The student groups summarize the data collected from activity 4.1 into tables and then to appropriate graphs. Each group then present the data to the class.<br>Conclusion and summarization: The teacher then concludes and summarizes the key aspects of data presentation and important aspects to be considered while presenting the data. |

| Non Lecture Hour Practical | | | | | | | | | | |
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| **S.No** | **Name of Practical** | **Description of Practical Activity** | | | | | | | | |
| **Topic 15 Measures of Central Tendency (LH :1 NLHT: 2 NLHP: 0)** | | | | | | | | | | |
| **A3** | **B3** | **C3** | **D3** | **E3** | **F3** | **G3** | **H3** | **I3** | **K3** | **L3** |
| CO 1,CO 4 | Define Measures of Central Tendency and Arithmetic Mean. | CC | MK | KH | TBL,L &PPT , PBL,FC ,PSM | Log book | S | II | - | LH |
| CO 1,CO 4 | Define Mean | CC | MK | KH | DIS,PB L,L&PP T | Log book | S | II | - | LH |
| CO 1,CO 4 | Define Median | CC | MK | KH | L&PPT ,PSM,P BL | Log book | S | II | - | LH |
| CO 1,CO 4 | Define Mode | CC | MK | KH | L&PPT ,PBL,PS M | Log book | S | II | - | LH |
| CO 1,CO 4 | Explain the Qualities of Good measure of tendency | CC | MK | KH | L&GD, L&PPT ,TBL | Log book | S | II | - | LH |
| CO 1,CO 4 | Calculate Measures of Central Tendency. | PSY-GUD | MK | SH | L&PPT ,DIS,PS M,TBL, PBL | Log book | S | II | - | NLHT15.1 |
| **Non Lecture Hour Theory** | | | | | | | | | | |

| S.No | Name of Activity | Description of Theory Activity |
|---|---|---|
| NLHT 15.1 | Calculating measures of central tendency | Demonstration by teacher: Using specific data sets the teacher demonstrates how to calculate mean, median and mode from the given data.<br>Hands-on training: The students are given three or four data sets to calculate different measures of central tendency from the data. Conclusion and summarization: The teacher discusses the importance and applicability of various measures of central tendency and describes a good measure of central tendency. |

**Non Lecture Hour Practical**

| S.No | Name of Practical | Description of Practical Activity |
|---|---|---|

**Topic 16 Measures of Deviation/Dispersion/Variability (LH :1 NLHT: 4 NLHP: 0)**

| A3 | B3 | C3 | D3 | E3 | F3 | G3 | H3 | I3 | K3 | L3 |
|---|---|---|---|---|---|---|---|---|---|---|
| CO 1,CO 4 | Define Measures of Deviation/ Dispersion / Variability and Range. | CC | MK | KH | TBL,L &PPT , PSM,DI S,PBL | Log book | S | II | - | LH |
| CO 1,CO 4 | Define Quartile deviation. | CC | MK | KH | L&PPT ,DIS,TB L,PBL, PSM | Log book | S | II | - | LH |
| CO 1,CO 4 | Define Mean deviation. | CC | MK | KH | DIS,PB L,TBL, PSM,L &PPT | Log book | S | II | - | LH |
| CO 1,CO | Define Standard deviation. | CC | MK | KH | PBL,DI S,L&PP | Log book | S | II | - | LH |

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| 4 | | | | | T ,TBL, PSM | | | | | |
| CO 1,CO 4 | Define Variance and Co-efficient of Variation. | CC | MK | KH | TBL,L &PPT , DIS,PB L | Log book | S | II | - | LH |
| CO 1,CO 4 | Define Standard Error | CC | NK | KH | PBL,L& PPT ,PS M,TBL | Log book | S | II | - | LH |
| CO 1,CO 4 | Explain the Qualities of Good measure of variability | CC | MK | KH | TBL,L &PPT , PSM,PB L,DIS | Log book | S | II | - | LH |
| CO 1,CO 4 | Calculate Measures of Deviation / Dispersion / Variability. | PSY-GUD | MK | SH | D,TBL, L&PPT ,BS,PB L | Log book | S | II | - | NLHT16.1 |
| CO 1,CO 4 | Calculate Measures of Deviation / Dispersion / Variability. | PSY-GUD | MK | SH | L&PPT ,D,PSM, PBL,TB L | Log book | S | II | - | NLHT16.2 |

