

## **Vision**

To be an outstanding department in pursuit of new horizons to create self-reliant pharmacists of global repute through pharmacy education

## **Mission**

To inculcate students, the knowledge and innovative practices to develop critical thinking, problem solving abilities and leadership skills. The institution will set a standard of ultimate

## **Programme Educational Objectives:**

**PEO 1: Based on Knowledge & Understanding:** The pharmacy students should possess upon graduation, knowledge of pharmaceuticals, medication use and their safety and effectiveness.

**PEO 2: Based on Skill:** The graduate should be able to demonstrate his skills in providing quality pharmaceuticals, drug information and therapy including legal and ethical aspects.

**PEO 3: Based on Attitudes:** The graduate should be able to inculcate the current knowledge, changes in technology, continuous upgrading of professional information and participation in implementation of National health programmes.

## **PROGRAM OUTCOMES:**

The Graduate student after completing B. Pharmacy program should be able to face the challenges in the following sections/ disciplines like Pharmaceutical industry, Community & Hospital pharmacy and the concept of Research as below;

### **1. Pharmacy Knowledge:**

Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioural, social, and administrative pharmacy sciences; and manufacturing practices.

## **2. Planning Abilities:**

Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

## **3. Problem analysis:**

Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

## **4. Modern tool usage:**

Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

## **5. Leadership skills:**

Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfilment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well-being.

## **6. Professional Identity:**

Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

## **7. Pharmaceutical Ethics:**

Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behaviour that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

## **8. Communication:**

Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

## 9. The Pharmacist and society:

Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

## 10. Environment and sustainability:

Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

## 11. Life-long learning:

Recognize the need for, and have the preparation ability to engage in independent and life-long learning in the broadest context of technological change. Self-assessment and feedback use effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

## COURSE OUTCOMES

### B. Pharm I Semester (RS3)

#### Human Anatomy and Physiology – I (Theory) (BP101T)

After completion of this course student will be able to:

BP101T.1	Utilize appropriate medical terminology and normal physiological values related to the structure and function of the human body systems
BP101T.2	Describe the structural characteristics and functional processes common to all human cells and tissues.
BP101T.3	Integrate understanding of basic chemical concepts and principles into understanding the human anatomy and physiology.
BP101T.4	Describe the interrelationships of cells, tissues, and body organ systems, homeostasis and the complementarity of structure and functions.
BP101T.5	Demonstrate an understanding of the location, structure and functioning of the major body systems studied.

### B. Pharm II Semester (RS3)

#### Pharmaceutical Organic Chemistry-I (Theory) (BP202T)

After completion of this course student will be able to:

BP202T.1	Demonstrate an intermediate ability to use effective written and/or oral communication through the application of structural aspects of organic chemistry.
BP202T.2	Utilize the standardized names and symbols to represent atoms, molecules, ions and chemical reactions.
BP202T.3	Explain different types of organic reactions and their mechanisms concerning different

	classes of organic compounds.
<b>BP202T.4</b>	Describe and predict the physicochemical properties of various organic compounds including their preparation and Uses.

### B. Pharm III Semester (RS3)

#### Physical Pharmaceutics-I (Theory) (BP302T)

After completion of this course student will be able to:

<b>BP302T.1</b>	Describe the solubility of drugs in solvent and distribution Phenomena.
<b>BP302T.2</b>	Explain the states of matter and describe the Physical properties of drug molecule in formulation of stable and effective dosage form.
<b>BP302T.3</b>	Explain solubility, surface and Interfacial Phenomena in developing dosage forms.
<b>BP302T.4</b>	Describe complexation and protein binding in pharmacy.
<b>BP302T.5</b>	Prepare and apply different pH and Buffer solutions.

#### Physical Pharmaceutics-I (Practical) (BP306P)

After completion of this course student will be able to:

<b>BP306P1</b>	Determine the solubility and evaluate physicochemical properties of the drugs.
<b>BP306P2</b>	Determine the partition coefficient and surface tension of various liquids using different methods and interpret the results obtained.
<b>BP306P3</b>	Determine the various constants used in the complexation process.

