

2021

425

2023-24

Dr. H. S. Gour Vishwavidyalaya, Sagar (M.P.)

Ph.D. Entrance Exam 2021-22

Syllabus: Research Methodology (Pharmaceutical Sciences)

Foundation of Research: Meaning, Objectives, Applications, Research Theory & Research Process: Concept, Construct, Definition, Variables, Problem Identification and formulation, Research Question, Investigation Question, Hypothesis Testing. Logic & its Importance.

Research Design: Concept and Importance in Research, Features of a good research design, Exploratory Research Design, Descriptive Research Designs, Experimental Design: Concept of Independent & Dependent variables. Qualitative and Quantitative Research. Regulatory authority and their research & ethical guidelines.

Sampling: Concepts of Statistical Population, Sample, Sampling Frame, Sampling Error, Sample Size, Non Response. Characteristics of good Samples, Probability of Samples, Determining size of the Sample. Practical considerations in Sampling and Sample size.

Data Analysis: Data Preparation, Univariate analysis (frequency tables, bar, charts, pie charts percentages) Bivariate analysis, Cross tabulations and Chi-square test including testing hypothesis of association.

Interpretation of Data and Paper Writing, Layout of a Research Paper, Journals in core branches of Pharmaceutical Sciences, Impact factor of Journals, Ethical issues related to publishing, Plagiarism and Self-Plagiarism, Encyclopedia, Academic & Research Databases related to Pharmaceutical Sciences

Tools and technique for Research: Method to search desired information effectively. Reference Management Software, Software for paper formatting. Software for detection of Plagiarism, Excel sheet formatting

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Syllabus for Ph.D. Entrance Exam-2021-22

The Ph.D. entrance will be based on the following syllabus. Candidates are required to have Post Graduate level knowledge of subjects as per prescribed syllabus.

Pharmacology

- Bioassays Immuno Pharmacology
- Drug interaction
- General pharmacological principles
- Pharmacology - Autocoids, Chemotherapeutic agents, Hormone antagonists, Hormones

Pharmacology of drugs- On systems - Autonomic nervous system, Cardiovascular system, Central nervous system, Gastro-intestinal system, Urinogenital System, Respiratory system.

- Hemopoietic System
- Principles of Toxicology

Pharmacognosy and Natural Products

- Phytopharmaceuticals - Characterization, Chemistry, Isolation, Source, Tests.
- Phytopharmaceuticals (groups) - Alkaloids, Carbohydrates, Essential oils, Glycosides, Lipids, Pharmaceutical enzymes, Resins, Steroids, Tannins, Terpenoids.
- Indigenous traditional drugs
- Nutraceuticals and Functional Foods
- Probiotics and Prebiotics
- Pharmacognosy of crude drugs.
- Plant tissue culture - Applications in drug production.
- Standardization of raw materials and herbal products.
- Methods of extraction, isolation and characterization of natural products. Various separation techniques used for isolation of natural products.
- Biosynthetic pathways. Primary and secondary metabolites, various classes of secondary metabolites (e.g. Alkaloids, glycosides, tannins, lignans, saponins, lipids, flavonoids, coumarins, anthocyanidines etc.). Here most imp. Part is chemistry of these classes.
- Important therapeutic classes: antidiabetics, hepatoprotectives, immunomodulators, nutraceuticals, natural products for gynecological disorders, anti-cancer, anti-viral (mainly anti-HIV), adaptogens etc.
- Dietary antioxidants, Marine natural products, Plant growth regulators.
- Standardization of natural products.