**Non Lecture Hour Theory**

| S.No | Name of Activity | Description of Theory Activity |
|---|---|---|
| NLHT 16.1 | Calculating measures of central tendency - 01 | Demonstration by teacher: Using specific data sets the teacher demonstrates how to calculate range, mean deviation and standard deviation from the given data.<br>Hands-on training: The students are given three or four data sets to calculate the Range, Mean Deviation, and standard deviation from the data. Conclusion and summarization: The teacher discusses |

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| | | the data sets and explains the difference between range, mean deviation, and standard deviation. |
| NLHT 16.2 | Calculating measures of central tendency - 02 | Demonstration by teacher: Using the same data sets from activity 6.1 the teacher demonstrates how to calculate variance and coefficient variation from the given data.<br>Hands-on training: The students are then given three or four data sets to calculate variance and coefficient variation from the data. Conclusion and summarization: The teacher discusses the data sets and explains variance and coefficient of variation and their applicability. Further, the teacher elaborates on good measures of dispersion. |

**Non Lecture Hour Practical**

| S.No | Name of Practical | Description of Practical Activity |
|---|---|---|

**Topic 17 Probability (LH :1 NLHT: 3 NLHP: 0)**

| A3 | B3 | C3 | D3 | E3 | F3 | G3 | H3 | I3 | K3 | L3 |
|---|---|---|---|---|---|---|---|---|---|---|
| CO 1 | Explain Probability | CC | MK | K | D-M,PL ,L&PPT ,IBL | Log book | S | II | - | LH |
| CO 1,CO 4 | Define Normal Distribution Curve and understand its variations | CC | MK | KH | PL,L&P PT ,DIS ,BS,ML | Log book | S | II | - | LH |
| CO 1,CO 4 | Calculate Probability and Normal Distribution. | PSY-GUD | MK | SH | DIS,D,L &PPT ,I BL,PBL | Log book | S | II | - | NLHT17.1 |

**Non Lecture Hour Theory**

| S.No | Name of Activity | Description of Theory Activity |
|---|---|---|
| NLHT 17.1 | Normal distribution and probability | Demonstration by teacher: The teacher demonstrates the normal distribution curve and its variations, |

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| | | like skewness and kurtosis, using different data. The teacher also demonstrates probability based on the normal distribution.<br>Hands on training: The students are given tabulated data to develop normal distribution curves. Then, they conduct probability predictions from the curve.<br>Conclusion and summarization: The teacher discusses the findings and clarifies doubts. |

**Non Lecture Hour Practical**

| S.No | Name of Practical | Description of Practical Activity |
|---|---|---|

**Topic 18 Hypothesis and Test of Significance (LH :1 NLHT: 3 NLHP: 0)**

| A3 | B3 | C3 | D3 | E3 | F3 | G3 | H3 | I3 | K3 | L3 |
|---|---|---|---|---|---|---|---|---|---|---|
| CO 1,CO 4 | Explain Hypothesis | CC | MK | K | L&PPT ,DIS | Log book | S | II | - | LH |
| CO 1,CO 4 | Explain Test of significance | CC | MK | KH | BS,DIS, L&GD | Log book | S | II | - | LH |
| CO 1,CO 4 | Discuss Hypothesis and Test of Significance. | CAP | MK | SH | L&PPT ,PSM,TBL,PBL ,D | Log book | S | II | - | NLHT18.1 |
| CO 1,CO 4 | Discuss Hypothesis and Test of Significance. | CAP | MK | SH | D,L&PPT ,TBL, DIS | Log book | S | II | - | NLHT18.2 |