#### Pharmaceutical Microbiology (Theory) (BP303T)

After completion of this course student will be able to:

<b>BP303T.1</b>	Compile the basic knowledge about contributions of various scientists in the field of microbiology; and the detailed information regarding bacteria morphology and cultivation and different types of microscopes
<b>BP303T.2</b>	Explain the identification techniques of bacteria and merits and demerits of various sterilization techniques
<b>BP303T.3</b>	Explain the morphology and cultivation of virus and fungi and describe different types of disinfectants used in the pharmaceutical industry and their evaluation techniques and sterility testing as per various pharmacopoeia
<b>BP303T.4</b>	Describe the aseptic techniques, microbiological assay of antibiotics, vitamins and amino acids
<b>BP303T.5</b>	Explain the factors affecting microbiological spoilage in pharmaceutical products and evaluation of preservatives and details of cell culture techniques and their application in pharmaceuticals

#### Pharmaceutical Microbiology (Practical) (BP307P)

After completion of this course student will be able to:

<b>BP307P.1</b>	Demonstrate aseptic and pure culture techniques with the competency to handle lab equipment and explain the importance of different types of media utilized in the laboratory.
<b>BP307P.2</b>	Implement appropriate methods isolation, identification and enumeration of microorganisms.
<b>BP307P.3</b>	Evaluate the efficacy of antimicrobial agents using reliable protocols and perform the

test for sterility and antimicrobial assays.

### Pharmaceutical Engineering (Theory) (BP 304 T)

After completion of this course student will be able to:

<b>BP304T.1</b>	Comprehend the Principles, construction and working of equipment involved in pharmaceutical processing.
<b>BP304T.2</b>	Explain the principles of unit operations and their significance
<b>BP304T.3</b>	Explain the basic concepts of Evaporation and Distillation and their applications in Preformulation studies.
<b>BP304T.4</b>	Explain the basic concepts of Flow of fluids and Heat transfer and their applications.
<b>BP304T.5</b>	Comprehend the materials of construction in Pharmaceutical industry, theory of corrosion and its prevention

### Pharmaceutical Engineering (Practical) (BP 308P)

After completion of this course student will be able to:

<b>BP308.1</b>	Demonstrate the handling of various equipment and machinery used in pharmaceutical industry as unit operations like Drying process, Mixing efficacy, Filtration & Evaporation.
<b>BP308.2</b>	Perform and analyse heat transfer through different materials and their significance in drying of substances
<b>BP308.3</b>	Perform and evaluate the size reduction and size separation operation and realize its significance in manufacturing process.
<b>BP308.4</b>	Implement and incorporate various methods of preparation of crystals and compare their size and yield.
<b>BP308.5</b>	Determine humidity of air using Dew point method and its significance to maintain room temperature and humidity in special areas in pharmaceutical industry

## B. Pharm IV Semester (RS3)

### Pharmacognosy & Phytochemistry – I (Theory) (BP405T)

After completion of this course student will be able to:

<b>BP405T.1</b>	Define Pharmacognosy and express its history and scope.
<b>BP405T.2</b>	Explain different class of Crude Drugs from natural origin and general methods of cultivation, collection, storage, quality control and conservation.
<b>BP405T.3</b>	Describe the natural drugs containing primary metabolites with respect to their chemistry, classification, biological source, morphology, uses and storage.
<b>BP405T.4</b>	Illustrate the different secondary metabolites and their pharmaceutical importance
<b>BP405T.5</b>	Define and apply the knowledge of alternative system of medicine in herbal drug technology.
<b>BP405T.6</b>	Express salient features of plant tissue cultures, transgenic plants and animals

## B. Pharm V Semester (RS3)

### INDUSTRIAL PHARMACYI (Theory) (BP502T)

After completion of this course student will be able to:

<b>BP502T.1</b>	Define and describe Preformulation study with physical and chemical properties
<b>BP502T.2</b>	Explain the theoretical considerations in development of Pharmaceutical Solid, Liquid and parenteral dosage forms.
<b>BP502T.3</b>	Formulation & Evaluation study of the Cosmetics and Aerosols and shelf life.
<b>BP502T.4</b>	Describe packaging components and their specifications

### **B. Pharm VI Semester (RS3)**

#### **Pharmaceutical Biotechnology (Theory) (BP605 T)**

After completion of this course student will be able to:

