



**BHARATI VIDYAPEETH  
(DEEMED TO BE UNIVERSITY), PUNE**

**FACULTY OF AYURVED**

**MD- Dravyaguna Vigyan  
New Syllabus**



**BHARATI VIDYAPEETH**  
**(DEEMED TO BE UNIVERSITY) PUNE, INDIA.**

**FACULTY OF AYURVED**

**Pune- Satara Road, Pune-411043.**

**Dravyaguna Vigyan**

*Accredited with 'A+' Grade (2017) by NAAC.*

*'A' Grade University status by MHRD, Govt. of India*

*Accredited (2004) & Reaccredited (2011) with 'A' Grade by NAAC.*

**Post- Graduate (M.D./M.S./Diploma in Ayurved)**

**Syllabus/ Curriculum**

## Contents

<b>Sr No</b>	<b>Topic</b>	<b>Page No</b>
1	Preface	3
2	Aims and Objectives	4
3	Vision and Mission	5
4	Goals of Course (POs and COs)	6-9
5	Eligibility	10
6	Medium of instruction and Pattern of study	10
7	Duration of the Course Study	10
8	Attendance and Progress	11
9	Subjects taught, Number of lectures/ practical and demonstrations for various subjects [ MD/MS]	12
10	Nomenclature of post-graduate degree	13
11	Synopsis and Dissertation	14-15
12	Scheme of Examinations	16-17

## **Preface**

Ayurveda is accepted worldwide as one of the oldest traditional systems of medicine. The ancient insight in this traditional system of medicine is still not profoundly discovered. Ayurveda signifies as "the life-science " where ayur means "life" and veda means "science" in Sanskrit. Ayurveda is the upaveda i.e. "auxiliary knowledge of Atharvaveda in Vedic tradition with its prime origin from Atharva-Veda and a supplement of the Rig-Veda. Lord Dhanvantari is worshipped as the God of Ayurveda. The goal of this traditional medicine system is to prevent illness, disease cure and preserve life. Being originated in India Ayurveda extends its wings in various parts of the world. In ancient days Ayurveda was taught in Gurukula system, which is now evolved in to post graduate courses from Institutions.

The Indian Medical Council was set up in 1971 by the Indian government to establish maintenance of standards for undergraduate and postgraduate education. It establishes suitable qualifications in Indian medicine and recognizes various forms of traditional practice including Ayurveda.

Ayurvedic practitioners also work in rural areas, providing health care to the million people in India alone. They therefore represent a major force for primary health care, and their training and placement are important to the government of India. Being a scientific medicine, Ayurveda has both preventive and curative aspects. The preventive component emphasizes the need for a strict code of personal and social hygiene, the details of which depend upon individual, climatic, and environmental needs.

The Bachelor of Ayurvedic Medicine and Surgery, MD/MS in various discipline of

Ayurveda started with the intention to encourage integrated teaching and de-emphasize compartmentalization of disciplines so as to achieve horizontal and vertical integration in different phases which helps to support National Health Services.

Looking into the health services provided to the public, understanding the need of practitioners of Ayurvedic system of medicine, as per the guidelines of apex body National Council of Indian system of Medicine (formerly CCIM) and suggestions provided by the faculty of various Specialties, stake holders and strategy of University this governance is framed

based on following aims and objectives -

### **Aims and objectives-**

The aims of the post-graduate degree courses shall be to provide orientation of specialties and super-specialties of Ayurveda, and to produce experts and specialists who can be competent and efficient teachers, physicians, surgeons, gynaecologists and obstetricians (Stri Roga and Prasuti Tantragraha), pharmaceutical experts, researchers and profound scholars in various fields of specialization of Ayurveda.

## **Faculty of Ayurved, Bharati Vidyapeeth (Deemed to be University), Pune**

### **Vision-**

To be a world class university for social transformation through dynamic education

### **Mission-**

- To ensure the good health and longevity of mankind.
- To carve a niche for our college in the world of Ayurved education
- To provide
  - Borderless access to Ayurved education
  - Quality Ayurved education
- To promote
  - Quality research in diverse areas of health care system.
  - Extensive use of ICT for teaching, learning and governance.
  - To develop national and international networks with industry and other academic and research institutions.

## **Program Outcomes For Post Graduate Courses in Ayurved-**

- PG degree holder should be expert and specialist of his/ her branch who can be competent and efficient teacher, physician, surgeon, gynaecologist and obstetrician (Stri Roga and Prasuti Tantragya), pharmaceutical expert, researcher and profound scholar in various fields of specialization of Ayurved.
- Should be having knowledge of Concept of Good clinical practices in Ayurved and modern medicine

### **Course specific outcomes**

#### **M. S – Ayurved Dhanvantari in**

##### **1. PRASUTI TANTRA & STREEROGA [OBSTETRICS AND GYNECOLOGY]**

- To be able to manage normal and complicated Pre-natal, Intra partum and Post natal cases by integrative approach
- To be able to manage all types of gynecological disorders at every epoch of womanhood.
- To be able to perform all kinds of Ayurvedic procedures and surgical procedures related to Stree roga and Prasutitantra
- To have knowledge of medico legal aspects of obstetrics and gynecology.

#### **M. S – Ayurved Dhanvantari in**

##### **2. SHALAKYA TANTRA [NETRA, SHIRO, NASA, KARNA, KANTHA, MUKHA]**

- To be able to manage all cases of E.N.T. and ophthalmology by integrative approach.
- To be able to perform all kinds of Ayurvedic procedures and surgical procedures related to Shalakyatantra
- To have knowledge of medico legal aspects of Shalakyatantra

#### **M. S – Ayurved Dhanvantari in**

##### **3. SHALYA TANTRA [GENERAL SURGERY]**

- To be able to manage all surgical cases by integrative approach
- To be able to perform all kinds of Ayurvedic procedures and general surgical procedures
- To have adequate knowledge of Anushashtra – Ksharkarma and prayoga, Agnikarma [thermo therapy], Raktamokshan [bloodletting ] or Asthisandhi evam marma vigyan [ orthopedic] or Sangyahan [Anesthesiology] or Mootraroga [ Urology]
- To have knowledge of medico legal aspects of Shalyatantra

## **M.D.- Ayurved Vachaspati in**

### **1. AYURVED SAMHITA & SIDDHANT**

- to have profound knowledge of Charak Samhita, Sushrut Samhita & AshtangHridayam, Ayurvediya and Darshanika Siddhanta with commentaries
- to be able to interpret philosophical principles incorporated in Charak Samhita, Sushrut Samhita, Ashtanga Hridaya, Ashtang Samgraha.
- To able to understand Practical applicability of principles of samhita and a competent Ayurved physician
- Competency in fundamental research

## **M.D.- Ayurved Vachaspati in**

### **2. RACHANA SHAARIRA**

- Should have thorough knowledge and competency in Ayurved Sharira and Modern anatomy
- Having extensive knowledge and skill of dissecting human dead bodies and its demonstration.

## **M.D.- Ayurved Vachaspati in**

### **3. KRIYA SHARIR**

- Having profound knowledge of Ayurved Kriya Sharir: - - and Contribution of different Ayurveda Samhita in Kriya Sharir
- Ability to determine and demonstrate the Sharir – Manans Prakriti
- Should have knowledge of Modern Physiology and its applied aspects

## **M.D.- Ayurved Vachaspati in**

### **4. DRAVYAGUNA VIGYAN**

- Have a clear understanding of medicinal plants in context to Ayurved and modern Pharmacology and Pharmaceutics
- Have an accurate knowledge of identification, Authentication and standardization of raw and wet plant drugs.
- Ability of cultivation and plantation of medicinal plants
- Knowledge about Pharmacovigilance
- Ability to conduct the pre clinical and clinical trials of medicinal plants

## **M.D.- Ayurved Vachaspati in**

### **5. RASASHASTRA EVAM BHAISHJYA KALPNA**

- Have an accurate knowledge of identification, Authentication and standardization of minerals and metals along with plant drugs
- Possess detailed knowledge of manufacturing practices of various dosage forms of



Ayurved formulations as per GMP

- Ability to establish, run and manage pharmacy as per GMP and FDA guidelines
- Having knowledge of Drug and cosmetics related acts
- Ability to conduct the pre clinical and clinical trials on minerals and metals

**M.D.- Ayurved Vachaspati in**

### **6. AGADA TANTRA EVUM VIDHIVAIDYAKA**

- To be able to understand and interpret Ayurvedic and Contemporary Toxicology
- Having knowledge of Pharmacodynamics of different formulations used in Agadatantra and Clinical & Experimental toxicology
- Ability of Ayurvedic & Contemporary Management Of Poisoning
- Should have profound knowledge of Forensic Medicine and Medical Jurisprudence
- Ability to diagnose and manage substance abuse [ De- addiction]
- Have knowledge of Pharmacovigilance, community health problems due to poisons & pollution, Drug interactions & incompatibility etc.

**M.D.- Ayurved Vachaspati in**

### **7. SWASTHAVRITTA**

- Having knowledge of Concept of holistic health and Principles of dietetics according to Ayurveda
- Understanding the Concept of community health, prevention, Stages of intervention according to Ayurved Modern medicine
- Should have knowledge of Ayurved and Modern Concept of Epidemiology [Janapadodhwamsa]
- Possess knowledge of Therapeutic effect of Yogic practices and ability to demonstrate various yogasanas in various diseases
- Understanding the role of Ayurved for Immunization, Occupational Health, Geriatrics, Life Style disorders (Non Communicable diseases)

**M.D.- Ayurved Vachaspati in**

### **8. ROGA NIDANA**

- To understand the Concept and applied aspects of fundamental principles of Rognidan
- To have profound Knowledge of classical Samprapti of all diseases with interpretation of Nidana Panchaka including Upadrava, Arishta and Sadhyasadhyata and Chikitsa Sutra.
- Ability of Ayurvedic interpretation of commonly occurring diseases in contemporary medicine, all relevant findings of modern clinical examinations and various Laboratory and other Diagnostic reports

- Ability of establishment and management of standard clinical laboratory set up
- Have knowledge about Upasargajanya Vyadhi (Communicable diseases)

### **M.D.- Ayurved Vachaspati in**

#### **9. Panchakarma**

- To have thorough knowledge of Kayachikitsa, basic principles of Shodhana (BioPurification methods) and Raktamokshana, Physiotherapy & Disease-wise Panchakarma
- To be able to perform poorva, Pradhan & Pashchat karma of Panchakarma procedures [ five Purification therapies] of Ayurveda and manage its complications [ Updrava].
- To be able to prepare all the necessary bhaishjya kalpana for various panchakarma procedures

### **M.D.- Ayurved Vachaspati in**

#### **10. Kayachikitsa**

- To have thorough knowledge of Fundamentals of Kayachikitsa  
BVDUCOA\_ Programme outcomes Page 7
- To be able to perform Rogi-Roga Pariksha in Ayurved and Modern perspectives with the help of modern diagnostic parameters.
- To be able to perform samanya and vishesh roga chikitsa including application of advances in Rasayana and Vajikarana therapies and emerging trends in Panchakarma in various disease management
- To have knowledge of Critical care medicine, Management of medical emergencies, ICU services, Field medical services
- To be able to participate in National Health Programmes and recognize prospective role of Ayurveda services and therapeutics in them.

### **M.D.- Ayurved Vachaspati in**

#### **11. KAUMARBHRITYA-BALA ROGA**

- Ability to interpret Ayurvedic genetics with Pathogenesis of Modern genetics and management of genetic disorders
- To have thorough knowledge of Neonatal Care and management of all types of neonatal diseases
- To diagnose and manage the Paediatric Disorders
- Ability to develop and manage paediatric ward with Fundamentals of Hospital management

## **Eligibility**

Passing marks for eligibility in admission to ASU&H- PG courses should be as per the ASU&H- PG regulations and should be followed strictly., -

- A person possessing the degree of Ayurvedacharya (Bachelor of Ayurveda Medicine and Surgery) or provisional degree certificate recognized as per the provisions of IMCC 1970/NCISM 2020 act and possess permanent or provisional registration certificate issued by the CCIM/NCISM/state board and must have completed a satisfactorily one year compulsory rotating internship as per the NCISM notification.
- In order to be eligible for admission to post graduate courses it shall be necessary for a candidate to obtain minimum of marks at 50<sup>th</sup> percentile in the All India AYUSH Post Graduate Entrance Test ( AIAPGET) .
- Candidates belonging to the scheduled castes, Scheduled Tribes and other Backward Classes the minimum marks shall be at 40<sup>th</sup> percentile.

## **Medium of instruction**

The medium of instruction for the programme shall be Sanskrit or Hindi or English with use of Ayurvedic technical terms.

## **Duration of the Course Study**

**Total Duration of Course** – 3 Years from the Commencement of classes. The maximum duration for completion of the course shall not exceed beyond the period of six years from the date of admission to the course.

**Curriculum** - As approved by Bharati Vidyapeeth [Deemed to be University], Pune is in line with the directives of the Central Council for Indian Medicine.

## **Attendance and Progress**

The students shall have to attend a minimum of seventy-five per cent. of total lectures, practical's and clinical tutorials or classes to become eligible for appearing in the examination. A Web based centralized biometric attendance system shall be required for the attendance of post-graduate students and manual attendance at department level in which student is pursuing the post-graduate course.

The student shall have to attend the hospital and perform other duties as may be assigned to him during study. The student of clinical subject shall have to do resident duties in their respective departments and student of non-clinical subject shall have duties in their respective departments like Pharmacy or Herbal Garden or Laboratory during study. The student shall attend special lectures, demonstrations, seminars, study tours and such other activities as may be arranged by the teaching departments.