**Non Lecture Hour Theory**

| S.No | Name of Activity | Description of Theory Activity |
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| NLHT 18.1 | Hypothesis | Demonstration by teacher: The teacher demonstrates systematic development of a hypothesis from a research problem.<br>Hands-on training: The students are grouped into three or four groups, with a maximum of 20 students in each group. Each group develop hypotheses from three or four given research problems. Then, they present the hypotheses in class.<br>Conclusion and summarization: The teacher discusses various hypotheses developed by the groups and summarizes the critical aspects. |
| NLHT 18.2 | Testing of significance | Demonstration by teacher: The teacher demonstrates the steps involved in testing a hypothesis using data from different scientific articles.<br>Hands-on training: The students' groups are then given three or four articles to identify and record the steps of hypothesis testing in them. Then, they will present the data in class.<br>Conclusion and summarization: The teacher concludes with significant points regarding the testing of the hypothesis. |

**Non Lecture Hour Practical**

| S.No | Name of Practical | Description of Practical Activity |
|---|---|---|

**Topic 19 Parametric and non-parametric tests (LH :1 NLHT: 2 NLHP: 0)**

| A3 | B3 | C3 | D3 | E3 | F3 | G3 | H3 | I3 | K3 | L3 |
|---|---|---|---|---|---|---|---|---|---|---|
| CO 1,CO 4 | Explain and differentiate Parametric and Non-parametric tests with examples | CC | MK | KH | L&GD, L&PPT ,BS | Log book | S | II | - | LH |
| CO 1,CO 4 | Discuss Parametric and Non-parametric tests | CAP | MK | KH | D,PBL, L&PPT ,DIS | Log book | S | II | - | NLHT19.1 |

**Non Lecture Hour Theory**

| S.No | Name of Activity | Description of Theory Activity |
|---|---|---|
| NLHT 19.1 | Understanding Parametric and Non-parametric tests | Demonstration by teacher: The teacher demonstrates the difference between parametric and nonparametric tests and introduces various parametric and nonparametric tests.<br>Hands-on training: The teacher provides three or four scientific articles to the students in groups. The students discuss and understand the application of parametric or nonparametric tests, and they record their findings.<br>Conclusion and summarization: The teacher concludes with major points regarding the applicability of parametric and nonparametric tests. |

**Non Lecture Hour Practical**

| S.No | Name of Practical | Description of Practical Activity |
|---|---|---|

**Topic 20 Concept of Co-relation and Regression (LH :1 NLHT: 1 NLHP: 0)**

| A3 | B3 | C3 | D3 | E3 | F3 | G3 | H3 | I3 | K3 | L3 |
|---|---|---|---|---|---|---|---|---|---|---|
| CO 1,CO 4 | Explain Correlation and Regression | CC | MK | KH | L&PPT ,D,PBL | Log book | S | II | - | LH |
| CO 1,CO 4 | Correlation and regression | CC | DK | KH | TBL,L &PPT ,D | Log book | S | II | - | NLHT20.1 |

**Non Lecture Hour Theory**

| S.No | Name of Activity | Description of Theory Activity |
|---|---|---|
| NLHT 20.1 | Undersanding correlation and regression | Demonstration by teacher: The teacher demonstrates various features of correlation and regression using data from scientific literature.<br>Hands-on training: Students are given three data sets that utilize correlation and regression, and they understand various scenarios for their application. |

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| | | Conclusion and summarization: The teacher concludes with major points regarding correlation and regression and their applicability. |

| **Non Lecture Hour Practical** | | |
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| **S.No** | **Name of Practical** | **Description of Practical Activity** |

**Topic 21 Commonly used Statistically software (LH :0 NLHT: 2 NLHP: 0)**

| A3 | B3 | C3 | D3 | E3 | F3 | G3 | H3 | I3 | K3 | L3 |
|---|---|---|---|---|---|---|---|---|---|---|
| CO 1,CO 4 | Demonstrate different Software used for Statistical Analysis | CC | NK | KH | D,DIS,TUT,L&PPT | Log book | S | II | - | NLHT21.1 |

| **Non Lecture Hour Theory** | | |
|---|---|---|
| **S.No** | **Name of Activity** | **Description of Theory Activity** |
| NLHT 21.1 | Statistical software | Demonstration by teacher: The teacher introduces various statistical software and its features and demonstrates any of them by performing some simple statistical tests.<br>Hands-on training: Students are allowed to review various statistical software, understand its features, and prepare a note.<br>Conclusion and summarization: The teacher concludes with major points regarding statistical software and their applicability. |

| **Non Lecture Hour Practical** | | |
|---|---|---|
| **S.No** | **Name of Practical** | **Description of Practical Activity** |