<b>BP605 T 1</b>	Define and explain products and applications of biotechnology.
<b>BP605 T 2</b>	Write the steps involved in bioprocess development and large scale production of representative fermentation products
<b>BP605 T 3</b>	Explain the techniques and steps involved in production of biopharmaceuticals.
<b>BP605 T 4</b>	Express salient features of plant tissue cultures, transgenic plants and animals
<b>BP605 T 5</b>	Explain recent tools, techniques and concepts of modern biotechnology

### **B. Pharm VII Semester (RS3)**

#### **PHARMACY PRACTICE (Theory) (BP703T)**

After completion of this course student will be able to:

<b>BP703T.1</b>	Implement various drug distribution methods and inventory control methods in a hospital.
<b>BP703T.2</b>	Monitor drug therapy of patient through medication chart review, clinical review, medication history interview & adopt Rational drug therapy.
<b>BP703T.3</b>	Identify drug related problems, detect and assess adverse drug reactions.
<b>BP703T.4</b>	Interpret selected laboratory results (as monitoring parameters in therapeutics) of specific disease states

### **B. Pharm VIII Semester (RS3)**

#### **BIOSTATISTICS AND RESEARCH METHODOLOGY (Theory) (BP801T)**

After completion of this course student will be able to:

<b>BP801T.1</b>	Study the descriptive statistics and applications in pharmaceutical research & experimental studies
<b>BP801T.2</b>	Study the measures of central tendency, correlation, probability theory
<b>BP801T.3</b>	Study the descriptive statistics, Graphics, parametric & non-parametric tests, ANOVA.
<b>BP801T.4</b>	To study the need for design of Experiments and study design types

## Post-Graduation (Master of Pharmacy)

### Program Specific Outcomes (PSO)

#### M. Pharm Pharmacognosy

At the end of successful completion of programme, a graduate should be able to

- PSO 1.** Develop and standardize drug and cosmetic formulations from natural sources as per pharmacopoeial standards
- PSO 2.** Carry out chemical and biological evaluation of crude drugs & finished products including traditional products using modern analytical tools.
- PSO 3.** Apply IPR and regulatory aspects in industrial setup, with respect to natural products & cosmetics

#### M. Pharm Pharmaceutics

- PSO 1.** To impart knowledge and skill required at the pharmaceutical and cosmetic industries with the key development of technological aspect, Preformulation study, Documentation requirements as per regulatory approval process, application of validation process and overall development of key formulation.
- PSO 2.** To impart knowledge and skill in various approaches in development of novel and targeted drug delivery system with rational selection of drug, polymers and methodology.
- PSO 3.** To impart knowledge and skill with the basic concepts of Biopharmaceutics and Pharmacokinetics and their models in drug product performance and relative bioavailability. Application of computers in optimization study, product development, computational modelling of drug disposition, biopharmaceutical characterization and aid in formulation development.
- PSO 4.** To impart knowledge and skill of research methodology, ethical practice of research and application of statistics in research.

#### M. Pharm Pharmacology

After successful completion of the program the post graduate will be able to:

- PSO 1.** Explore the concepts of drug action and molecular mechanism involved.
- PSO 2.** Relate the assimilated scientific information and principles of pharmacokinetics and pharmacodynamics in drug discovery process.

- PSO 3.** Design pharmacological screening models for investigation through logics and problem solving ability.
- PSO 4.** Interpret the advanced understanding of drug action into key stages in preclinical and clinical research studies
- PSO 5.** Develop an skill to visualize and work on multidisciplinary tasks in the area of drug development and its allied fields.

#### **M. Pharm Pharmaceutical Chemistry**

After successful completion of the program the graduate will be able to:

- PSO 1.** Develop drug design strategies from natural and synthetic leads.
- PSO 2.** Implement practical and advanced analytical techniques to solve the problems in isolation, separation, purification and standardization of chemical entities and formulations with an industrial perspective.
- PSO 3.** Develop laboratory skills including handling of sophisticated instruments/equipment, use of technical software, interpret lab findings and apply them in drug discovery process.

#### **M. Pharm Pharmacy Practice**

After successful completion of the program the graduate will be able to:

- PSO 1.** Implement the sound knowledge of fundamental principles of pharmacotherapy and apply in the areas of clinical, hospital and community.
- PSO 2.** