



Syllabus for Written Examination

Post: **Assistant Professor/Lecturer**

Subject: **Pharmaceutical Sciences** (Major: M Pharm. Natural Products Chemistry /Pharmacognosy/
Pharmaceutical Analysis/ Photochemistry/Drug Discovery)

1. The knowledge of the related subject matters which are generally included in the concerned bachelor and master level courses

- (a) A general review on the source of drugs, primary and secondary metabolism, and construction mechanism of organic molecules.
- (b) Pharmacognostic study of medicinal and aromatic plants of Nepal.
- (c) Phytochemical and pharmacological screening of the plant extracts and active phytochemicals (common in-vitro, in-vivo, and in-silico tests)
- (d) Chemistry, classification, biosynthesis, synthesis, and pharmacological activities of major primary and secondary metabolites (alkaloids, polyphenols, tannins, glycosides, steroids, terpenoids, flavonoids lipids, enzymes and proteins, lignin and pectin, etc.).
- (e) Pharmacopoeia and related drugs of biological origins.
- (f) Extraction, isolation, and purification of phytochemicals.
- (g) Structure elucidation and spectroscopic analysis of phytopharmaceuticals (NMR, Mass spectrometer, IR, HPLC, GC, and UV).
- (h) Chromatographic, electrical, titrimetric, and biological techniques of drug analysis with their applications.
- (i) Identification, validation, and optimization of target molecules and clinical trials of natural drugs
- (j) Traditional and complementary/alternative systems of medicine.
- (k) Plant tissue culture, biotechnology, and bio-prospecting.
- (l) Insight on plant hormones and toxicity of natural drugs.
- (m) Principles and uses of different types of titrations and electrochemical methods of analysis of drug and drug substances.

2. Basic knowledge of the recent trends in Natural Products Chemistry, Pharmacognosy, Drug Discovery, Phytochemistry, and Pharmaceutical Analysis

- (a) Current status and future scope of pharmaceutical chemistry.
- (b) Drug design, discovery, and development from the natural or synthetic source of the drug.
- (c) New technologies used in pharmaceutical analysis to fasten the drug discovery process.
- (d) Cultivation, utilization, and commercialization of medicinal plants and their products.
- (e) Quality control guidelines for quality control and quality assurance of drugs and drug excipients.
- (f) Herbal Pharmacology and Formulations.
- (g) An ethnomedicinal study, Lead discovery, modification, and SAR/QSAR studies of drug molecules.
- (h) Overview of promising Cosmeceuticals and Nutraceuticals of natural origin, their trade, and commerce.

3. National and global trends and issues regarding the Pharmaceutical Education

4. Teaching and research methodology:

Teaching skills, conceptualization of research topic, pharmaceutical research proposal design and scientific writing, project development, pharmacy law, and research ethics.



Syllabus for Written Examination

Post: **Assistant Professor/Lecturer**

Subject: **Pharmaceutical Sciences** (major: M. Pharm. Pharmacology, Biotherapeutic)

1. The knowledge of the related subject matters which are generally included in the concerned bachelor and master level courses

- (a) Basics of pharmacology and therapeutics, drug nomenclature, sources, receptors, agonist and antagonist, pharmacokinetics and pharmacodynamics of drugs
- (b) Neurotransmission in ANS, CNS, and non-adrenergic non-cholinergic transmission (NANC).
- (c) Systemic pharmacology: Pathophysiology of diseases, indication, mechanism of actions, pharmacology, and toxicology of existing as well as novel drugs pertaining to Autonomic Pharmacology, Central Nervous, System pharmacology, Cardiovascular Pharmacology, Hematinics, Coagulants, anticoagulants, fibrinolytic and anti-platelets drugs (Drugs used in CVS, CNS, respiratory system, urinary system, GI tract, antimicrobial and parasitic infection).
- (d) Endocrine pharmacology and Chronopharmacology.
- (e) Chemotherapy and cellular and molecular mechanisms of actions and resistance.
- (f) Immunopharmacology, Autocoids, and GIT Pharmacology.
- (g) Various animals used in the drug discovery process and good laboratory practices in the maintenance and handling of experimental animals.
- (h) Applicability of molecular pharmacology and biomarkers in the drug discovery process
- (i) Ethical and regulatory requirements for toxicity studies.

2. Basic knowledge of the recent trends in Pharmacology

- (a) In vitro and in vivo models and newer screening methods involved in the drug discovery process (Screening of antihypertensive drugs, antioxidants, anticancer, antidiabetic, agents, etc.)
- (b) Basic aspects, terminologies, progress, safety monitoring, ADR, pharmacovigilance, and drug interactions (definition and types, detection and reporting methods, severity and seriousness, predictability and preventability assessment and management, ADR reporting and tools).
- (c) Recent advances in treatment: Alzheimer's disease, Parkinson's disease, cancer, diabetes mellitus.
- (d) Pharmacogenomics, gene mapping and cloning of the diseased gene, genetic variation, and its role in health/ pharmacology. Polymorphisms affecting drug metabolism.
- (e) Toxicokinetic evaluation in preclinical studies, importance, and applications of toxicokinetic and saturation kinetics, alternative methods to animal toxicity testing.

3. National and global trends and Issues regarding the Pharmaceutical Education

4. Teaching and research methodology:

Teaching skills, Conceptualization of Research topic, Pharmaceutical Research Proposal design and scientific writing, project development, Pharmacy law, and research ethics.