

School of Pharmacy

**Programme Outcomes (POs), Programme Specific
Outcomes (PSOs) & Course Outcomes (POs)**

Programme Outcomes (POs):

B. Pharm:

PO1: Technical Knowledge of Pharmaceutical Science (core subjects) and Practice (applications of the subjects in profession).

PO2: Hands-on practical training on sophisticated analytical instruments, biomedical devices, simulated software for animal studies, drug designing through CADD.

PO3: To impart knowledge about the Code of Conduct and Professional Integrity to practice the profession of Pharmacy.

PO4: Providing Pharmaceutical care to the consumers.

PO5: Development of Team spirit and leadership qualities.

PO6: Effective verbal and non-verbal communication while dealing with professional clients and peers.

PO7: Brainstorming of the potential problems pertaining to technical, cognitive and communicative skills and their solutions by mentors.

PO8: Placement of Students/ Self-employment.

D. Pharm:

PO1: Technical Knowledge of Pharmaceutical Science (core subjects) and Practice (applications of the subjects in profession).

PO2: To impart knowledge about the Code of Conduct and Professional Integrity to practice the profession of Pharmacy.

PO3: Providing Pharmaceutical care to the consumers.

PO4: Effective verbal and non-verbal communication while dealing with professional clients and peers.

PO5: To impart knowledge about prescription handling and patient counseling.

PO6: To study the inventory control and Drug store management in the drug store/ Pharmacy of a hospital.

PO7: Brainstorming of the potential problems pertaining to technical, cognitive and communicative skills and their solutions by mentors.

PO8: Placement of Students/ Self-Employment.

Programme Specific Outcomes (PSOs):

B. Pharm:

Bachelor of Pharmacy is a four year degree programme divided in Eight semesters. The students are introduced to the basics of Organic, Physical, Inorganic and Medicinal Chemistry for the synthesis, analysis and instrumentation. Students are taught Anatomy, Physiology and Biochemistry to understand the structure, functions and composition of the human body. Knowledge of these basic subjects is essential for thorough understanding of the concepts and applications of Pathophysiology, Pharmacology and Biopharmaceutics which will help students to understand the fundamentals of Drug therapy and its disposition. The basics of Pharmaceutics are essential in understanding the principles of the technology involved in the manufacturing of different dosage forms, their physico-chemical properties, evaluation along with the sterilization techniques and microbiological assessment of formulations and active pharmaceutical ingredients (APIs) under aseptic conditions. The knowledge of Pharmacognosy is useful to identify the medicinal plants taxonomically, along with the methods of extraction and isolation of constituents from plant sources. Pharmaceutical Jurisprudence provides the insight of the regulatory norms of the national and international drug regulatory bodies. Pharmaceutical Management adds on the marketing and managerial skills in the graduating Pharmacy Students to explore their career in Pharma marketing, Product Development Team of the Pharmaceutical Industry.

The students after graduating have a wide array of options as below:

As Employee:

- a) **Pharmaceutical Industry:** Students keen to make their career in a Pharmaceutical Industry have the following job profiles:
 - i) **Production:** As Production trainee, supervisors, managers etc.
 - ii) **QC/QA:** To assure whether the Active Pharmaceutical Ingredients (APIs) used in formulations and the manufactured formulations passes the required quality standards as per the norms of USFDA (United States Food and Drugs Administration) or FDA of Govt. of India.
 - iii) **Microbiology:** To assure that the production area is maintaining aseptic conditions and the quality of air is in accordance with the norms of FDA.
 - iv) **Packaging and warehousing:** To assure that the finished products are packed, labeled and stored for delivery as per the statutory norms.
 - v) **Marketing:** As sales representatives. Freshers are inducted as trainee in the Business Development Team or Marketing and Sales Representatives. They are generally promoted as Area Sales Manager, Regional Sales Manager and Vice President etc.
- b) **Pharmacist:** In private and Government hospitals/ dispensaries, Government Pharmacists in Defence, Police etc.

- c) **Analyst:** As Government certified Analysts in Government Drug Testing Laboratories and Pharmaceutical industries.
- d) **Drugs Inspector:** Every state appoints Drugs inspector to inspect drug manufacturing premises, chemist retail and wholesale shops.

As Entrepreneur:

- a) **Own a Chemist/ Pharmacy Retail or Wholesale shop:** Students after graduating apply for Registration as Pharmacist in the State Pharmacy Councils and after seeking the Registration Certificate; they can apply for the license to open Pharmacy Retail or Wholesale Shop through Drugs Control Department (FDA of their state).
- b) **Set up a Pharmaceutical Manufacturing Unit:** After passing out B. Pharm., the students can apply to the FDA of their state to get the license to set up a Pharmaceutical manufacturing unit.
- c) **Set up a Contract Research Organization (CRO):** Students can set up their own CRO and get necessary approvals and certifications from the Government Accreditation/ Licensing Authorities to take up contract research projects.

Higher Education:

Students after B. Pharm., can pursue masters in Pharmacy (M. Pharm.), Management (MBA) and Law (LLB) to find job opportunities in research, managerial and advisory options in Pharmaceutical industry or academic institutions.

D. Pharm:

Diploma in Pharmacy is a Two-year programme divided in year wise fashion. The students are introduced to the basics of Anatomy, Physiology and Biochemistry to understand the concepts and applications of these subjects in Pharmacology and the fundamentals of Drug therapy. In Pharmaceutics, the students are taught the basics of writing and handling of prescription, understand prescription errors, manufacturing aspects of different dosage forms, sterilization techniques and microbiological assessment of formulations and active pharmaceutical ingredients (APIs) under aseptic conditions. The knowledge of Pharmacognosy is useful to gain knowledge about herbal drugs/ formulations. Pharmaceutical Jurisprudence provides the insight of the regulatory norms of the national and international drug regulatory bodies. A subject of Drug Store and Business Management explains the stock and inventory of the Drug Store along with the Marketing and Managerial skills. In Hospital and Clinical Pharmacy, the students are required to learn various skills like drug information, drug distribution and therapeutic drug monitoring for improved patient care. In clinical/ community pharmacy, students will be learning various skills such as dispensing of drugs, responding to minor ailments by providing suitable safe medication, patient counseling for improved patient care in the community set up.