**Subjects taught, Number of lectures/ practical and demonstrations for various subjects [ MD/MS]**

❖ **Specialties in which post-graduate degree is allowed are as under: -**

Sr. No.	Name of speciality	Nearest terminology of modern subject	Department in which postgraduate degree can be conducted
<b>Pre-clinical speciality</b>			
1	Ayurveda Samhita evam Siddhant	Ayurveda Samhita and basic principles of Ayurveda	Samhita and basic principles of Ayurveda
2	Rachana Sharira	Anatomy	Rachana Sharira
3	Kriya Sharira	Physiology	Kriya Sharira
<b>Para-clinical speciality</b>			
4	Dravyaguna Vigyana	Materia Medica and Pharmacology	Dravyaguna
5	Rasa Shastra evam Bhaishajya Kalpana	Ayurveda Pharmaceuticals	Rasa Shastra evam Bhaishajya Kalpana
6	Roga Nidana evam Vikriti Vigyana	Diagnostic Procedure and Pathology	Roga Nidana evam Vikriti Vigyana
<b>Clinical speciality</b>			
7	Prasuti evam Stri Roga	Obstetrics and Gynecology	Prasuti evam Stri Roga
8	Kaumarabhritya –Bala Roga	Pediatrics	Kaumarabhritya– Bala Roga
9	Swasthavritta	Preventive Social Medicine	Swasthavritta and Yoga
10	Kayachikitsa	Medicine	Kayachikitsa
11	Shalya	Surgery	Shalya Tantra
12	Shalaky	Diseases of Eye, Ear, Nose, Throat Head, Neck, Oral and Dentistry	Shalaky Tantra
13	Panchakarma	Panchakarma	Panchakarma
14	Agada Tantra	Toxicology and Forensic Medicine	Agada Tantra.

❖ **Nomenclature of post-graduate degree. -**

The nomenclature of post-graduate degree in respective specialties shall be as under: -

Sl.No.	Nomenclature of specialty or degree	Abbreviation
<b>Pre-clinical specialty</b>		
1	Ayurveda Vachaspati – Ayurveda Samhita Evum Siddhant	M.D. (Ayurveda)- Compendium and Basic Principles
2	Ayurveda Vachaspati – Rachana Sharira	M.D. (Ayurveda) - Anatomy
3	Ayurveda Vachaspati – Kriya Sharira	M.D. (Ayurveda) - Physiology
<b>Para-clinical specialty</b>		
4	Ayurveda Vachaspati – Dravyaguna Vigyana	M.D. (Ayurveda) - Materia Medica and Pharmacology
5	Ayurveda Vachaspati – Rasa Shastra evam Bhaishajya Kalpana	M.D. (Ayurveda) - Pharmaceuticals
6	Ayurveda Vachaspati – Roga Nidana evam Vikriti Vigyana	M.D. (Ayurveda)- Diagnostic procedure and Pathology
<b>Clinical specialty</b>		
7	Ayurveda Dhanvantari – Prasuti evam Stri Roga	M.S. (Ayurveda)- Obstetrics and Gynecology
8	Ayurveda Vachaspati – Kaumarabhritya –Bala Roga	M.D. (Ayurveda)- Pediatrics
9	Ayurveda Vachaspati – Swasthavritta	M.D. (Ayurveda)- Social and Preventive Medicine
10	Ayurveda Vachaspati – Kayachikitsa	M.D. (Ayurveda)- Medicine
11	Ayurveda Dhanvantari – Shalya	M.S. (Ayurveda)- Surgery
12	Ayurveda Dhanvantari – Shalakyia	M.S. (Ayurveda)- Diseases of Eye, Ear, Nose, Throat Head, Neck, Oral and Dentistry
13	Ayurveda Vachaspati – Panchakarma	M.D. (Ayurveda)- Panchakarma
14	Ayurveda Vachaspati – Agada Tantra	M.D. (Ayurveda)- Toxicology and Forensic Medicine

## **Synopsis and Dissertation**

Central Scientific Advisory Post Graduate Committee appointed by Central Council of Indian Medicine shall suggest the areas of Research and topics and the same shall be followed by University Committee while approving the Dissertation title.

The title of the dissertation along with the synopsis, with approval of the Ethics Committee constituted by the institute shall be submitted to the University within a period of six months from the date of admission to the post-graduate course.

If the student fails to submit the title of dissertation and synopsis within specified period, his terms for final post-graduate course shall be extended for six months or more in accordance with the time of submission of the synopsis to the University.

- **Synopsis**

The synopsis of the proposed scheme of work shall indicate the expertise and action plan of work of the student relating to the proposed theme of work, the name of the department and the name and designation of the guide or supervisor and co-guide (if any).

The University shall approve the synopsis not later than three months after submission of the synopsis.

A Board of Research Studies shall be constituted by the University to approve the title.

The University shall display the approved synopsis of dissertation on their website.

- **Dissertation**

Once the title for dissertation is approved by the Board of Research Studies of the University, the student shall not be allowed to change the title of the proposed theme of work without permission of the University.

No student shall be allowed to submit the dissertation before six months of completion of course and the student shall continue his regular study in the institution after submission of dissertation to complete three years.

The dissertation shall consist of not less than forty thousand words.

The dissertation shall contain, at the end, a summary of not more than one thousand and five hundred words and the conclusion not exceeding one thousand words.

Five copies of the bound dissertation along with a certificate from the supervisor or guide shall reach the office of the Registrar of the University four months before the final examination.

The student shall be permitted to appear in the final examination of post-graduate degree course only after approval of the dissertation by the examiners.



## **Scheme of Examination**

The post-graduate degree course shall have two university examinations in the following manner, namely: -

1. The preliminary examination -
2. The final examination –

**1.The preliminary examination** – Conducted at the end of one academic year after admission.

**The subjects/ Number of Papers** for preliminary examination namely: -

**Paper I-** Research Methodology and Bio or Medical Statistics;

**Paper II-** Applied aspects regarding concerned subjects.

### **Rules-**

The student shall have to undergo training in the department concerned and shall maintain month-wise record of the work done during the last two years of study in the specialty opted by him as under:-

- (a) Study of literature related to specialty,
- (b) Regular clinical training in the hospital for student of clinical subject,
- (c) Practical training of research work carried out in the department, for student of pre-clinical and paraclinical subject,
- (d) Participation in various seminars, symposia and discussions; and (e) progress of the work done on the topic of dissertation.

The assessment of the work done by the students of first year post-graduate course during the first year will be done before the preliminary examination.

Examination shall ordinarily be held in the month of June or July and November or December every year. For being declared successful in the examination, student shall have to pass all the subjects separately in preliminary examination. The student shall be required to obtain a minimum of fifty per cent and marks in practical and theory subjects separately to be announced as a pass. If a student fails in the preliminary examination, he shall have to pass before appearing in the final examination.

**2. The final examination** -Conducted on completion of three academic years after the admission to postgraduate course.

The final examination shall include dissertation, written papers and clinical or practical and oral examination.

**Number of Papers** -There shall be four theory papers in each specialty and one practical or clinical and viva-voce examination in the concerned specialty or group of subspecialties selected by the student for special study.

The student shall publish or get accepted minimum one research paper on his research work in one journal and one paper presentation in regional level seminar.

The preliminary examination and final examination shall be held in written, practical, or clinical and oral examination. If the student fails in theory or practical in the final examination, he can appear in the subsequent examination without requiring submitting a fresh dissertation. The subsequent examination for failed candidates shall be conducted at every six-month interval; and the post-graduate degree shall be conferred after the dissertation is accepted and the student passes the final examination.

M.D./M.S.-AYURVEDA

PRELIMINARY PAPER-I  
RESEARCH METHODOLOGY AND MEDICAL STATISTICS

**PART-A**  
**RESEARCH METHODOLOGY**

- 1 Introduction to Research**
  - A. Definition of the term research
  - B. Definition of the term anusandhan
  - C. Need of research in the field of Ayurveda
  
- 2 General guidelines and steps in the research process**
  - A. Selection of the research problem
  - B. Literature review: different methods (including computer database) with their advantages and limitations
  - C. Defining research problem and formulation of hypothesis
  - D. Defining general and specific objectives
  - E. Research design: observational and interventional, descriptive and analytical, preclinical and clinical, qualitative and quantitative
  - F. Sample design
  - G. Collection of the data
  - H. Analysis of data.
  - I. Generalization and interpretation, evaluation and assessment of hypothesis.
  - J. Ethical aspects related to human and animal experimentation.
  - K. Information about Institutional Ethics Committee (IEC) and Animal Ethics Committee (AEC) and their functions. Procedure to obtain clearance from respective committees, including filling up of the consent forms and information sheets and publication ethics.
  
- 3 Preparation of research proposals in different disciplines for submission to funding agencies taking EMR-AYUSH scheme as a model.**
  
- 4. Scientific writing and publication skills.**
  - a. Familiarization with publication guidelines- Journal specific and CONSORT guidelines.
  - b. Different types of referencing and bibliography.
  - c. Thesis/Dissertation: contents and structure
  - d. Research articles structuring: Introduction, Methods, Results and Discussions (IMRAD)
  
- 5 Classical Methods of Research. Tadvidya sambhasha, vadmarga and tantrayukti**

Concept of Pratyakshadi Pramana Pariksha, their types and application for Research in Ayurveda.

Dravya-, Guna-, Karma-Parikshana Paddhati  
Aushadhi-yog Parikshana Paddhati  
Swastha, Atura Pariksha Paddhati  
Dashvidha Parikshya Bhava  
Tadvidya sambhasha, vadmarga and tantrayukti

**6 Comparison between methods of research in Ayurveda (Pratigya, Hetu, Udaharana, Upanaya, Nigaman) and contemporary methods in health sciences.**

**7. Different fields of Research in Ayurveda**

- a. Fundamental research on concepts of Ayurveda
- b. Panchamahabhuta and tridosha.
- c. Concepts of rasa, guna, virya, vipak, prabhav and karma
- d. Concept of prakriti-saradi bhava, ojas, srotas, agni, aam and koshta.

**8. Literary Research-**

Introduction to manuscriptology: Definition and scope. Collection, conservation, cataloguing.

Data mining techniques, searching methods for new literature; search of new concepts in the available literature. Methods for searching internal and external evidences about authors, concepts and development of particular body of knowledge.

**9. Drug Research (Laboratory-based)-** Basic knowledge of the following:

**Drug sources:** plant, animal and mineral. Methods of drug identification.

**Quality control and standardization aspects:** Basic knowledge of Pharmacopoeial standards and parameters set by Ayurvedic Pharmacopoeia of India.

Information on WHO guidelines for standardization of herbal preparations. Good Manufacturing Practices(GMP) and Good Laboratory Practices (GLP).

**10. Safety aspects:** Protocols for assessing acute, sub-acute and chronic toxicity studies. Familiarization with AYUSH guidelines (Rule 170), CDCSO and OECD guidelines.

**11. Introduction to latest Trends in Drug Discovery and Drug Development**

- Brief information on the traditional drug discovery process
- Brief information on the latest trends in the Drug Discovery process through employment of rational approach techniques; anti-sense approach, use of micro and macro-arrays, cell culture based assays, use of concepts of systems biology and network physiology
- Brief introduction to the process of Drug development

**12. Clinical research:**

Introduction to Clinical Research Methodology identifying the priority areas of Ayurveda

Basic knowledge of the following:-

- Observational and Interventional studies
- Descriptive & Analytical studies
- Longitudinal & Cross sectional studies
- Prospective & Retrospectives studies
- Cohort studies

Randomized Controlled Trials (RCT) & their types  
Single-case design, case control studies, ethnographic studies, black box design, cross-over design, factorial design.

Errors and bias in research.

New concepts in clinical trial- Adaptive clinical trials/ Good clinical practices (GCP)

Phases of Clinical studies: 0,1,2,3, and 4.

**Survey studies -**

Methodology, types, utility and analysis of Qualitative Research methods. Concepts of in-depth interview and Focus Group

Discussion.

13. Pharmacovigilance for ASU drugs. Need, scope and aims & objectives. National Pharmacovigilance Programme for ASU drugs.

14. Introduction to bioinformatics, scope of bioinformatics, role of computers in biology. Introduction to Database- Pub med, Medlar and Scopus. Accession of databases.

15. Intellectual Property Rights- Different aspect and steps in patenting. Information on Traditional Knowledge Digital Library (TKDL).

**PART-B**

**40 marks**

**MEDICAL STATISTICS**

**Teaching hours: 80**

1 **Definition of Statistics :** Concepts, relevance and general applications of Biostatistics in Ayurveda

Collection, classification, presentation, analysis and interpretation of data  
(Definition, utility and methods)

2 **Scales of Measurements** - nominal, ordinal, interval and ratio scales.

**Types of variables** – Continuous, discrete, dependent and independent variables.

**Type of series** – Simple, Continuous and Discrete

3 **Measures of Central tendency** – Mean, Median and Mode.

4 **Variability:** Types and measures of variability – Range, Quartile deviation, Percentile, Mean deviation and Standard deviation

5 **Probability:** Definitions, types and laws of probability,

6 **Normal distribution:** Concept and Properties, Sampling distribution, Standard Error, Confidence Interval and its application in interpretation of results and normal probability curve.

7 **Fundamentals of testing of hypotheses:**

Null and alternate hypotheses, type I and type 2 errors.

Tests of significance: Parametric and Non-Parametric tests, level of significance and power of the test, 'P' value and its interpretation, statistical significance and clinical significance

8 **Univariate analysis of categorical data:**

Confidence interval of incidence and prevalence, Odds ratio, relative risk and Risk difference, and their confidence intervals

9 **Parametric tests:**

'Z' test, Student's 't' test: paired and unpaired, 'F' test, Analysis of variance (ANOVA) test, repeated measures analysis of variance

10 **Non parametric methods:**

Chi-square test, Fisher's exact test, McNemar's test, Wilcoxon test, Mann-Whitney U test, Kruskal – Wallis with relevant post hoc tests (Dunn)

11 **Correlation and regression analysis:**

Concept, properties, computation and applications of correlation, Simple linear correlation, Karl Pearson's correlation co-efficient, Spearman's rank correlation.  
Regression- simple and multiple.

12 **Sampling and Sample size computation for Ayurvedic research:**

Population and sample. Advantages of sampling, Random (Probability) and non random (Non- probability) sampling. Merits of random sampling. Random sampling methods- simple random, stratified, systematic, cluster and multiphase sampling. Concept, logic and requirement of sample size computation, computation of sample size for comparing two means, two proportions, estimating mean and proportions.