**Table 4 : NLHT Activity**

(*Refer table 3 of similar activity number)

| Activity No* | CO No | Activity details |
|---|---|---|
| 2.1 | CO 1,CO 5 | Historical developments in research |
| 3.1 | CO 1,CO 2 | Different Research types Part I |
| 3.2 | CO 1,CO 2 | Research Types Part II |
| 4.1 | CO 5 | Ethics Committe Functioning |
| 5.1 | CO 1,CO 2 | Literary research |
| 5.2 | CO 1,CO 2 | Research designs |
| 5.3 | CO 1,CO 2 | Randomized clinical trial and terminologies related to it |
| 5.4 | CO 1,CO 2 | Preclinical methods in research |
| 6.1 | CO 1,CO 2,CO 5 | Research process: Research question and Hypothesis |
| 6.2 | CO 1,CO 2 | Research process: Materials and Methodology |
| 7.1 | CO 3 | Demonstrate use of Research portals, database and Artificial intelligence in ayurveda |
| 8.1 | CO 3 | Different Guidelines to report research |
| 10.1 | CO 5 | Research Critiquing |
| 11.1 | CO 1,CO 4 | Differentiating descriptive and inferential statistics |
| 12.1 | CO 1,CO 4 | Data types and scales |
| 13.1 | CO 1,CO 4 | Statistical terms |
| 14.1 | CO 1,CO 4 | Data presentation |

| | | |
|---|---|---|
| 14.2 | CO 1,CO 4 | Data collection |
| 15.1 | CO 1,CO 4 | Calculating measures of central tendency |
| 16.1 | CO 1,CO 4 | Calculating measures of central tendency - 01 |
| 16.2 | CO 1,CO 4 | Calculating measures of central tendency - 02 |
| 17.1 | CO 1,CO 4 | Normal distribution and probability |
| 18.1 | CO 1,CO 4 | Hypothesis |
| 18.2 | CO 1,CO 4 | Testing of significance |
| 19.1 | CO 1,CO 4 | Understanding Parametric and Non-parametric tests |
| 20.1 | CO 1,CO 4 | Undersanding correlation and regression |
| 21.1 | CO 1,CO 4 | Statistical software |

**Table 5 : List of Practicals**

**Not Applicable**

**Table 6 : Assessment Summary: Assessment is subdivided in A to H points**

### 6 A : Number of Papers and Marks Distribution

| Subject Code | Papers | Theory | Practical/Clinical Assessment (-) | | | | | Grand Total |
|---|---|---|---|---|---|---|---|---|
| | | | Practical | Viva | Elective | IA | Sub Total | |
| AyUG-RM | 1 | 50 | - | - | - | - | - | 50 |

### 6 B : Scheme of Assessment (Formative and Summative)

| PROFESSIONAL COURSE | FORMATIVE ASSESSMENT | | | SUMMATIVE ASSESSMENT |
|---|---|---|---|---|
| | First Term (1-6 Months) | Second Term (7-12 Months) | Third Term (13-18 Months) | |
| Third | NA | NA | NA | **UE**** |

**PA:** Periodical Assessment; **TT:** Term Test; **UE:** University Examinations; **NA:** Not Applicable.
****University Examination shall be on entire syllabus