Medicinal Chemistry

- Category of drugs - Analgesics, Anticonvulsants, Antidepressants, Antihistaminics, Anxiolytics, Cardio Vascular drugs (Adrenergic & Cholinergic drugs, Antianginal agents Vasodilators, Anticoagulants, Anti-hypertensive drugs, Antilipemic agents, Antiplatelet agents, Cardiotonic agents, Coagulants, Diuretics, Hypoglycemic agents), Hypnotics and Sedatives, Local Anaesthetics, Neuroleptics, NSAIDS
- Chemotherapeutic agents - Antibacterials, Antibiotics, Sulpha drugs
- Diagnostic agents

- Eicosanoids and their applications
- Introduction to drug design
- Radiopharmaceuticals
- Vitamins
- Stereochemistry of drug molecules
- Steroidal Hormones and non Steroidal Hormones

Biochemistry

- Biochemical role – Bioenergetics, Enzymes, Hormones, Nucleic acids, Vitamins
- Metabolism – Carbohydrates, Lipids, Proteins, *Nucleic Acids*
- Lipid profiles
- Biochemistry and its importance in Pharmaceutical Sciences.
- Biological oxidation and reduction, respiratory chain, oxidative phosphorylation. Enzymes and co-enzymes of Bioredox system.
- Biosynthesis of DNA and its replication, mutation and repair mechanism.
- An introduction to genetic engineering, biosynthesis of RNA, genetic code and protein synthesis.

Pharmaceutical Analysis

- Absorption spectroscopy – Principles, Instrumentation, Applications
- Advances in GLC, HPLC, HPTLC, NMR, MS, GC-MS.
- Chromatographic techniques – Column, Gel filtration, Ion-exchange, Paper, TLC
- Conductometry
- Flame photometry
- Fluorimetry
- Polarography
- Potentiometry
- Pharmacopoeial assays
- Non-aqueous titrations
- Complexometric methods, redox titrimetric methods

Pharmaceutics

- *GIT Absorption of drugs*
- *Bioavailability and bioequivalence*
- *Compartment Models:*
- *Non-Compartmental*
- *Non Linear Pharmacokinetics*
- Surgical Products
- *Collection, processing and storage of blood products*

- *Biologicals obtained by Fermentation*
- *Antibiotics*
- *Organization and Structure Organization of a hospital and hospital pharmacy*
- *Drug Distribution Systems in Hospitals*
- *Central Sterile Supply Unit and its Management*
- *Manufacture of Sterile and Non sterile Products:*
- *Nuclear Pharmacy*
- *Solubility and Distribution phenomenon*
- *Micromeritics Particle size and size distribution,*
- *Colloids Introduction,.*
- *Complexation and Protein Binding Diffusion and Dissolution*
- *Polymer Science*
- *Dosage forms – Preformulation, Formulation, Development, Evaluation: oral parenteral, topical*
- *Formulation and preparation of cosmetics*
- *Introduction to new drug delivery systems*
- *Manufacturing standards and Q.C. limits*

Industrial Unit Operations

- *Pharmaceutical applications and principles-Drying, Filtration, Mixing, Size reduction, Size separation, evaporation, distillation etc.*

Clinical Pharmacy

- *Dosage regimen- Geriatrics, Lactation, Pediatrics, Pregnancy*
- *Drug interactions and drug - Adverse drug reactions, Food interactions*
- *Renal and hepatic impairment*
- *Therapeutic drug monitoring*

Applied Microbiology and Biotechnology

- *Eukaryotic and Prokaryotic cells*
- *Sterilization methods, Validation and sterility testing and mechanisms*
- *Applications of microorganisms*
- *Expression of recombinant protein*
- *Genetic engineering – Amplification, Conjugation, Gene cloning, Transduction, Transformation*
- *Immobilization techniques and applications*

- Preparation of official sera and vaccines
- Serological and diagnostics tests

GATT

General Agreement on Tariff and Trade and its impact on pharmaceutical industry. History of GATT, its impact on pharmaceutical industry. Pharmaceutical market in India.

IPR

Types of intellectual property rights: industrial property and copyrights Indian Patent Acts, 1970 with latest amendment. Definition, types of patents.

Standard institutions and regulatory authorities

- Bureau of Indian standards (BIS).
- International Organization for Standardization (ISO).
- United States of Food and Drug Administration (USFDA).
- Central Drug Standard Control Organization (CDSCO).
- International Conference on Harmonization (ICH).
- World Health Organization (WHO).