13 **Vital statistics and Demography:**

computation and applications - Rate, Ratio, Proportion, Mortality and fertility rates, Attack rate and hospital-related statistics

14 **Familiarization with the use of Statistical software like SPSS/Graph Pad**

**PRACTICAL**

**100 marks**

**I. RESEARCH METHODOLOGY**

**Teaching hours 120**

**PRACTICAL NAME**

**1 Pharmaceutical Chemistry**

Familiarization and demonstration of common lab instruments for carrying out analysis as per API

**2 Awareness of Chromatographic Techniques**

Demonstration or Video clips of following:

- Thin-layer chromatography (TLC).
- Column chromatography (CC).
- Flash chromatography (FC)
- High-performance thin-layer chromatography (HPTLC)
- High Performance (Pressure) Liquid Chromatography (HPLC)
- Gas Chromatography (GC, GLC)

**4 Pharmacognosy**

Familiarization and Demonstration of different techniques related to:-Drug administration techniques- oral and parenteral.

Blood collection by orbital plexuses puncturing.

Techniques of anesthesia and euthanasia.

Information about different types of laboratory animals used in experimental research  
Drug identification as per API including organoleptic evaluation

#### **5 Pharmacology and toxicology**

Familiarization and demonstration of techniques related to pharmacology and toxicology

#### **6 Biochemistry (Clinical)**

Familiarization and demonstration of techniques related to basic instruments used in a clinical biochemistry laboratory – semi and fully automated clinical analyzers, electrolyte analyzer, ELISA-techniques, nephelometry.

Demonstration of blood sugar estimation, lipid profiles, kidney function test, liver function test. HbA1, cystatin and microalbumin estimation by nephelometry or other suitable techniques. Interpretation of the results obtained in the light of the data on normal values.

#### **7 Clinical Pathology**

Familiarization and demonstration of techniques related to basic and advanced instruments used in a basic clinical pathology lab. Auto cell counter, urine analyzer, ESR, microscopic examination of urine.

#### **8 Imaging Sciences**

Familiarization and demonstration of techniques related to the imaging techniques. Video film demonstration of CT-Scan, MRI-scan and PET-scan.

#### **9 Clinical protocol development**

## **II. MEDICAL STATISTICS**

**Practical hours:20**

Statistical exercise of examples from Topic number 4, 5, 8-12, 14, 15. Records to be prepared.

#### **Distribution of marks (practical):**

1. Instrumental spotting test– 20 marks
2. Clinical protocol writing exercise on a given problem– 20 marks
3. Records:Research methodology -10 Mark
4. Medical statistics -10 marks
5. Viva- Voce -40 Marks

#### **REFERENCE BOOKS:-**

##### **Pharmacognosy:**

1. Aushotosh Kar “Pharmacognosy & Pharmacobiotechnology” New Age International Publisher. Latest Edition. New Delhi.
2. Drug Survey by Mayaram Uniyal
3. Fahn A (1981). Plant Anatomy 3rd Edition Pergamon Press, Oxford
4. Kokate, CK., Purohit, AP, Gokhale, SB (2010). Pharmacognosy. Nirali Prakashan. Pune.
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8. Tyler VE Jr and Schwarting AE., Experimental Pharmacognosy, Burgess Pub. Co, Minneapolis, Minnesota.
9. Wallis- TE (2011)- reprint. Practical Pharmacognosy (Fourth Edition) Pharma Med Press, Hyderabad.
10. Wallis T E, Analytical Microscopy, J & A Churchill limited, London.
11. Wallis T E., Text Book of Pharmacognosy, J & A Churchill Limited, London.
12. WHO guidelines on good agricultural and collection practices- (GACP) for medicinal plants (2003). World Health Organization- Geneva.
13. WHO monographs on selected medicinal plants (1999)—Vol. 1. 1.Plants, Medicinal 2.Herbs 3.Traditional medicine. ISBN 92 4 154517 8. WHO Geneva.

**Pharmaceutical chemistry, quality control and drug standardization:**

1. Ayurvedic Pharmacopoeia of India. Part I- volume 1 to 8 and Part II- volume 1 to 3. Ministry of Health and Family Welfare. Controller of Publication. Govt of India. New Delhi.
2. Brain, KR and Turner, TD. (1975). The Practical Evaluation Phytopharmaceuticals. Wright Sciencetechnica, Bristol.
3. Galen Wood Ewing (1985). Instrumental Methods of Chemical Analysis. McGraw-Hill College ;Fifth edition
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5. HPTLC- Fingerprint atlas of Ayurvedic Single Plant Drugs mentioned in Ayurvedic Pharmacopoeia Vol- III and IV. CENTRAL COUNCIL FOR RESEARCH IN AYURVEDA AND SIDDHA. New Delhi.
6. Kapoor, RC (2010). Some observations on the metal based preparations in Indian System of Medicine. Indian Journal of Traditional Knowledge. 9(3): 562-575
7. Khopkar, S. M. Analytical Chemistry, New Age International Publishers , 3 rd edition
8. Laboratory Guide for- The Analysis of Ayurved and Siddha Formulations – CCRAS, New Delhi.
9. Mahadik KR, Bothara K G. Principles of Chromatography by, 1st edition, Nirali Prakashan.
10. Qadry JS and Qadry S Z., Text book of Inorganic Pharmaceutical and Medicinal Chemistry, B. S.Shah Prakashan, Ahmedabad.
11. Quality Control Methods for Medicinal Plant Material. Reprint (2002). WHO- Geneva.
12. Rangari V.D., Pharmacognosy & Phytochemistry, Vol I, II, Career Publication,
13. Sharma BK. Instrumental Methods of Chemical Analysis by, Goel Publishing House.
14. Srivastav VK and Shrivastav KK. Introduction to Chromatography (Theory and Practice)
15. Stahl E., Thin Layer Chromatography - A Laboratory Handbook, Springer Verlag, Berlin.
16. Sukhdev Swami Handa, Suman Preet Singh Khanuja, Gennaro Longo and Dev Dutt Rakesh (2008).Extraction Technologies for Medicinal and Aromatic Plants -INTERNATIONAL CENTRE FOR SCIENCE AND HIGH TECHNOLOGY- Trieste,

**Biochemistry and Laboratory techniques:**

1. Asokan P. (2003) Analytical Biochemistry, China publications,
2. Campbell, P.N and A.D .Smith, Biochemistry Illustrated, 4th ed, Churchill Livingstone.
3. David Frifelder. W. H. Freeman. (1982). Physical Biochemistry by; 2 edition



4. David Sultan (2003). Text book of Radiology and Imaging, Vol-1, 7th Edition.
5. Deb, A.C., Fundamentals of Biochemistry, Books and Allied (P) Ltd, 2002.
6. Harold Varley. Practical Clinical Bio-chemistry
7. Kanai L. Mukherjee. Clinical Pathology: Medical Laboratory Technology Vol. I. Tata McGrawHill 1996, New Delhi.
8. Gradwohl, Clinical Laboratory-methods and diagnosis, Vol-I
9. Clinical Biochemistry -Sabitri Sanyal, Clinical Pathology, B.I. Churchill Livingstone (P) Ltd, New Delhi. 2000.
10. Satyanarayanan, U. Essentials of Biochemistry, Books and allied (P) Ltd. 2002
11. Zubay, G.L. Biochemistry, W.M.C. Brown Publishers, New York 1998.
12. Text book of Radiology and Imaging, Vol-1, David Sultan, 7th Edition. 2003.

#### **Research methodology:**

1. Alley, Michael. The craft of scientific writing. Englewood Cliffs. N.N. Prentice 1987.
2. Ayurvediya Anusandhan Paddhati – P.V. Sharma
3. Altick and Fenstermaker. (2007). *The Art of Literary Research*. 4th ed. W. W. Norton. Castle, Gregory. *Blackwell Guide to Literary Theory*. Blackwells,
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5. Day R.A. How to write a scientific paper. Cambridge University Press.
6. Cooray P.G. Guide to scientific and technical writing.
7. Deepika Chawla and Neena Sondhi. (2011). *Research Methods- Concepts and cases*. New Delhi: Vikas Publishing House.
8. Greenhalgh, T. (2006) *How to Read a Paper: The Basics of Evidence-Based Medicine*. (3rd ed) Blackwell
9. Kothari- CR (2004). *Research Methodology- Methods and Techniques* (Second Revised Edition). New Age International Publishers- New Delhi.
10. Kumar, R. 2005. *Research Methodology: a Step-by-Step Guide for Beginners, 2nd ed*. Thousand Oaks, CA, London: Sage Publications.
11. Petter Laake, Haakon Breien Benestad and Bjørn Reino Olsen. (2007). *Research Methodology in the Medical and Biological sciences*. Academic Press is an imprint of Elsevier, 84 Theobald's Road, London WC1X 8RR, UK. ISBN: 978-0-12-373874-5
12. Relevant portions of Ayurvedic Samhitas and other texts

#### **Drug research and development:**

1. RICK NG, (2009). *DRUGS- from discovery to approval*. John Wiley & Sons, Inc., Hoboken, New Jersey
2. Research guidelines for evaluating the safety and efficacy of herbal medicines. (1993). . WHO- (Regional Office for the Western Pacific – Manila) ISBN 92 9061 110 3 (NLM Classification: WB925).
3. Jagdeesh, Sreekant Murthy, Gupta, YK and Amitabh Prakash Eds. *Biomedical Research (From Ideation to Publication)* (2010). Wolters Kluwer/ Lippincott Williams and Wilkins.
4. WHO Guidelines on Safety Monitoring of herbal medicines in pharmacovigilance systems. (2004). WHO- Geneva. ISBN 92 4 1592214.
5. Natural products isolation. (2006) 2nd ed. / edited by Satyajit D. Sarker, Zahid Latif, Alexander I. Gray. (Methods in biotechnology; 20). Includes bibliographical references and

index. Humana Press Inc. ISBN 1-58829-447-1 (acid-free paper) – ISBN 1-59259-955-9 (eISBN)

6. Gazette Extraordinary Part- II-Section 3 - Sub section (i) December 2008. Govt of India. AYUSH Guidelines on safety studies- Rule 170 of Drugs and Cosmetics Act.
7. OECD (2000) Guidance Document on Acute Oral Toxicity. Environmental Health and Safety Monograph Series on Testing and Assessment No 24.
8. OECD Guideline for the Testing of Chemicals – Repeated Dose 90-day Oral Toxicity Study in Rodents, 408, 1998. <http://browse.oecdbookshop.org/oecd/pdfs/free/9740801e.pdf> (latest version)
9. OECD Series on Principles of Good Laboratory Practice (GLP) and Compliance Monitoring, 1998. [http://www.oecd.org/document/63/0,2340,en\\_2649\\_34381\\_2346175\\_1\\_1\\_1\\_1,00.p hp](http://www.oecd.org/document/63/0,2340,en_2649_34381_2346175_1_1_1_1,00.p hp)
10. ICH Harmonised Tripartite Guideline (2000). Maintenance of the ICH Guideline on Non-clinical Safety Studies for the conduct of Human Clinical Trials for Pharmaceuticals M3 (R1).
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12. Jaju B.P.: Pharmacological Practical Exercise Book, *Jaypee Brothers, New Delhi.*
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14. Ravindran R.: X-Pharm (Software), Indian Journal of Pharmacology, *JIPMER, Pondicherry.*

#### **Biotechnology and Bio-informatics:**

1. Angela M. Meireles A (2009). Extracting Bioactive compounds for food products. Theory and applications. CRC- Press Taylor and Francis Group.
2. Bergeron BP 2002 Bioinformatics Computing 1st Edition, Prentice Hall
3. Chikhale, N.J. and Virendra Gomase, Bioinformatics- Theory and Practice, Publisher: Himalaya Publication House, India; 1 edition (July, 2007) ISBN-13: 978-81-8318-831-9
4. Lesk, A.M. Introduction to Bioinformatics Oxford 2002.
5. Satyanarayana, U.: Biotechnology, Books and Allied (P) Ltd, Kolkata, 2005
6. Setubal J. C and J. Meidanis, Introduction to Computational Molecular Biology, PWS Publishing Company, 1997.
7. <http://www.iitb.ac.in/~crnts>.
8. <http://www.zygogen.com>.
9. <http://www.dsir.nic.in/reports/tifp/database/metallo.pdf>.
10. [www.consort-statement.org](http://www.consort-statement.org)
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12. [www.icmr.nic.in](http://www.icmr.nic.in)

#### **Clinical Evaluation:**

1. CDSCO, Good Clinical Practices For Clinical Research in India, Schedule Y (Amended Version – 2005), <http://cdsco.nic.in/html/GCPI.php>
2. Ethical Guidelines for Biomedical Research on Human subjects. (2000). Indian Council of Medical Research- New Delhi.
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6. ICH Harmonised Tripartite Guidelines for Good Clinical Practices.(1997)- Quintiles- Published by Brookwood Medical Publications. Richmond, Surrey. United Kingdom.
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8. Petter Laake, Haakon Breien Benestad and Bjørn Reino Olsen. (2007). Research Methodology in the Medical and Biological sciences. Academic Press is an imprint of Elsevier, 84 Theobald's Road, London WC1X 8RR, UK. ISBN: 978-0-12-373874-5
9. William C. Scheffer Introduction to Clinical Researchs

#### Medical Statistics:

1. Armitage, P. and Berry, G. (1994) Statistical Methods in Medical Research (3rd ed). Blackwell Science.
2. Armitage P, Berry G, Matthews JNS: *Statistical Methods in Medical Research*. Fourth edition. Oxford, Blackwell Science Ltd; 2002
3. Bland, M. (2000) An Introduction to Medical Statistics (3rd ed). Oxford: Oxford University Press.
4. Bradford Hill – Basic Medical Statistics
5. Cambell, M.J. and Machin, D. (1993) Medical Statistics: A Common Sense Approach (2nd ed). Chester: Wiley.
6. Dwivedi S. N., Sundaram K. R and V. Sreenivas (2009). Medical Statistics - Principles & Methods-BI Publications Pvt. Ltd., New Delhi –1.
7. Gupta S.P. - Fundamentals of statistics, Sultan Chand. Delhi.
8. Indrayan. (2008). Basic Methods of Medical Research. AITBS Publishers- India
9. Mahajan B K, Methods in Bio statistics for medical students, 5th Ed. New Delhi, Jaypee Brothers Medical Publishers
10. Mehdi, B and Prakash A. (2010). Biostatistics in Pharmacology. Practical Manual in experimental and clinical pharmacology. 1st Edition. New-Delhi: Jaypee brothers Medical Publishers
11. Rao, NSN and Murthy, NS. (2008) 2nd Edition. Applied statistics in health sciences. Jaypee Brothers Medical Publishers (P) Ltd. Bengaluru, New Delhi.
12. Rick J Turner and Todd A Durham (2008). Introduction to Statistics in Pharmaceutical Clinical trials. Published by the Pharmaceutical Press- An imprint of RPS Publishing, 1 Lambeth High Street, London SE1 7JN, UK
13. Symalan, K. (2006). Statistics in Medicine (First Edition) Trivandrum: Global Education Bureau.
14. Sundar Rao, Jesudian Richard - An Introduction to Biostatistics.
15. Suhas Kumar Shetty- Medical statistics made easy

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**M.D.-AYURVEDA PRELIMINARY**  
**DRAVYAGUNA VIGYAN(Materia Medica & Pharmacology)**  
**PAPER-II**

Theory 100 Marks

**PART-A 50 marks**

1. Panchamahabhuta siddhanta, Samanya Vishesa siddhanta, Tridosha siddhanta. Extensive study on classifications of Dravya as described in Brihatrayi.
2. Applied aspects of Rasa, Guna, Virya, Vipaka and Prabhava
3. Applied aspects of Aushdha karma with reference to Sharngadhara and Bhavaprakasha
4. Importance of Namarupa vigyan and concept of basonyms and synonyms of Dravyas
5. Applied knowledge of Bhaishajya Prayoga (marga, kalpana, matra, anupana, sevan, kala etc.)