### 6 C : Calculation Method for Internal assessment Marks

Not applicable

## 6 D : Evaluation Methods for Periodical Assessment

| S. No. | Evaluation Methods |
|---|---|
| 1. | Practical / Clinical Performance |
| 2. | Viva Voce, MCQs, MEQ (Modified Essay Questions/Structured Questions) |
| 3. | Open Book Test (Problem Based) |
| 4. | Summary Writing (Research Papers/ Samhitas) |
| 5. | Class Presentations; Work Book Maintenance |
| 6. | Problem Based Assignment |
| 7. | Objective Structured Clinical Examination (OSCE), Objective Structured Practical Examination (OPSE), Mini Clinical Evaluation Exercise (Mini-CEX), Direct Observation of Procedures (DOP), Case Based Discussion (CBD) |
| 8. | Extra-curricular Activities, (Social Work, Public Awareness, Surveillance Activities, Sports or Other Activities which may be decided by the department). |
| 9. | Small Project |
| 10. | Activities Indicated in Table 3 - Column G3 as per Indicated I, II or III term in column I3. |

**6 E : Question Paper Pattern**

**III PROFESSIONAL BAMS EXAMINATIONS**
**AyUG-RM**
**PAPER-I**
Time: 1.5 Hours Maximum Marks: 50
INSTRUCTIONS: All questions compulsory

| | | **Number of Questions** | **Marks per question** | **Total Marks** |
|---|---|---|---|---|
| Q 1 | MULTIPLE CHOICE QUESTIONS (MCQ) | 10 | 1 | 10 |
| Q 2 | SHORT ANSWER QUESTIONS (SAQ) | 4 | 5 | 20 |
| Q 3 | LONG ANSWER QUESTIONS (LAQ) | 2 | 10 | 20 |
| | | | | 50 |

**6 F : Distribution of theory examination**

| **Paper 1** (RM-MS) | | | | | |
|---|---|---|---|---|---|
| **Sr. No** | **A List of Topics** | **B Marks** | **MCQ** | **SAQ** | **LAQ** |
| 1 | **Introduction to Research** | 30 | No | Yes | No |
| 2 | **Historical developments in research** | | No | Yes | No |
| 3 | **Research Types** | | Yes | Yes | Yes |
| 4 | **Research Ethics** | | Yes | Yes | No |
| 5 | **Research Designs and terminologies** | | Yes | No | Yes |
| 6 | **Research process** | | Yes | No | Yes |
| 7 | **Different Database, portals and Artificial Intelligence.** | | Yes | Yes | No |
| 8 | **Different Guidelines to report research** | | Yes | Yes | No |
| 9 | **Intellectual Property Right (IPR)/Patent/ TKDL** | | Yes | No | No |
| 10 | **Research Critiquing** | | Yes | No | No |
| 11 | **Introduction to Medical statistics** | 20 | Yes | No | No |
| 12 | **Data** | | Yes | No | No |
| 13 | **Basic statistical terms** | | Yes | No | No |
| 14 | **Collection and Presentation of Data** | | Yes | Yes | Yes |
| 15 | **Measures of Central Tendency** | | No | No | Yes |
| 16 | **Measures of Deviation/Dispersion/Variability** | | No | No | Yes |
| 17 | **Probability** | | No | Yes | No |
| 18 | **Hypothesis and Test of Significance** | | Yes | No | No |
| 19 | **Parametric and non-parametric tests** | | Yes | Yes | No |
| 20 | **Concept of Co-relation and Regression** | | Yes | No | No |
| 21 | **Commonly used Statistically software** | | Yes | No | No |
| **Total Marks** | | **50** | | | |