The students after passing out D. Pharm programme, have the following placement options as below:

As Employee:

- a) **Pharmacist:** In private and Government hospitals/ dispensaries, Government Pharmacists in Defence, Police etc.
- b) **Technician:** In Pharmacy colleges, Pharmaceutical industry.

As Entrepreneur:

- c) **Own a Chemist/ Pharmacy Retail shop:** Students after passing out Diploma in Pharmacy apply for Registration as Pharmacist in the State Pharmacy Councils and after seeking the Registration Certificate; they can apply for the license to open Pharmacy Retail Shop through Drugs Control Department (FDA of their state).

Higher Education:

Students after passing D. Pharm., can pursue Bachelor of Pharmacy (B. Pharm.) under Lateral Entry seats.

Course Outcomes (Cos):

B. Pharm:

Pharmaceutics:

- CO1: To understand the basics of different dosage forms, pharmaceutical incompatibilities and pharmaceutical calculations.
- CO2: To understand various physicochemical properties of drug molecules in the designing of the dosage forms along with principles of chemical kinetics and stability testing of formulations.
- CO3: To understand the basic concepts and applications of biopharmaceutics and pharmacokinetics and bioequivalence along with their significance.

Pharmaceutical Chemistry:

- CO1: To understand the classification and nomenclature of organic compounds, structural isomerism, important physico-chemical properties, reactions and synthesis of these compounds.
- CO2: To know the sources of impurities and methods to determine the impurities in inorganic drugs and pharmaceuticals and understand the medicinal and pharmaceutical importance of inorganic compounds.
- CO3: To understand the principles of volumetric and electro chemical analysis, various volumetric and electrochemical titrations. Students develop analytical skills for the Qualitative and

Quantitative analysis.

CO4: To understand the chemistry of drugs with respect to their pharmacological activity, drug metabolic pathways, Structural Activity Relationship (SAR) of different class of drugs and synthesis of active pharmaceutical ingredients (APIs).

CO5: To understand the chromatographic separation, analysis of drugs and development of analytical methods.

Pharmacology:

CO1: To understand the gross morphology, structure and functions of various organs of the Human body.

CO2: To understand the molecular levels of the chemical process associated with living cells along with the principles of metabolism of nutrient molecules in physiological and pathological conditions.

CO3: To understand the pharmacological actions of different categories of drugs and the mechanism of drug action at organ system/sub cellular/ macromolecular levels for the prevention and treatment of various diseases.

Pharmacognosy:

CO1: To understand the taxonomic identification of medicinal plants.

CO2: To study the morphology and microscopy of crude drugs.

CO3: To understand raw material as source of herbal drugs from cultivation to herbal drug product along with the WHO and ICH guidelines for evaluation of herbal drugs.

Pharmaceutical Management and Regulatory Science:

CO1: To understand the marketing concepts, techniques and their applications in the pharmaceutical industry along with the know-how of marketing management in Sales and Product management.

CO2: To know about the process of drug discovery and development, various regulatory Authorities and agencies governing the manufacture and sale of pharmaceuticals, regulatory approval process and their registration in Indian and international markets.

Pharmacy Practice:

CO1: To know various drug distribution methods in a hospital, pharmacy stores management and inventory control.

CO2: To monitor drug therapy of patient through medication chart review and clinical review, obtain medication history interview and counsel the patients, identifying drug related problems, detection and assessment of adverse drug reactions.

Computer Applications in Pharmacy:

CO1: To understand the Database Management system, computer applications in clinical studies.

Communicative Skills in Pharmacy:

CO1: To understand the behavioral needs for a Pharmacist to function effectively in different profiles of pharmacy profession.

CO2: To learn and practice verbal and non-verbal communication along with managerial skills.

Course Outcomes (Cos):

D. Pharm:

Pharmaceutics:

CO1: To understand the basics of different dosage forms, handling of prescription and aseptic techniques.

Hospital and Clinical Pharmacy:

CO1: To know various drug distribution methods in a hospital and study of the pharmacy stores management and inventory control.

CO2: To do patient counseling in community pharmacy.

Pharmaceutical Chemistry:

CO1: To understand the classification and nomenclature of organic compounds, structural isomerism and important physico-chemical properties.

CO2: To know the sources of impurities and methods to determine the impurities in inorganic drugs and pharmaceuticals and understand the medicinal and pharmaceutical importance of inorganic compounds.

CO4: To understand the chemistry of drugs with respect to their pharmacological activity and synthesis of active pharmaceutical ingredients (APIs).

Pharmacology:

CO1: To understand the gross morphology, structure and functions of various organs of the human body.

CO3: To understand the pharmacological actions of different categories of drugs along with their mechanism of action, therapeutic/ prophylactic uses and adverse effects.

Pharmacognosy:

CO1: To study the morphology and microscopy of crude drugs.

CO3: To study of Herbal drugs and formulations.

Drug Store and Business Management:

CO1: To study the drug distribution, stock maintenance, pharmacy store management and inventory control in a hospital.

CO2: To study the prescription errors and understand the concept of rational drug therapy.

Communicative Skills in Pharmacy:

CO1: To understand the behavioral needs for a Pharmacist to function effectively in different profiles of pharmacy profession.

CO2: To learn and practice verbal and non-verbal communication along with managerial skills.