**PART-B 50 marks**

6. Basic principles of Desha pravichara, Dravya sangrahana (collection), Samrakshana (preservation)
7. Evolution of Dravyaguna vigyan with special emphasis on Nighantus
8. Prashasta bhesaj lakshana
9. Profound knowledge on applied aspects of Agrya aushadha
10. Methodology of studying controversial, pratinidhi (substitute), apamishrana (adulterant) and unidentified dravya
11. Pharmacognosy and its relevance in Dravyaguna vigyan
12. An integrated study of Charakokta Bhesaj pariksha and scientific method of drug evaluation with special reference to quality, safety and efficacy
13. Brief knowledge and importance of clinical pharmacology
14. General principles of various good cultivation practices, collection practices, storage practices and manufacturing practices
15. Pharmacovigilance and ADR issues
16. Knowledge on the Ayurvedic Pharmacopoeia of India, The Formulary of India and international pharmacopoeias

**PRACTICAL 100 marks**

Contents:

1. Field visits for the Identification of important classical medicinal plants (Minimum two visits to neighboring forest areas)
2. Macroscopic and microscopic identification of minimum two plants of each of prayojyanga (useful parts of plants)
3. Preliminary study of pharmacoepial standards (API) of minimum 5 plants
4. Minimum two experiments on Animals

**Distribution of marks (Practical)**

1. Herbarium sheets -10 Marks
2. Practical of macroscopic and microscopic identification of prajoyyanga (one part of the plant)-30 Marks
3. Practical record book of pharamcopoeial standards and animal experimentations -10 Marks
4. Spotting -30 Marks
5. Viva-voce -20 Marks

**REFERENCE BOOKS:**

- 1 Abhinav Buti Darpan (Vol.1-2)- Vd. Roop Lal Vaishya
- 2 Aushadna Vigyna Shastra -Acharya Pt. Vishvanatha Dwidevi
- 3 Ayurvediya Aushadnkarma vigyana -Acharya V.J. Thakur
- 4 Bedi Vanaspati Kosha- Prof. Ramesh Bedi
- 5 Bhaishajyaguna Vigyana - Dr. Alakhnarayan Singh
- 6 Bhav Prakash Nigantu (English) - Shreekanthamurti
- 7 Bhav Prakash Nighantu -With Vd. Krishna Chandra Chunekar commentary
- 8 Bhrinad dravyagunadarsha - Mahendra Kumar Shastri
- 9 Classical Uses of Medicinal Plants - Acharya Priyavrata Sharma
- 10 Controversial Medicinal Plants - Vd. G. Bapa Lal
- 11 Dalhana Ka Dravyaguna Shastra Ke Kshetra Me Yogadana -Vd. Shiv Kumar Vyas
- 12 Dravyaguna Kosha - Acharya Priyavrata Sharma
- 13 Dravyaguna Sutram - Acharya Priyavrata Sharma
- 14 Dravyaguna Vigyana - Dr. Gyanendra Pandey
- 15 Dravyaguna Vigyana(Vol. 1-2) -Acharya Yadavji Tikram Ji
- 16 Dravyaguna Vijyana - Dr. V.M. Gogate
- 17 Dravyaguna Vigyana (Vol. 1-5) - Acharya Priyavrata Sharma
- 18 Dravyaguna Shastrum- Vaidya G.A. Phadake
- 19 Dravyaguna Vijyana - Dr. A.P. Deshpande
- 20 Dravyagunavijnana basic Principles - Prof.D.S.Lucas
- 21 Forgotten Healers (Indian Medicinal Plants) - Dr. Prakash Pranjape
- 22 Glossry of Vegetable Drugs in Bhritrayis -Thakur Balwant Singh & Vd. Krishna Chandra Chunekar
- 23 Introduction to Dravyaguna - Acharya Priyavrata Sharma
- 24 Kriyatamka Aushadi Parichaya - Acharya Pt. Vishvanath Dwidevi
- 25 Materia Medica - Acharya Ghosh
- 26 Nighantu Adarsh (Vol. 1-2) - Vd. Bapa Lal
- 27 Pharmacological basis of Medical Practice - Goodman & Gillman
- 28 Pharmacology and Pharmacotherapeutics - Satoskar Bhandarkar & Ainapure
- 29 Prayogatamaka Dravyaguna Vigyana- Dr. Maya Ram Uniyal
- 30 Priya nighantu - Acharya Priyavrata Sharma
- 31 Raspanchaka/Dravyaguna Siddhanta - Prof. Shivcharan Dhyani
- 32 System of Plant Nomenclature in Ayurveda - Dr. Gyanendra Panday

- 33 Text Book of Pharmacology - Trees & Valis  
34 Textbook of Dravyaguna - Dr.K.Nishteswar  
35 Unani Dravyaguna Vigyana - Hakim Daljeet Singh
- 36 Useful parts of Charaka, Sushrut, and Vagbhata. -  
37 Uttarakand Ki Vanaspathiya - Dr. Gyanendra Pandey  
38 Vanoaushadi Darshika - Thakur Balwant Singh  
39 Vanoaushadi Nidarshika - Dr. Ram Sushil Singh  
40 Vedic Vanaspathyan - Dr. Dinesh Chandra Sharma  
41 Pharmacopia of India –all the volumes  
42 Database on medicinal plants all the volumes of CCRAS  
43 Aurveda formulary of india – all the volumes  
44 All the nighantooos  
45 Laghutrayi
- .....

**M.D.-AYURVEDA FINAL**  
**DRAVYAGUNA VIGYAN**

**(Materia Medica & Pharmacology)**

**DRAVYAGUNA VIGYAN**

**PAPER-I**

**Namarupa Vigyana**

**100 marks**

1. Importance of Namagyana of Dravya, origin of Namarupagyana of Aushadhi in Veda, etymological derivation of various names and synonyms of Aushadhi.
2. Rupagyana in relation to Aushadhi. Sthula and Sukshma description (Macroscopic and Microscopic study) of different parts of the plant.
3. Synonyms of dravyas(aushadha and Ahara) mentioned in Vedic compendia, Brihatrayee, Bhavaprakasha and Rajanighantu.
4. Basonyms, synonyms and distinguish morphological characteristic features of medicinal plants listed in Ayurvedic Pharmacopoeia of India(API).
5. Knowledge of Anuktadravya (Extrapharmacopial drugs)with regards to namarupa.
6. Sandigdhadravya(Controversial drugs) vinischaya.
7. Knowledge of biodiversity, endangered medicinal species.
8. Knowledge of TKDL, Introduction to relevant portions of Drugs and cosmetic act, Magic remedies Act, Intellectual Property Right (IPR) and Regulations pertaining to Import and Export of Ayurvedic drugs.
09. Knowledge of tissue culture techniques
10. Knowledge of Genetically Modified Plants

**PAPER –II**

**Guna Karma Vigyan**

**100 marks**

1. Fundamental principles of drug action in Ayurveda and conventional medicine.
2. Detailed study of rasa-guna- virya- vipaka-prabhava and karma with their applied aspects and commentators (Chakrapanidatta, Dalhana, Arunadatta, Hemadri and Indu) views on them.
3. Comprehensive study of karma as defined in Brihatrayee&Laghutrayee



4. Detailed study of Guna and Karma of dravyas listed in API and BhavaprakashaNighantu along with current research review.
5. Detailed study of aharadravya/ aharavarga ascribed in Brihatrayee and various nighantus along with Kritannavarga.
6. Pharmacological principles and knowledge on drugs acting on various systems.
7. Basic knowledge on experimental pharmacology for the evaluation of - analgesic, anti pyretic, anti inflammatory, anti diabetic, anti hypertensive, hypo lipidemic, anti ulcer, cardio protective, hepatoprotective, diuretics, adaptogens, CNS activities.
8. Knowledge on Heavy metal analysis, pesticidal residue and aflatoxins
9. Knowledge on evaluation of anti microbial and antimycotic activities.

### **PAPER – III**

#### **Prayogavigyana**

**Marks 100**

1. BhaishjyaPrayogSiddhant [Principles of drug administration] - BhaishajyaMarga (routes of drug administration), VividhaKalpana (Dosage forms), Principles of Yoga Vijnan (compounding), Matra (Dosage), Anupana (Vehicle), Aushadhagrahankal (Time of drug administration), Sevankalavadhi (duration of drug administration), Pathyapathya (Dos' /Donts' /Contraindications), complete Prescription writing (SamagraVyavasthapatraka).
2. Samyoga- ViruddhSidhanta and its importance
3. Amayikaprayoga (therapeutic uses) of important plants ascribed in as well as Brihatrayee, Chakradutta, Yoga ratnakara and Bhavaprakasha.
4. Knowledge of Pharmaco-vigilance in Ayurveda and conventional system of medicine.
5. Knowledge of clinical pharmacology and clinical drug research as per GCP guide lines.
6. Knowledge of Pharmacogenomics

### **PAPER- IV**

**100 marks**

1. Etymology of nighantu, their relevance, utility and salient features.
2. Chronological history of the following Nighantus with their authors name, period and content- Paryayaratnamala, Dhanvantarinighantu, Hridayadipikanighantu, Ashtanganighantu, Rajanighantu, Siddhamantranighantu, Bhavaprakashanighantu, Madanpalanighantu, Rajavallabhanighantu, MadhavaDravyaguna, Kaiyadevanighantu, Shodhalanighantu, Saligramnighantu, Nighanturatnakara, Nighantuadharsha and Priyanighantu
3. Detailed study Aushadhakalpana mentioned in Sharangadharasamhita and Ayurvedic Formulary of India (AFI).



4. General awareness on poshakaahara(Nutraceuticals),Varnya(cosmoceuticals), food additives, Excipients etc.
5. Knowledge of plant extracts, colors, flavors and preservatives.
6. Review of important modern works on classical medicinal plants published by Govt of India, department of AYUSH and ICMR.

### **Syllabus of the Practical training of part two M.D. (Ayu) - Dravyaguna**

#### **Practical:-**

#### **Study tours:**

Field identification of medicinal plants through at least three local Dravyaguna study tours within the state and one study tour out of state. Preparation of minimum 50 herbarium sheets, along with raw drug either from field, of plants be collected during study tours.

1. Evaluation of Crude drugs:

Macro and microscopic methods of examining five drugs of each of different useful parts of plants, including their powders.

2. Phytochemical evaluation of raw material:

Quantitative standards like foreign matter, extractive ( water and alcohol), ash value, acid insoluble ash and TLC separation of various parts of minimum two plants of Ayurvedic Pharmacopoeia of India.

3. Yoga vijnana :

Preparation of two yoga of each kalpana of Ayurvedic Formulary of India:

4. Pharmacology:

- Rasa nirdharana by Taste Threshold method of minimum one drug for each of rasas.
- Observation of animal experimentation models (both in vitro and in vivo)- 05 models for possible rasadigunas.

5. Clinical

- Regular clinical training in the hospital for submission of Single AushadhiPrayoga (Single drug trial/ Clinico-pharmacological studies.)
- Survey for Amayikaprayoga of aushadhi(Pharmaco epidemiology) for studying their role in clinical practice in contemporary period -observational study-minimum.

6. Dissertation

A Dissertation, as per the approval of Departmental Research Committee/Competent Committee for the purpose, be prepared under the guidance of approved supervisor

inDravyaguna and submitted 6 months before the final examination. The approval of Dissertation shall be essential before appearing the final examinations.

7. Method of practical training – Posting for minimum one month in each of the following units -

Quality control laboratory of nearest pharmacy/institution for crude drug identification, adulterants and substitutes & understanding standardization techniques.

Experimental pharmacology laboratory for developing skills in animal experimentation

Regular clinical training in the Teaching hospital for studying EkalaAushadhiPrayoga& Adverse drug reactions(ADR).

8. Post Graduate Scholar is expected to present minimum two scientific papers in National / international seminars during the course of study

9. Post Graduate Scholar is expected to publish / get accepted at least one paper in indexed/ peer reviewed journal under the supervision of guide.