## 6 G : Instructions for UG Paper Setting & Blue print

1. All questions shall be compulsory.
2. Questions shall be drawn based on Table 6F, which provides the topic name, types of questions (MCQ(Multiple Choice Question), SAQ(Short Answer Question), LAQ(Long Answer Question)).
3. The marks assigned in Table 6F for each topic/group of topics shall be considered as the maximum allowable marks for that topic/group of topics.
4. Ensure that the total marks allocated per topic/group of topics do not exceed the limits specified in Table 6F.
5. Refer to Table 6F before setting the questions. Questions shall be framed only from topics where the type is marked as “YES”, and avoided if marked as “NO”.
6. Each 50-mark question paper of AyUG-RM shall contain:
   - 10 MCQs (5 Research Methodology + 5 Statistics)
   - 4 SAQs (3 Research Methodology + 1 Statistics)
   - 2 LAQs (1 Research Methodology + 1 Statistics)
7. MCQs:
   - Majority shall be drawn from the Must to Know part of the syllabus.
   - Questions from the Desirable to Know part of syllabus shall not exceed 2 for AyUG-RM.
   - Questions from the Nice to Know part of syllabus shall not exceed 1 for AyUG-RM.
8. SAQs:
   - Majority shall be drawn from the Must to Know part of the syllabus.
   - Questions from the Desirable to Know part of syllabus shall not exceed 1.
   - No questions shall be drawn from the Nice to Know part of syllabus.
   - SAQs shall assess understanding, application, and analysis, rather than simple recall.
9. LAQs:
   - All LAQs shall be drawn exclusively from the Must to Know part of the syllabus.
   - No questions shall be taken from the Desirable to Know or Nice to Know part of the syllabus.
10. Long Answer Questions shall be structured to assess higher cognitive abilities, such as application, analysis, and synthesis.
11. Follow the guidelines in User Manual III for framing MCQs, SAQs, and LAQs.

## 6 H : Distribution of Practical Exam

**Not Applicable**

**References Books/ Resources**

| S.No | Resources |
|---|---|
| 1 | Gupta S P. Statictical methods. 46 th. Sultan Chand and sons; 2021 |
| 2 | Itrat M, Khan TN, Radhika K. Research methodology and biostatistics. 2023. |
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| 7 | Rao TB. Methods of biostatistics. 2nd ed. Hyderabad: Paras Medical Publisher; 2004. |
| 8 | Aslam M, Singh S. Research methodology & biostatistics in pharmacology. 1st ed. New Delhi: Academa Publishers; 2006. |
| 9 | Naseema C, Jibin VK. Research methodology in education and application of statistics. Delhi: Shipra Publications; 2011. |
| 10 | Chawla D, Sondhi N. Research methodology: concepts and cases. New Delhi: Vikas Publishing House; 2011. |
| 11 | Kothari CR. Research Methodology: Methods and Techniques. 2nd ed. Daryaganj: New Age International; 2004. 1 p. |
| 12 | Reporting guidelines \| EQUATOR Network |
| 13 | AYUSH RESEARCH PORTAL |
| 14 | Official website of Intellectual Property India |

## Syllabus Committee

| | |
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| 3. | Dr. Shivashankar Rangaswamy, Head of Department, Department of Hygiene and Research Methodology, |
| 4. | Dr. R.Jeeva Gladys, Reader, Department of Sool Manglair Maruthuvam,Velumayilu Siddha Medical College,Kancheepuram, Tamil Nadu-05 |
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| 18. | Dr Kartar Singh Dhiman, Vice Chancellor, Shri Krishna Ayush University, Umri Road, Sector 8, Kurukshetra, Haryana |
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| 20. | Prof. Rabinarayan Acharya, Director General, Central Council for Research in Ayurvedic Sciences (CCRAS), New Delhi 58 |
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| **Curriculum Expert** | |
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| HSET Training committee | |
| Master Trainer- Dr Mohan R. Joshi, Associate Dean, Professor, Samhita Siddhant and Sanskrit Dept. All India Institute of Ayurveda, Goa. | |
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| 2. | Dr. Priya Vishal Naik Assistant professor Dept of Sanskrit Samhita Siddhant, R A Podar medical College Worli Mumbai, Maharashtra |
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| 8. | Dr. Pradeep S. Shindhe, Professor and HoD department of Shalyatantra, KAHER S Sri BMK Ayurveda Mahavidyalaya, Shahapur, Belagavi |
| 9. | Dr. Renu Bharat Rathi, Professor , Head, Kaymarbhritya Dept., Mahatma Gandhi Ayurved College Hospital and Research centre, Salod, Wardha, Maharashtra |
| 10. | Dr. Priti Desai, Professor, Dept of Rachana Sharir, Sardar Patel Ayurved Medical College & Hospital, Balaghat (MP) |
| 11. | Dr. Manpreeth Mali Patil, Assistant professor, Department of Kaumarabhritya, Poornima Ayurvedic Medical College hospital and research centre, Raichur, Karnataka |
| 12. | Dr. Puja CN Pathak , Assistant Professor, Department of Kaumarabhritya, Shri Ramchandra Vaidya Ayurvedic Medical College and Hospital, Lucknow, Uttar Pradesh |
| 13. | Dr. Nilakshi Shekhar Pradhan, Professor & HOD Shalakya, SSAM, Hadapsar Pune, Maharashtra |
| 14. | Dr. Vaishali Pavan Mali, Assistant Professor, Department of Samhita –Siddhant, Ch. Brahm Prakash Ayurved Charak Sansthan, New Delhi |
| 15. | Dr Maya V. Gokhale, HOD, Professor Department of Panchakarma, SSAM, Hadapsar, Pune Maharashtra |
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| | |
|---|---|
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| | |
| **Subjects:** Rachana Sharira (PG), Kriya Sharira (PG), Ayurveda Biology (PG), DravyagunaVijnana (PG), Rasashastra & Bhaishajyakalpana (PG), Agada Tantra evam Vidhi Vaidyaka (PG), Roganidana – Vikriti Vijnana (PG), Swasthavritta (PG) | |
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| 2. | Member: - Dr. Anand Katti, Professor, Department of Ayurved Samhita & Siddhant, Government, Ayurvedic Medical College, Bangalore, Karnataka, |
| | |
| **Subjects:** Shalya Tantra (UG & PG), Shalakya Tantra (UG), Shalakya Tantra (PG )-Karna Naasa & Mukha, Shalakya Tantra (PG )-Netra, Streeroga & Prasuti Tantra (UG & PG), Samhita Adhyayana-III (UG), Samhita & Siddhanta (PG) | |
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| 3. | Member:- Dr. Aditaya Nath Tewari, Associate Professor, PG Department of RNVV, Ch Brahm Prakash Ayurved Charak Sansthan, New Delhi, |
| | |
| **Subjects:** Kayachikitsa (UG) including atyaika chikitsa, Kayachikitsa (PG) including atyaika chikitsa, Manasaroga (PG), Rasayana & Vajikarana (PG), Kaumarabhritya (UG & PG), Panchakarma (UG & PG) | |
| 1. | Co-ordinator Dr. Aziz Arbar, Professor, KAHER s Shri BM Kankanawadi Ayurveda Mahavidyalaya, Post Graduate Studies and Research Centre, Belagavi, Karnataka, |
| 2. | Member: Vd. Kiran Nimbalkar, Professor, Ayurved & Unani Tibbia College and Hospital, New Delhi, |
| 3. | Member: Dr. Shivanand Patil, Assistant Professor, Department of Agada Tantra, All India Institute of Ayurveda, Goa, |