**Pattern of Practical Examination-**

**Total =200 marks**

1. Herbarium	- 10 Marks
2. Pharmacognosy practical record	- 10 Marks
3. Pharmacology practical record	- 10 Marks
4. Clinical records record	-10 Marks
5. Practical examination(Identification of green and raw drugs, microscopic examination, Ekalaushadhapariksha	- 60 Marks
6. Thesis Presentation	- 20Marks
7. Viva voce	-80 Marks

**Reference books -**

**REFERENCE BOOKS:**

- 1 Abhinav Buti Darpan (Vol.1-2)- Vd. Roop Lal Vaishya
- 2 Aushadna Vigyna Shastra -Acharya Pt. Vishvanatha Dwidevi
- 3 Ayurvediya Aushadnkarma vigyana -Acharya V.J. Thakur
- 4 Bedi Vanaspati Kosha- Prof. Ramesh Bedi
- 5 Bhaishajyaguna Vigyana - Dr. Alakhnarayan Singh
- 6 Bhav Prakash Nigantu (English) - Shreekanthamurti
- 7 Bhav Prakash Nighantu -With Vd. Krishna Chandra Chunekar commentary
- 8 Bhrinad dravyagunadarsha - Mahendra Kumar Shastri
- 9 Classical Uses of Medicinal Plants - Acharya Priyavrata Sharma

- 10 Controversial Medicinal Plants - Vd. G. Bapa Lal
- 11 Dalhana Ka Dravyaguna Shastra Ke Kshetra Me Yogadana -Vd. Shiv Kumar Vyas
- 12 Dravyaguna Kosha - Acharya Priyavrata Sharma
- 13 Dravyaguna Sutram - Acharya Priyavrata Sharma
- 14 Dravyaguna Vigyana - Dr. Gyanendra Pandey
- 15 Dravyaguna Vigyana(Vol. 1-2) -Acharya Yadavji Tikram Ji
- 16 Dravyaguna Vijyana - Dr. V.M. Gogate
- 17 Dravyaguna Vigyana (Vol. 1-5) - Acharya Priyavrata Sharma
- 18 Dravyaguna Shastrum- Vaidya G.A. Phadake
- 19 Dravyaguna Vijyana - Dr. A.P. Deshpande
- 20 Dravyagunavijnana basic Principles - Prof.D.S.Lucas
- 21 Forgotten Healers (Indian Medicinal Plants) - Dr. Prakash Pranjape
- 22 Glossry of Vegetable Drugs in Bhritrayis -Thakur Balwant Singh & Vd. Krishna Chandra Chunekar
- 23 Introduction to Dravyaguna - Acharya Priyavrata Sharma
- 24 Kriyatamka Aushadi Parichaya - Acharya Pt. Vishvanath Dwidevi
- 25 Materia Medica - Acharya Ghosh
- 26 Nighantu Adarsh (Vol. 1-2) - Vd. Bapa Lal
- 27 Pharmacological basis of Medical Practice - Goodman & Gillman
- 28 Pharmacology and Pharmacotherapeutics - Satoskar Bhandarkar & Ainapure
- 29 Prayogatamaka Dravyaguna Vigyana- Dr. Maya Ram Uniyal
  
- 30 Priya nighantu - Acharya Priyavrata Sharma
- 31 Raspanchaka/Dravyaguna Siddhanta - Prof. Shivcharan Dhyani
- 32 System of Plant Nomenclature in Ayurveda - Dr. Gyanendra Panday
- 33 Text Book of Pharmaconogy - Trees & Valis
- 34 Textbook of Dravyaguna - Dr.K.Nishteswar
- 35 Unani Dravyaguna Vigyana - Hakim Daljeet Singh
  
- 36 Useful parts of Charaka, Sushurut, and Vagbhata. -
- 37 Uttarakand Ki Vanaspatiya - Dr. Gyanendra Pandey
- 38 Vanoaushadi Darshika - Thakur Balwant Singh
- 39 Vanoaushadi Nidarshika - Dr. Ram Sushil Singh
- 40 Vedic Vanaspatiyam - Dr. Dinesh Chandra Sharma
- 41 Pharmacopia of India –all the volumes
- 42 Database on medicinal plants all the volums of CCRAS
- 43 Aurveda formulary of india – all the volums
- 44 All the nighantoos
- 45 Laghutrayi

**Bharati Vidyapeeth**  
**Deemed to be University, Pune**  
**Faculty of Ayurved**  
**Programme- MD Ayurved in Dravyaguna**

**Addition in the syllabus of Dravyaguna**

1. Interpret Clinical application of Raspanchak
2. Classifications and techniques of aqueous and alcoholic extracts
3. Adverse drug reaction and Pharmacovigilance with recent updates
4. Vrikshayurveda and Ethno-medicine
5. Network pharmacology and Bioinformatics
6. Bhesjavacharaniya (Criteria's to be considered for selection of drugs in vyadhis)
7. Assessment and understanding the relation between Parthivatwa & subjective/ objective parametric tests.
8. Rational prescription along with safe dispensing of Ayurvedic formulations.
9. Traditional & Local health Practices



**BHARATI VIDYAPEETH  
(DEEMED TO BE UNIVERSITY), PUNE**

**FACULTY OF AYURVED  
MD- Dravyaguna Vigyan  
Old Syllabus**



**BHARATI VIDYAPEETH**  
**(DEEMED TO BE UNIVERSITY) PUNE, INDIA.**

**FACULTY OF AYURVED**

**Pune- Satara Road, Pune-411043.**

**DRAVYAGUNA VIGYAN**

*Accredited with 'A+' Grade (2017) by NAAC.*

*'A' Grade University status by MHRD, Govt. of India*

*Accredited (2004) & Reaccredited (2011) with 'A' Grade by NAAC.*

**Post- Graduate (M.D./M.S./Diploma in Ayurved)**

**Syllabus/ Curriculum**

## Contents

<b>Sr No</b>	<b>Topic</b>	<b>Page No</b>
1	Preface	3
2	Aims and Objectives	4
3	Vision and Mission	5
4	Goals of Course (POs and COs)	6-9
5	Eligibility	10
6	Medium of instruction and Pattern of study	10
7	Duration of the Course Study	10
8	Attendance and Progress	11
9	Subjects taught, Number of lectures/ practical and demonstrations for various subjects [ MD/MS]	12
10	Nomenclature of post-graduate degree	13
11	Synopsis and Dissertation	14-15
12	Scheme of Examinations	16-17

## **Preface**

Ayurveda is accepted worldwide as one of the oldest traditional systems of medicine. The ancient insight in this traditional system of medicine is still not profoundly discovered. Ayurveda signifies as "the life-science " where ayur means "life" and veda means "science" in Sanskrit. Ayurveda is the upaveda i.e. "auxiliary knowledge of Atharvaveda in Vedic tradition with its prime origin from Atharva-Veda and a supplement of the Rig-Veda. Lord Dhanvantari is worshipped as the God of Ayurveda. The goal of this traditional medicine system is to prevent illness, disease cure and preserve life. Being originated in India Ayurveda extends its wings in various parts of the world. In ancient days Ayurveda was taught in Gurukula system, which is now evolved in to post graduate courses from Institutions.

The Indian Medical Council was set up in 1971 by the Indian government to establish maintenance of standards for undergraduate and postgraduate education. It establishes suitable qualifications in Indian medicine and recognizes various forms of traditional practice including Ayurveda.

Ayurvedic practitioners also work in rural areas, providing health care to the million people in India alone. They therefore represent a major force for primary health care, and their training and placement are important to the government of India. Being a scientific medicine, Ayurveda has both preventive and curative aspects. The preventive component emphasizes the need for a strict code of personal and social hygiene, the details of which depend upon individual, climatic, and environmental needs.

The Bachelor of Ayurvedic Medicine and Surgery, MD/MS in various discipline of



Ayurveda started with the intention to encourage integrated teaching and de-emphasize compartmentalization of disciplines so as to achieve horizontal and vertical integration in different phases which helps to support National Health Services.

Looking into the health services provided to the public, understanding the need of practitioners of Ayurvedic system of medicine, as per the guidelines of apex body National Council of Indian system of Medicine (formerly CCIM) and suggestions provided by the faculty of various Specialties, stake holders and strategy of University this governance is framed

based on following aims and objectives -

### **Aims and objectives-**

The aims of the post-graduate degree courses shall be to provide orientation of specialties and super-specialties of Ayurveda, and to produce experts and specialists who can be competent and efficient teachers, physicians, surgeons, gynaecologists and obstetricians (Stri Roga and Prasuti Tantragraha), pharmaceutical experts, researchers and profound scholars in various fields of specialization of Ayurveda.

## **Faculty of Ayurved, Bharati Vidyapeeth (Deemed to be University), Pune**

### **Vision-**

To be a world class university for social transformation through dynamic education

### **Mission-**

- To ensure the good health and longevity of mankind.
- To carve a niche for our college in the world of Ayurved education
- To provide
  - Borderless access to Ayurved education
  - Quality Ayurved education
- To promote
  - Quality research in diverse areas of health care system.
  - Extensive use of ICT for teaching, learning and governance.
  - To develop national and international networks with industry and other academic and research institutions.

## **Program Outcomes For Post Graduate Courses in Ayurved-**

- PG degree holder should be expert and specialist of his/ her branch who can be competent and efficient teacher, physician, surgeon, gynaecologist and obstetrician (Stri Roga and Prasuti Tantragya), pharmaceutical expert, researcher and profound scholar in various fields of specialization of Ayurved.
- Should be having knowledge of Concept of Good clinical practices in Ayurved and modern medicine

### **Course specific outcomes**

#### **M. S – Ayurved Dhanvantari in**

##### **1. PRASUTI TANTRA & STREEROGA [OBSTETRICS AND GYNECOLOGY]**

- To be able to manage normal and complicated Pre-natal, Intra partum and Post natal cases by integrative approach
- To be able to manage all types of gynecological disorders at every epoch of womanhood.
- To be able to perform all kinds of Ayurvedic procedures and surgical procedures related to Stree roga and Prasutitantra
- To have knowledge of medico legal aspects of obstetrics and gynecology.

#### **M. S – Ayurved Dhanvantari in**

##### **2. SHALAKYA TANTRA [NETRA, SHIRO, NASA, KARNA, KANTHA, MUKHA]**

- To be able to manage all cases of E.N.T. and ophthalmology by integrative approach.
- To be able to perform all kinds of Ayurvedic procedures and surgical procedures related to Shalakyatantra
- To have knowledge of medico legal aspects of Shalakyatantra

#### **M. S – Ayurved Dhanvantari in**

##### **3. SHALYA TANTRA [GENERAL SURGERY]**

- To be able to manage all surgical cases by integrative approach
- To be able to perform all kinds of Ayurvedic procedures and general surgical procedures
- To have adequate knowledge of Anushashtra – Ksharkarma and prayoga, Agnikarma [thermo therapy], Raktamokshan [bloodletting ] or Asthisandhi evam marma vigyan [ orthopedic] or Sangyahan [Anesthesiology] or Mootraroga [ Urology]
- To have knowledge of medico legal aspects of Shalyatantra

## **M.D.- Ayurved Vachaspati in**

### **1. AYURVED SAMHITA & SIDDHANT**

- to have profound knowledge of Charak Samhita, Sushrut Samhita & AshtangHridayam, Ayurvediya and Darshanika Siddhanta with commentaries
- to be able to interpret philosophical principles incorporated in Charak Samhita, Sushrut Samhita, Ashtanga Hridaya, Ashtang Samgraha.
- To able to understand Practical applicability of principles of samhita and a competent Ayurved physician
- Competency in fundamental research

## **M.D.- Ayurved Vachaspati in**

### **2. RACHANA SHAARIRA**

- Should have thorough knowledge and competency in Ayurved Sharira and Modern anatomy
- Having extensive knowledge and skill of dissecting human dead bodies and its demonstration.

## **M.D.- Ayurved Vachaspati in**

### **3. KRIYA SHARIR**

- Having profound knowledge of Ayurved Kriya Sharir: - - and Contribution of different Ayurveda Samhita in Kriya Sharir
- Ability to determine and demonstrate the Sharir – Manans Prakriti
- Should have knowledge of Modern Physiology and its applied aspects

## **M.D.- Ayurved Vachaspati in**

### **4. DRAVYAGUNA VIGYAN**

- Have a clear understanding of medicinal plants in context to Ayurved and modern Pharmacology and Pharmaceutics
- Have an accurate knowledge of identification, Authentication and standardization of raw and wet plant drugs.
- Ability of cultivation and plantation of medicinal plants
- Knowledge about Pharmacovigilance
- Ability to conduct the pre clinical and clinical trials of medicinal plants

## **M.D.- Ayurved Vachaspati in**

### **5. RASASHASTRA EVAM BHAISHJYA KALPNA**

- Have an accurate knowledge of identification, Authentication and standardization of minerals and metals along with plant drugs
- Possess detailed knowledge of manufacturing practices of various dosage forms of

Ayurved formulations as per GMP

- Ability to establish, run and manage pharmacy as per GMP and FDA guidelines
- Having knowledge of Drug and cosmetics related acts
- Ability to conduct the pre clinical and clinical trials on minerals and metals

**M.D.- Ayurved Vachaspati in**

### **6. AGADA TANTRA EVUM VIDHIVAIDYAKA**

- To be able to understand and interpret Ayurvedic and Contemporary Toxicology
- Having knowledge of Pharmacodynamics of different formulations used in Agadatantra and Clinical & Experimental toxicology
- Ability of Ayurvedic & Contemporary Management Of Poisoning
- Should have profound knowledge of Forensic Medicine and Medical Jurisprudence
- Ability to diagnose and manage substance abuse [ De- addiction]
- Have knowledge of Pharmacovigilance, community health problems due to poisons & pollution, Drug interactions & incompatibility etc.