## Abbreviations

| Domain | | T L Method | | Level | | Assessment | | Integration | |
|---|---|---|---|---|---|---|---|---|---|
| CK | Cognitive/Knowledge | L | Lecture | K | Know | T-CS | Theory case study | V-RS | V RS |
| CC | Cognitive/Comprehension | L&PPT | Lecture with PowerPoint presentation | KH | Knows how | T-OBT | Theory open book test | V-KS | V KS |
| CAP | Cognitive/Application | L&GD | Lecture & Group Discussion | SH | Shows how | P-VIVA | Practical Viva | H-KC | H KC |
| CAN | Cognitive/Analysis | L_VC | Lecture with Video clips | D | Does | P-REC | Practical Recitation | H-SH | H SH |
| CS | Cognitive/Synthesis | REC | Recitation | | | P-EXAM | Practical exam | H-PK | H PK |
| CE | Cognitive/Evaluation | SY | Symposium | | | PRN | Presentation | H-SHL | H SHL |
| PSY-SET | Psychomotor/Set | TUT | Tutorial | | | P-PRF | Practical Performance | H-SP | H SP |
| PSY-GUD | Psychomotor/Guided response | DIS | Discussions | | | P-SUR | Practical Survey | H-KB | H-KB |
| PSY-MEC | Psychomotor/Mechanism | BS | Brainstorming | | | P-EN | Practical enact | H-Samhita | H-Samhita |
| PSY-ADT | Psychomotor Adaptation | IBL | Inquiry-Based Learning | | | P-RP | Practical Role play | V-DG | V DG |
| PSY-ORG | Psychomotor/Origination | PBL | Problem-Based Learning | | | P-MOD | Practical Model | V-RN | V RN |
| AFT-REC | Affective/ Receiving | CBL | Case-Based Learning | | | P-POS | Practical Poster | V-RS | V RS |
| AFT-RES | Affective/Responding | PrBL | Project-Based Learning | | | P-CASE | Practical Case taking | V-AT | V AT |
| AFT-VAL | Affective/Valuing | TBL | Team-Based Learning | | | P-ID | Practical identification | V-SW | V SW |
| AFT-SET | Affective/Organization | TPW | Team Project Work | | | P-PS | Practical Problem solving | | |
| AFT-CHR | Affective/ characterization | FC | Flipped Classroom | | | QZ | Quiz | | |
| PSY-PER | Psychomotor/perception | BL | Blended Learning | | | PUZ | Puzzles | | |
| PSY-COR | Psychomotor/ Complex Overt Response | EDU | Edutainment | | | CL-PR | Class Presentation | | |
| | | ML | Mobile Learning | | | DEB | Debate | | |
| | | ECE | Early Clinical Exposure | | | WP | Word puzzle | | |
| | | SIM | Simulation | | | O-QZ | Online quiz | | |
| | | RP | Role Plays | | | O-GAME | Online game-based assessment | | |
| | | SDL | Self-directed learning | | | M-MOD | Making of Model | | |
| | | PSM | Problem-Solving Method | | | M-CHT | Making of Charts | | |
| | | KL | Kinaesthetic Learning | | | M-POS | Making of Posters | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | W | Workshops | | | C-INT | Conducting interview | | |
| | | GBL | Game-Based Learning | | | INT | Interactions | | |
| | | LS | Library Session | | | CR-RED | Critical reading papers | | |
| | | PL | Peer Learning | | | CR-W | Creativity Writing | | |
| | | RLE | Real-Life Experience | | | C-VC | Clinical video cases | | |
| | | PER | Presentations | | | SP | Simulated patients | | |
| | | D-M | Demonstration on Model | | | PM | Patient management problems | | |
| | | PT | Practical | | | CHK | Checklists | | |
| | | X-Ray | X-ray Identification | | | Mini-CEX | Mini-CEX | | |
| | | CD | Case Diagnosis | | | DOPS | DOPS | | |
| | | LRI | Lab Report Interpretation | | | CWS | CWS | | |
| | | DA | Drug Analysis | | | RS | Rating scales | | |
| | | D | Demonstration | | | RK | Record keeping | | |
| | | D-BED | Demonstration Bedside | | | COM | Compilations | | |
| | | DL | Demonstration Lab | | | Portfolios | Portfolios | | |
| | | DG | Demonstration Garden | | | Log book | Log book | | |
| | | FV | Field Visit | | | TR | Trainers report | | |
| | | | | | | SA | Self-assessment | | |
| | | | | | | PA | Peer assessment | | |
| | | | | | | 360D | 360-degree evaluation | | |
| | | | | | | PP-Practical | Practical | | |
| | | | | | | VV-Viva | Viva | | |
| | | | | | | DOAP | Demonstration Observation Assistance Performance | | |
| | | | | | | SBA | Scenario Based Assessment | | |
| | | | | | | CBA | Case based Assessment | | |
| | | | | | | S-LAQ | Structured LAQ | | |
| | | | | | | OSCE | Observed Structured Clinical Examination | | |
| | | | | | | OSPE | Observed Structured Practical Examination | | |
| | | | | | | DOPS | Direct observation of procedural skills | | |