**M.D.- Ayurved Vachaspati in**

### **7. SWASTHAVRITTA**

- Having knowledge of Concept of holistic health and Principles of dietetics according to Ayurveda
- Understanding the Concept of community health, prevention, Stages of intervention according to Ayurved Modern medicine
- Should have knowledge of Ayurved and Modern Concept of Epidemiology [Janapadodhwamsa]
- Possess knowledge of Therapeutic effect of Yogic practices and ability to demonstrate various yogasanas in various diseases
- Understanding the role of Ayurved for Immunization, Occupational Health, Geriatrics, Life Style disorders (Non Communicable diseases)

**M.D.- Ayurved Vachaspati in**

### **8. ROGA NIDANA**

- To understand the Concept and applied aspects of fundamental principles of Rognidan
- To have profound Knowledge of classical Samprapti of all diseases with interpretation of Nidana Panchaka including Upadrava, Arishta and Sadhyasadhyata and Chikitsa Sutra.
- Ability of Ayurvedic interpretation of commonly occurring diseases in contemporary medicine, all relevant findings of modern clinical examinations and various Laboratory and other Diagnostic reports

- Ability of establishment and management of standard clinical laboratory set up
- Have knowledge about Upasargajanya Vyadhi (Communicable diseases)

### **M.D.- Ayurved Vachaspati in**

#### **9. Panchakarma**

- To have thorough knowledge of Kayachikitsa, basic principles of Shodhana (BioPurification methods) and Raktamokshana, Physiotherapy & Disease-wise Panchakarma
- To be able to perform poorva, Pradhan & Pashchat karma of Panchakarma procedures [ five Purification therapies] of Ayurveda and manage its complications [ Updrava].
- To be able to prepare all the necessary bhaishjya kalpana for various panchakarma procedures

### **M.D.- Ayurved Vachaspati in**

#### **10. Kayachikitsa**

- To have thorough knowledge of Fundamentals of Kayachikitsa  
BVDUCOA\_ Programme outcomes Page 7
- To be able to perform Rogi-Roga Pariksha in Ayurved and Modern perspectives with the help of modern diagnostic parameters.
- To be able to perform samanya and vishesh roga chikitsa including application of advances in Rasayana and Vajikarana therapies and emerging trends in Panchakarma in various disease management
- To have knowledge of Critical care medicine, Management of medical emergencies, ICU services, Field medical services
- To be able to participate in National Health Programmes and recognize prospective role of Ayurveda services and therapeutics in them.

### **M.D.- Ayurved Vachaspati in**

#### **11. KAUMARBHRITYA-BALA ROGA**

- Ability to interpret Ayurvedic genetics with Pathogenesis of Modern genetics and management of genetic disorders
- To have thorough knowledge of Neonatal Care and management of all types of neonatal diseases
- To diagnose and manage the Paediatric Disorders
- Ability to develop and manage paediatric ward with Fundamentals of Hospital management

## **Eligibility**

Passing marks for eligibility in admission to ASU&H- PG courses should be as per the ASU&H- PG regulations and should be followed strictly., -

- A person possessing the degree of Ayurvedacharya (Bachelor of Ayurveda Medicine and Surgery) or provisional degree certificate recognized as per the provisions of IMCC 1970/NCISM 2020 act and possess permanent or provisional registration certificate issued by the CCIM/NCISM/state board and must have completed a satisfactorily one year compulsory rotating internship as per the NCISM notification.
- In order to be eligible for admission to post graduate courses it shall be necessary for a candidate to obtain minimum of marks at 50<sup>th</sup> percentile in the All India AYUSH Post Graduate Entrance Test ( AIAPGET) .
- Candidates belonging to the scheduled castes, Scheduled Tribes and other Backward Classes the minimum marks shall be at 40<sup>th</sup> percentile.

## **Medium of instruction**

The medium of instruction for the programme shall be Sanskrit or Hindi or English with use of Ayurvedic technical terms.

## **Duration of the Course Study**

**Total Duration of Course** – 3 Years from the Commencement of classes. The maximum duration for completion of the course shall not exceed beyond the period of six years from the date of admission to the course.

**Curriculum** - As approved by Bharati Vidyapeeth [Deemed to be University], Pune is in line with the directives of the Central Council for Indian Medicine.

## **Attendance and Progress**

The students shall have to attend a minimum of seventy-five per cent. of total lectures, practical's and clinical tutorials or classes to become eligible for appearing in the examination. A Web based centralized biometric attendance system shall be required for the attendance of post-graduate students and manual attendance at department level in which student is pursuing the post-graduate course.

The student shall have to attend the hospital and perform other duties as may be assigned to him during study. The student of clinical subject shall have to do resident duties in their respective departments and student of non-clinical subject shall have duties in their respective departments like Pharmacy or Herbal Garden or Laboratory during study. The student shall attend special lectures, demonstrations, seminars, study tours and such other activities as may be arranged by the teaching departments.



**Subjects taught, Number of lectures/ practical and demonstrations for various subjects [ MD/MS]**

❖ **Specialties in which post-graduate degree is allowed are as under: -**

Sr. No.	Name of speciality	Nearest terminology of modern subject	Department in which postgraduate degree can be conducted
<b>Pre-clinical speciality</b>			
1	Ayurveda Samhita evam Siddhant	Ayurveda Samhita and basic principles of Ayurveda	Samhita and basic principles of Ayurveda
2	Rachana Sharira	Anatomy	Rachana Sharira
3	Kriya Sharira	Physiology	Kriya Sharira
<b>Para-clinical speciality</b>			
4	Dravyaguna Vigyana	Materia Medica and Pharmacology	Dravyaguna
5	Rasa Shastra evam Bhaishajya Kalpana	Ayurveda Pharmaceuticals	Rasa Shastra evam Bhaishajya Kalpana
6	Roga Nidana evam Vikriti Vigyana	Diagnostic Procedure and Pathology	Roga Nidana evam Vikriti Vigyana
<b>Clinical speciality</b>			
7	Prasuti evam Stri Roga	Obstetrics and Gynecology	Prasuti evam Stri Roga
8	Kaumarabhritya –Bala Roga	Pediatrics	Kaumarabhritya– Bala Roga
9	Swasthavritta	Preventive Social Medicine	Swasthavritta and Yoga
10	Kayachikitsa	Medicine	Kayachikitsa
11	Shalya	Surgery	Shalya Tantra
12	Shalaky	Diseases of Eye, Ear, Nose, Throat Head, Neck, Oral and Dentistry	Shalaky Tantra
13	Panchakarma	Panchakarma	Panchakarma
14	Agada Tantra	Toxicology and Forensic Medicine	Agada Tantra.

❖ **Nomenclature of post-graduate degree. -**

The nomenclature of post-graduate degree in respective specialties shall be as under: -

Sl.No.	Nomenclature of specialty or degree	Abbreviation
<b>Pre-clinical specialty</b>		
1	Ayurveda Vachaspati – Ayurveda Samhita Evum Siddhant	M.D. (Ayurveda)- Compendium and Basic Principles
2	Ayurveda Vachaspati – Rachana Sharira	M.D. (Ayurveda) - Anatomy
3	Ayurveda Vachaspati – Kriya Sharira	M.D. (Ayurveda) - Physiology
<b>Para-clinical specialty</b>		
4	Ayurveda Vachaspati – Dravyaguna Vigyana	M.D. (Ayurveda) - Materia Medica and Pharmacology
5	Ayurveda Vachaspati – Rasa Shastra evam Bhaishajya Kalpana	M.D. (Ayurveda) - Pharmaceuticals
6	Ayurveda Vachaspati – Roga Nidana evam Vikriti Vigyana	M.D. (Ayurveda)- Diagnostic procedure and Pathology
<b>Clinical specialty</b>		
7	Ayurveda Dhanvantari – Prasuti evam Stri Roga	M.S. (Ayurveda)- Obstetrics and Gynecology
8	Ayurveda Vachaspati – Kaumarabhritya –Bala Roga	M.D. (Ayurveda)- Pediatrics
9	Ayurveda Vachaspati – Swasthavritta	M.D. (Ayurveda)- Social and Preventive Medicine
10	Ayurveda Vachaspati – Kayachikitsa	M.D. (Ayurveda)- Medicine
11	Ayurveda Dhanvantari – Shalya	M.S. (Ayurveda)- Surgery
12	Ayurveda Dhanvantari – Shalakyia	M.S. (Ayurveda)- Diseases of Eye, Ear, Nose, Throat Head, Neck, Oral and Dentistry
13	Ayurveda Vachaspati – Panchakarma	M.D. (Ayurveda)- Panchakarma
14	Ayurveda Vachaspati – Agada Tantra	M.D. (Ayurveda)- Toxicology and Forensic Medicine

## **Synopsis and Dissertation**

Central Scientific Advisory Post Graduate Committee appointed by Central Council of Indian Medicine shall suggest the areas of Research and topics and the same shall be followed by University Committee while approving the Dissertation title.

The title of the dissertation along with the synopsis, with approval of the Ethics Committee constituted by the institute shall be submitted to the University within a period of six months from the date of admission to the post-graduate course.

If the student fails to submit the title of dissertation and synopsis within specified period, his terms for final post-graduate course shall be extended for six months or more in accordance with the time of submission of the synopsis to the University.

- **Synopsis**

The synopsis of the proposed scheme of work shall indicate the expertise and action plan of work of the student relating to the proposed theme of work, the name of the department and the name and designation of the guide or supervisor and co-guide (if any).

The University shall approve the synopsis not later than three months after submission of the synopsis.

A Board of Research Studies shall be constituted by the University to approve the title.

The University shall display the approved synopsis of dissertation on their website.

- **Dissertation**

Once the title for dissertation is approved by the Board of Research Studies of the University, the student shall not be allowed to change the title of the proposed theme of work without permission of the University.

No student shall be allowed to submit the dissertation before six months of completion of course and the student shall continue his regular study in the institution after submission of dissertation to complete three years.

The dissertation shall consist of not less than forty thousand words.

The dissertation shall contain, at the end, a summary of not more than one thousand and five hundred words and the conclusion not exceeding one thousand words.

Five copies of the bound dissertation along with a certificate from the supervisor or guide shall reach the office of the Registrar of the University four months before the final examination.

The student shall be permitted to appear in the final examination of post-graduate degree course only after approval of the dissertation by the examiners.

## **Scheme of Examination**

The post-graduate degree course shall have two university examinations in the following manner, namely: -

1. The preliminary examination -
2. The final examination –

**1.The preliminary examination** – Conducted at the end of one academic year after admission.

**The subjects/ Number of Papers** for preliminary examination namely: -

**Paper I-** Research Methodology and Bio or Medical Statistics;

**Paper II-** Applied aspects regarding concerned subjects.

### **Rules-**

The student shall have to undergo training in the department concerned and shall maintain month-wise record of the work done during the last two years of study in the specialty opted by him as under:-

- (a) Study of literature related to specialty,
- (b) Regular clinical training in the hospital for student of clinical subject,
- (c) Practical training of research work carried out in the department, for student of pre-clinical and paraclinical subject,
- (d) Participation in various seminars, symposia and discussions; and (e) progress of the work done on the topic of dissertation.

The assessment of the work done by the students of first year post-graduate course during the first year will be done before the preliminary examination.

Examination shall ordinarily be held in the month of June or July and November or December every year. For being declared successful in the examination, student shall have to pass all the subjects separately in preliminary examination. The student shall be required to obtain a minimum of fifty per cent and marks in practical and theory subjects separately to be announced as a pass. If a student fails in the preliminary examination, he shall have to pass before appearing in the final examination.

**2. The final examination** -Conducted on completion of three academic years after the admission to postgraduate course.

The final examination shall include dissertation, written papers and clinical or practical and oral examination.

**Number of Papers** -There shall be four theory papers in each specialty and one practical or clinical and viva-voce examination in the concerned specialty or group of sub-specialties selected by the student for special study.

The student shall publish or get accepted minimum one research paper on his research work in one journal and one paper presentation in regional level seminar.

The preliminary examination and final examination shall be held in written, practical, or clinical and oral examination. If the student fails in theory or practical in the final examination, he can appear in the subsequent examination without requiring submitting a fresh dissertation. The subsequent examination for failed candidates shall be conducted at every six-month interval; and the post-graduate degree shall be conferred after the dissertation is accepted and the student passes the final examination.

M.D./M.S.-AYURVEDA

PRELIMINARY PAPER-I  
RESEARCH METHODOLOGY AND MEDICAL STATISTICS

**PART-A**  
**RESEARCH METHODOLOGY**

- 1 Introduction to Research**
  - A. Definition of the term research
  - B. Definition of the term anusandhan
  - C. Need of research in the field of Ayurveda
  
- 2 General guidelines and steps in the research process**
  - A. Selection of the research problem
  - B. Literature review: different methods (including computer database) with their advantages and limitations
  - C. Defining research problem and formulation of hypothesis
  - D. Defining general and specific objectives
  - E. Research design: observational and interventional, descriptive and analytical, preclinical and clinical, qualitative and quantitative
  - F. Sample design
  - G. Collection of the data
  - H. Analysis of data.
  - I. Generalization and interpretation, evaluation and assessment of hypothesis.
  - J. Ethical aspects related to human and animal experimentation.
  - K. Information about Institutional Ethics Committee (IEC) and Animal Ethics Committee (AEC) and their functions. Procedure to obtain clearance from respective committees, including filling up of the consent forms and information sheets and publication ethics.
  
- 3 Preparation of research proposals in different disciplines for submission to funding agencies taking EMR-AYUSH scheme as a model.**
  
- 4. Scientific writing and publication skills.**
  - a. Familiarization with publication guidelines- Journal specific and CONSORT guidelines.
  - b. Different types of referencing and bibliography.
  - c. Thesis/Dissertation: contents and structure
  - d. Research articles structuring: Introduction, Methods, Results and Discussions (IMRAD)
  
- 5 Classical Methods of Research. Tadvidya sambhasha, vadmarga and tantrayukti**

Concept of Pratyakshadi Pramana Pariksha, their types and application for Research in Ayurveda.

Dravya-, Guna-, Karma-Parikshana Paddhati  
Aushadhi-yog Parikshana Paddhati  
Swastha, Atura Pariksha Paddhati  
Dashvidha Parikshya Bhava  
Tadvidya sambhasha, vadmarga and tantrayukti

**6 Comparison between methods of research in Ayurveda (Pratigya, Hetu, Udaharana, Upanaya, Nigaman) and contemporary methods in health sciences.**

**7. Different fields of Research in Ayurveda**

- a. Fundamental research on concepts of Ayurveda
- b. Panchamahabhuta and tridosha.
- c. Concepts of rasa, guna, virya, vipak, prabhav and karma
- d. Concept of prakriti-saradi bhava, ojas, srotas, agni, aam and koshta.

**8. Literary Research-**

Introduction to manuscriptology: Definition and scope. Collection, conservation, cataloguing.

Data mining techniques, searching methods for new literature; search of new concepts in the available literature. Methods for searching internal and external evidences about authors, concepts and development of particular body of knowledge.

**9. Drug Research (Laboratory-based)-** Basic knowledge of the following:

**Drug sources:** plant, animal and mineral. Methods of drug identification.

**Quality control and standardization aspects:** Basic knowledge of Pharmacopoeial standards and parameters set by Ayurvedic Pharmacopoeia of India.

Information on WHO guidelines for standardization of herbal preparations. Good Manufacturing Practices(GMP) and Good Laboratory Practices (GLP).

**10. Safety aspects:** Protocols for assessing acute, sub-acute and chronic toxicity studies. Familiarization with AYUSH guidelines (Rule 170), CDCSO and OECD guidelines.

**11. Introduction to latest Trends in Drug Discovery and Drug Development**

- Brief information on the traditional drug discovery process
- Brief information on the latest trends in the Drug Discovery process through employment of rational approach techniques; anti-sense approach, use of micro and macro-arrays, cell culture based assays, use of concepts of systems biology and network physiology
- Brief introduction to the process of Drug development

**12. Clinical research:**

Introduction to Clinical Research Methodology identifying the priority areas of Ayurveda

Basic knowledge of the following:-

- Observational and Interventional studies
- Descriptive & Analytical studies
- Longitudinal & Cross sectional studies
- Prospective & Retrospectives studies
- Cohort studies



Randomized Controlled Trials (RCT) & their types  
Single-case design, case control studies, ethnographic studies, black box design, cross-over design, factorial design.

Errors and bias in research.

New concepts in clinical trial- Adaptive clinical trials/ Good clinical practices (GCP)

Phases of Clinical studies: 0,1,2,3, and 4.

**Survey studies -**

Methodology, types, utility and analysis of Qualitative Research methods. Concepts of in-depth interview and Focus Group

Discussion.

13. Pharmacovigilance for ASU drugs. Need, scope and aims & objectives. National Pharmacovigilance Programme for ASU drugs.

14. Introduction to bioinformatics, scope of bioinformatics, role of computers in biology. Introduction to Database- Pub med, Medlar and Scopus. Accession of databases.

15. Intellectual Property Rights- Different aspect and steps in patenting. Information on Traditional Knowledge Digital Library (TKDL).

**PART-B**

**40 marks**

**MEDICAL STATISTICS**

**Teaching hours: 80**

1 **Definition of Statistics :** Concepts, relevance and general applications of Biostatistics in Ayurveda

Collection, classification, presentation, analysis and interpretation of data  
(Definition, utility and methods)

2 **Scales of Measurements** - nominal, ordinal, interval and ratio scales.

**Types of variables** – Continuous, discrete, dependent and independent variables.

**Type of series** – Simple, Continuous and Discrete

3 **Measures of Central tendency** – Mean, Median and Mode.

4 **Variability:** Types and measures of variability – Range, Quartile deviation, Percentile, Mean deviation and Standard deviation

5 **Probability:** Definitions, types and laws of probability,

6 **Normal distribution:** Concept and Properties, Sampling distribution, Standard Error, Confidence Interval and its application in interpretation of results and normal probability curve.

7 **Fundamentals of testing of hypotheses:**

Null and alternate hypotheses, type I and type 2 errors.

Tests of significance: Parametric and Non-Parametric tests, level of significance and power of the test, 'P' value and its interpretation, statistical significance and clinical significance

8 **Univariate analysis of categorical data:**

Confidence interval of incidence and prevalence, Odds ratio, relative risk and Risk difference, and their confidence intervals

**9 Parametric tests:**

'Z' test, Student's 't' test: paired and unpaired, 'F' test, Analysis of variance (ANOVA) test, repeated measures analysis of variance

**10 Non parametric methods:**

Chi-square test, Fisher's exact test, McNemar's test, Wilcoxon test, Mann-Whitney U test, Kruskal – Wallis with relevant post hoc tests (Dunn)

**11 Correlation and regression analysis:**

Concept, properties, computation and applications of correlation, Simple linear correlation, Karl Pearson's correlation co-efficient, Spearman's rank correlation.  
Regression- simple and multiple.

**12 Sampling and Sample size computation for Ayurvedic research:**

Population and sample. Advantages of sampling, Random (Probability) and non random (Non- probability) sampling. Merits of random sampling. Random sampling methods- simple random, stratified, systematic, cluster and multiphase sampling. Concept, logic and requirement of sample size computation, computation of sample size for comparing two means, two proportions, estimating mean and proportions.

**13 Vital statistics and Demography:**

computation and applications - Rate, Ratio, Proportion, Mortality and fertility rates, Attack rate and hospital-related statistics

**14 Familiarization with the use of Statistical software like SPSS/Graph Pad**

**PRACTICAL**

**100 marks**

**I. RESEARCH METHODOLOGY**

**Teaching hours 120**

**PRACTICAL NAME**

**1 Pharmaceutical Chemistry**

Familiarization and demonstration of common lab instruments for carrying out analysis as per API

**2 Awareness of Chromatographic Techniques**

Demonstration or Video clips of following:

- Thin-layer chromatography (TLC).
- Column chromatography (CC).
- Flash chromatography (FC)
- High-performance thin-layer chromatography (HPTLC)
- High Performance (Pressure) Liquid Chromatography (HPLC)
- Gas Chromatography (GC, GLC)

**4 Pharmacognosy**

Familiarization and Demonstration of different techniques related to:-Drug administration techniques- oral and parenteral.

Blood collection by orbital plexuses puncturing.

Techniques of anesthesia and euthanasia.

Information about different types of laboratory animals used in experimental research  
Drug identification as per API including organoleptic evaluation

#### **5 Pharmacology and toxicology**

Familiarization and demonstration of techniques related to pharmacology and toxicology

#### **6 Biochemistry (Clinical)**

Familiarization and demonstration of techniques related to basic instruments used in a clinical biochemistry laboratory – semi and fully automated clinical analyzers, electrolyte analyzer, ELISA-techniques, nephelometry.

Demonstration of blood sugar estimation, lipid profiles, kidney function test, liver function test. HbA1, cystatin and microalbumin estimation by nephelometry or other suitable techniques. Interpretation of the results obtained in the light of the data on normal values.

#### **7 Clinical Pathology**

Familiarization and demonstration of techniques related to basic and advanced instruments used in a basic clinical pathology lab. Auto cell counter, urine analyzer, ESR, microscopic examination of urine.

#### **8 Imaging Sciences**

Familiarization and demonstration of techniques related to the imaging techniques. Video film demonstration of CT-Scan, MRI-scan and PET-scan.

#### **9 Clinical protocol development**

## **II. MEDICAL STATISTICS**

**Practical hours:20**

Statistical exercise of examples from Topic number 4, 5, 8-12, 14, 15. Records to be prepared.

#### **Distribution of marks (practical):**

1. Instrumental spotting test– 20 marks
2. Clinical protocol writing exercise on a given problem– 20 marks
3. Records:Research methodology -10 Mark
4. Medical statistics -10 marks
5. Viva- Voce -40 Marks

#### **REFERENCE BOOKS:-**

##### **Pharmacognosy:**

1. Aushotosh Kar “Pharmacognosy & Pharmacobiotechnology” New Age International Publisher. Latest Edition. New Delhi.
2. Drug Survey by Mayaram Uniyal
3. Fahn A (1981). Plant Anatomy 3rd Edition Pergamon Press, Oxford
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**Pharmaceutical chemistry, quality control and drug standardization:**

1. Ayurvedic Pharmacopoeia of India. Part I- volume 1 to 8 and Part II- volume 1 to 3. Ministry of Health and Family Welfare. Controller of Publication. Govt of India. New Delhi.
2. Brain, KR and Turner, TD. (1975). The Practical Evaluation Phytopharmaceuticals. Wright Sciencetechnica, Bristol.
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5. HPTLC- Fingerprint atlas of Ayurvedic Single Plant Drugs mentioned in Ayurvedic Pharmacopoeia Vol- III and IV. CENTRAL COUNCIL FOR RESEARCH IN AYURVEDA AND SIDDHA. New Delhi.
6. Kapoor, RC (2010). Some observations on the metal based preparations in Indian System of Medicine. Indian Journal of Traditional Knowledge. 9(3): 562-575
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8. Laboratory Guide for- The Analysis of Ayurved and Siddha Formulations – CCRAS, New Delhi.
9. Mahadik KR, Bothara K G. Principles of Chromatography by, 1st edition, Nirali Prakashan.
10. Qadry JS and Qadry S Z., Text book of Inorganic Pharmaceutical and Medicinal Chemistry, B. S.Shah Prakashan, Ahmedabad.
11. Quality Control Methods for Medicinal Plant Material. Reprint (2002). WHO- Geneva.
12. Rangari V.D., Pharmacognosy & Phytochemistry, Vol I, II, Career Publication,
13. Sharma BK. Instrumental Methods of Chemical Analysis by, Goel Publishing House.
14. Srivastav VK and Shrivastav KK. Introduction to Chromatography (Theory and Practice)
15. Stahl E., Thin Layer Chromatography - A Laboratory Handbook, Springer Verlag, Berlin.
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**Biochemistry and Laboratory techniques:**

1. Asokan P. (2003) Analytical Biochemistry, China publications,
2. Campbell, P.N and A.D .Smith, Biochemistry Illustrated, 4th ed, Churchill Livingstone.
3. David Frifelder. W. H. Freeman. (1982). Physical Biochemistry by; 2 edition

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12. Text book of Radiology and Imaging, Vol-1, David Sultan, 7th Edition. 2003.

#### **Research methodology:**

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2. Ayurvediya Anusandhan Paddhati – P.V. Sharma
3. Altick and Fenstermaker. (2007). *The Art of Literary Research*. 4th ed. W. W. Norton. Castle, Gregory. *Blackwell Guide to Literary Theory*. Blackwells,
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12. Relevant portions of Ayurvedic Samhitas and other texts

#### **Drug research and development:**

1. RICK NG, (2009). *DRUGS- from discovery to approval*. John Wiley & Sons, Inc., Hoboken, New Jersey
2. Research guidelines for evaluating the safety and efficacy of herbal medicines. (1993). . WHO- (Regional Office for the Western Pacific – Manila) ISBN 92 9061 110 3 (NLM Classification: WB925).
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4. WHO Guidelines on Safety Monitoring of herbal medicines in pharmacovigilance systems. (2004). WHO- Geneva. ISBN 92 4 1592214.
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#### **Biotechnology and Bio-informatics:**

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8. <http://www.zygogen.com>.
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10. [www.consort-statement.org](http://www.consort-statement.org)
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#### **Clinical Evaluation:**

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2. Ethical Guidelines for Biomedical Research on Human subjects. (2000). Indian Council of Medical Research- New Delhi.
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9. William C. Scheffer Introduction to Clinical Researchs

#### Medical Statistics:

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2. Armitage P, Berry G, Matthews JNS: *Statistical Methods in Medical Research*. Fourth edition. Oxford, Blackwell Science Ltd; 2002
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15. Suhas Kumar Shetty- Medical statistics made easy

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**M.D.-AYURVEDA PRELIMINARY**  
**DRAVYAGUNA VIGYAN(Materia Medica & Pharmacology)**  
**PAPER-II**

Theory 100 Marks

**PART-A 50 marks**

1. Panchamahabhuta siddhanta, Samanya Visheshha siddhanta, Tridosha siddhanta. Extensive study on classifications of Dravya as described in Brihatrayi.
2. Applied aspects of Rasa, Guna, Virya, Vipaka and Prabhava
3. Applied aspects of Aushdha karma with reference to Sharngadhara and Bhavaprakasha
4. Importance of Namarupa vigyan and concept of basonyms and synonyms of Dravyas
5. Applied knowledge of Bhaishajya Prayoga (marga, kalpana, matra, anupana, sevan, kala etc.)

**PART-B 50 marks**

6. Basic principles of Desha pravichara, Dravya sangrahana (collection), Samrakshana (preservation)
7. Evolution of Dravyaguna vigyan with special emphasis on Nighantus
8. Prashasta bhashaj lakshana
9. Profound knowledge on applied aspects of Agrya aushadha
10. Methodology of studying controversial, pratinidhi (substitute), apamishrana (adulterant) and unidentified dravya
11. Pharmacognosy and its relevance in Dravyaguna vigyan
12. An integrated study of Charakokta Bhashaj pariksha and scientific method of drug evaluation with special reference to quality, safety and efficacy
13. Brief knowledge and importance of clinical pharmacology
14. General principles of various good cultivation practices, collection practices, storage practices and manufacturing practices
15. Pharmacovigilance and ADR issues
16. Knowledge on the Ayurvedic Pharmacopoeia of India, The Formulary of India and international pharmacopoeias

**PRACTICAL 100 marks**

Contents:

1. Field visits for the Identification of important classical medicinal plants (Minimum two visits to neighboring forest areas)
2. Macroscopic and microscopic identification of minimum two plants of each of prayojyanga (useful parts of plants)
3. Preliminary study of pharmacoepial standards (API) of minimum 5 plants
4. Minimum two experiments on Animals



**Distribution of marks (Practical)**

1. Herbarium sheets -10 Marks
2. Practical of macroscopic and microscopic identification of prajoyyanga (one part of the plant)-30 Marks
3. Practical record book of pharamcopoeial standards and animal experimentations -10 Marks
4. Spotting -30 Marks
5. Viva-voce -20 Marks

**REFERENCE BOOKS:**

- 1 Abhinav Buti Darpan (Vol.1-2)- Vd. Roop Lal Vaishya
- 2 Aushadna Vigyna Shastra -Acharya Pt. Vishvanatha Dwidevi
- 3 Ayurvediya Aushadnkarma vigyana -Acharya V.J. Thakur
- 4 Bedi Vanaspati Kosha- Prof. Ramesh Bedi
- 5 Bhaishajyaguna Vigyana - Dr. Alakhnarayan Singh
- 6 Bhav Prakash Nigantu (English) - Shreekanthamurti
- 7 Bhav Prakash Nighantu -With Vd. Krishna Chandra Chunekar commentary
- 8 Bhrinad dravyagunadarsha - Mahendra Kumar Shastri
- 9 Classical Uses of Medicinal Plants - Acharya Priyavrata Sharma
- 10 Controversial Medicinal Plants - Vd. G. Bapa Lal
- 11 Dalhana Ka Dravyaguna Shastra Ke Kshetra Me Yogadana -Vd. Shiv Kumar Vyas
- 12 Dravyaguna Kosha - Acharya Priyavrata Sharma
- 13 Dravyaguna Sutram - Acharya Priyavrata Sharma
- 14 Dravyaguna Vigyana - Dr. Gyanendra Pandey
- 15 Dravyaguna Vigyana(Vol. 1-2) -Acharya Yadavji Tikram Ji
- 16 Dravyaguna Vijyana - Dr. V.M. Gogate
- 17 Dravyaguna Vigyana (Vol. 1-5) - Acharya Priyavrata Sharma
- 18 Dravyaguna Shastrum- Vaidya G.A. Phadake
- 19 Dravyaguna Vijyana - Dr. A.P. Deshpande
- 20 Dravyagunavijnana basic Principles - Prof.D.S.Lucas
- 21 Forgotten Healers (Indian Medicinal Plants) - Dr. Prakash Pranjape
- 22 Glossry of Vegetable Drugs in Bhritrtrayis -Thakur Balwant Singh & Vd. Krishna Chandra Chunekar
- 23 Introduction to Dravyaguna - Acharya Priyavrata Sharma
- 24 Kriyatamka Aushadi Parichaya - Acharya Pt. Vishvanath Dwidevi
- 25 Materia Medica - Acharya Ghosh
- 26 Nighantu Adarsh (Vol. 1-2) - Vd. Bapa Lal
- 27 Pharmacological basis of Medical Practice - Goodman & Gillman
- 28 Pharmacology and Pharmacotherapeutics - Satoskar Bhandarkar & Ainapure
- 29 Prayogatamaka Dravyaguna Vigyana- Dr. Maya Ram Uniyal
- 30 Priya nighantu - Acharya Priyavrata Sharma
- 31 Raspanchaka/Dravyaguna Siddhanta - Prof. Shivcharan Dhyani
- 32 System of Plant Nomenclature in Ayurveda - Dr. Gyanendra Panday

- 33 Text Book of Pharmacology - Trees & Valis  
34 Textbook of Dravyaguna - Dr.K.Nishteswar  
35 Unani Dravyaguna Vigyana - Hakim Daljeet Singh  
  
36 Useful parts of Charaka, Sushrut, and Vagbhata. -  
37 Uttarakand Ki Vanaspathiya - Dr. Gyanendra Pandey  
38 Vanoaushadi Darshika - Thakur Balwant Singh  
39 Vanoaushadi Nidarshika - Dr. Ram Sushil Singh  
40 Vedic Vanaspathyan - Dr. Dinesh Chandra Sharma  
41 Pharmacopia of India –all the volumes  
42 Database on medicinal plants all the volumes of CCRAS  
43 Aurveda formulary of india – all the volumes  
44 All the nighantooos  
45 Laghutrayi
- .....

**M.D.-AYURVEDA FINAL**  
**DRAVYAGUNA VIGYAN**

**(Materia Medica & Pharmacology)**

**DRAVYAGUNA VIGYAN**

**PAPER-I**

**Namarupa Vigyana**

**100 marks**

1. Importance of Namagyana of Dravya, origin of Namarupagyana of Aushadhi in Veda, etymological derivation of various names and synonyms of Aushadhi.
2. Rupagyana in relation to Aushadhi. Sthula and Sukshma description (Macroscopic and Microscopic study) of different parts of the plant.
3. Synonyms of dravyas(aushadha and Ahara) mentioned in Vedic compendia, Brihatrayee, Bhavaprakasha and Rajanighantu.
4. Basonyms, synonyms and distinguish morphological characteristic features of medicinal plants listed in Ayurvedic Pharmacopoeia of India(API).
5. Knowledge of Anuktadravya (Extrapharmacopial drugs)with regards to namarupa.
6. Sandigdhadravya(Controversial drugs) vinischaya.
7. Knowledge of biodiversity, endangered medicinal species.
8. Knowledge of TKDL, Introduction to relevant portions of Drugs and cosmetic act, Magic remedies Act, Intellectual Property Right (IPR) and Regulations pertaining to Import and Export of Ayurvedic drugs.
09. Knowledge of tissue culture techniques
10. Knowledge of Genetically Modified Plants

**PAPER –II**

**Guna Karma Vigyan**

**100 marks**

1. Fundamental principles of drug action in Ayurveda and conventional medicine.
2. Detailed study of rasa-guna- virya- vipaka-prabhava and karma with their applied aspects and commentators (Chakrapanidatta, Dalhana, Arunadatta, Hemadri and Indu) views on them.
3. Comprehensive study of karma as defined in Brihatrayee&Laghutrayee

4. Detailed study of Guna and Karma of dravyas listed in API and BhavaprakashaNighantu along with current research review.
5. Detailed study of aharadravya/ aharavarga ascribed in Brihatrayee and various nighantus along with Kritannavarga.
6. Pharmacological principles and knowledge on drugs acting on various systems.
7. Basic knowledge on experimental pharmacology for the evaluation of - analgesic, anti pyretic, anti inflammatory, anti diabetic, anti hypertensive, hypo lipidemic, anti ulcer, cardio protective, hepatoprotective, diuretics, adaptogens, CNS activities.
8. Knowledge on Heavy metal analysis, pesticidal residue and aflatoxins
9. Knowledge on evaluation of anti microbial and antimycotic activities.

### **PAPER – III**

#### **Prayogavigyana**

**Marks 100**

1. BhaishjyaPrayogSiddhant [Principles of drug administration] - BhaishajyaMarga (routes of drug administration), VividhaKalpana (Dosage forms), Principles of Yoga Vijnan( compounding), Matra (Dosage), Anupana (Vehicle), Aushadhagrahankal (Time of drug administration ), Sevankalavadhi (duration of drug administration), Pathyapathya (Dos' /Donts' /Contraindications), complete Prescription writing (SamagraVyavasthapatraka).
2. Samyoga- ViruddhSidhanta and its importance
3. Amayikaprayoga (therapeutic uses) of important plants ascribed in as well as Brihatrayee, Chakradutta, Yoga ratnakara and Bhavaprakasha.
4. Knowledge of Pharmaco-vigilance in Ayurveda and conventional system of medicine.
5. Knowledge of clinical pharmacology and clinical drug research as per GCP guide lines.
6. Knowledge of Pharmacogenomics

### **PAPER- IV**

**100 marks**

1. Etymology of nighantu, their relevance, utility and salient features.
2. Chronological history of the following Nighantus with their authors name, period and content- Paryayaratnamala, Dhanvantarinighantu, Hridayadipikanighantu, Ashtanganighantu, Rajanighantu, Siddhamantranighantu, Bhavaprakashanighantu, Madanpalanighantu, Rajavallabhanighantu, MadhavaDravyaguna, Kaiyadevanighantu, Shodhalanighantu, Saligramnighantu, Nighanturatnakara, Nighantuadharsha and Priyanighantu
3. Detailed study Aushadhakalpana mentioned in Sharangadharasamhita and Ayurvedic Formulary of India (AFI).

4. General awareness on poshakaahara(Nutraceuticals),Varnya(cosmoceuticals), food additives, Excipients etc.
5. Knowledge of plant extracts, colors, flavors and preservatives.
6. Review of important modern works on classical medicinal plants published by Govt of India, department of AYUSH and ICMR.

### **Syllabus of the Practical training of part two M.D. (Ayu) - Dravyaguna**

#### **Practical:-**

#### **Study tours:**

Field identification of medicinal plants through at least three local Dravyaguna study tours within the state and one study tour out of state. Preparation of minimum 50 herbarium sheets, along with raw drug either from field, of plants be collected during study tours.

1. Evaluation of Crude drugs:

Macro and microscopic methods of examining five drugs of each of different useful parts of plants, including their powders.

2. Phytochemical evaluation of raw material:

Quantitative standards like foreign matter, extractive ( water and alcohol), ash value, acid insoluble ash and TLC separation of various parts of minimum two plants of Ayurvedic Pharmacopoeia of India.

3. Yoga vijnana :

Preparation of two yoga of each kalpana of Ayurvedic Formulary of India:

4. Pharmacology:

- Rasa nirdharana by Taste Threshold method of minimum one drug for each of rasas.
- Observation of animal experimentation models (both in vitro and in vivo)- 05 models for possible rasadigunas.

5. Clinical

- Regular clinical training in the hospital for submission of Single AushadhiPrayoga (Single drug trial/ Clinico-pharmacological studies.)
- Survey for Amayikaprayoga of aushadhi(Pharmaco epidemiology) for studying their role in clinical practice in contemporary period -observational study-minimum.

6. Dissertation

A Dissertation, as per the approval of Departmental Research Committee/Competent Committee for the purpose, be prepared under the guidance of approved supervisor

inDravyaguna and submitted 6 months before the final examination. The approval of Dissertation shall be essential before appearing the final examinations.

7. Method of practical training – Posting for minimum one month in each of the following units -

Quality control laboratory of nearest pharmacy/institution for crude drug identification, adulterants and substitutes & understanding standardization techniques.

Experimental pharmacology laboratory for developing skills in animal experimentation

Regular clinical training in the Teaching hospital for studying EkalaAushadhiPrayoga& Adverse drug reactions(ADR).

8. Post Graduate Scholar is expected to present minimum two scientific papers in National / international seminars during the course of study

9. Post Graduate Scholar is expected to publish / get accepted at least one paper in indexed/ peer reviewed journal under the supervision of guide.

**Pattern of Practical Examination-**

**Total =200 marks**

1. Herbarium	- 10 Marks
2. Pharmacognosy practical record	- 10 Marks
3. Pharmacology practical record	- 10 Marks
4. Clinical records record	-10 Marks
5. Practical examination(Identification of green and raw drugs, microscopic examination, Ekalaushadhapariksha	- 60 Marks
6. Thesis Presentation	- 20Marks
7. Viva voce	-80 Marks

**Reference books -**

**REFERENCE BOOKS:**

- 1 Abhinav Buti Darpan (Vol.1-2)- Vd. Roop Lal Vaishya
- 2 Aushadna Vigyna Shastra -Acharya Pt. Vishvanatha Dwidevi
- 3 Ayurvediya Aushadnkarma vigyana -Acharya V.J. Thakur
- 4 Bedi Vanaspati Kosha- Prof. Ramesh Bedi
- 5 Bhaishajyaguna Vigyana - Dr. Alakhnarayan Singh
- 6 Bhav Prakash Nigantu (English) - Shreekanthamurti
- 7 Bhav Prakash Nighantu -With Vd. Krishna Chandra Chunekar commentary
- 8 Bhrinad dravyagunadarsha - Mahendra Kumar Shastri
- 9 Classical Uses of Medicinal Plants - Acharya Priyavrata Sharma

- 10 Controversial Medicinal Plants - Vd. G. Bapa Lal
- 11 Dalhana Ka Dravyaguna Shastra Ke Kshetra Me Yogadana -Vd. Shiv Kumar Vyas
- 12 Dravyaguna Kosha - Acharya Priyavrata Sharma
- 13 Dravyaguna Sutram - Acharya Priyavrata Sharma
- 14 Dravyaguna Vigyana - Dr. Gyanendra Pandey
- 15 Dravyaguna Vigyana(Vol. 1-2) -Acharya Yadavji Tikram Ji
- 16 Dravyaguna Vijyana - Dr. V.M. Gogate
- 17 Dravyaguna Vigyana (Vol. 1-5) - Acharya Priyavrata Sharma
- 18 Dravyaguna Shastrum- Vaidya G.A. Phadake
- 19 Dravyaguna Vijyana - Dr. A.P. Deshpande
- 20 Dravyagunavijnana basic Principles - Prof.D.S.Lucas
- 21 Forgotten Healers (Indian Medicinal Plants) - Dr. Prakash Pranjape
- 22 Glossry of Vegetable Drugs in Bhritrayis -Thakur Balwant Singh & Vd. Krishna Chandra Chunekar
- 23 Introduction to Dravyaguna - Acharya Priyavrata Sharma
- 24 Kriyatamka Aushadi Parichaya - Acharya Pt. Vishvanath Dwidevi
- 25 Materia Medica - Acharya Ghosh
- 26 Nighantu Adarsh (Vol. 1-2) - Vd. Bapa Lal
- 27 Pharmacological basis of Medical Practice - Goodman & Gillman
- 28 Pharmacology and Pharmacotherapeutics - Satoskar Bhandarkar & Ainapure
- 29 Prayogatamaka Dravyaguna Vigyana- Dr. Maya Ram Uniyal
  
- 30 Priya nighantu - Acharya Priyavrata Sharma
- 31 Raspanchaka/Dravyaguna Siddhanta - Prof. Shivcharan Dhyani
- 32 System of Plant Nomenclature in Ayurveda - Dr. Gyanendra Panday
- 33 Text Book of Pharmaconogy - Trees & Valis
- 34 Textbook of Dravyaguna - Dr.K.Nishteswar
- 35 Unani Dravyaguna Vigyana - Hakim Daljeet Singh
  
- 36 Useful parts of Charaka, Sushurut, and Vagbhata. -
- 37 Uttarakand Ki Vanaspatiya - Dr. Gyanendra Pandey
- 38 Vanoaushadi Darshika - Thakur Balwant Singh
- 39 Vanoaushadi Nidarshika - Dr. Ram Sushil Singh
- 40 Vedic Vanaspatiyam - Dr. Dinesh Chandra Sharma
- 41 Pharmacopia of India –all the volumes
- 42 Database on medicinal plants all the volums of CCRAS
- 43 Aurveda formulary of india – all the volums
- 44 All the nighantoos
- 45 Laghutrayi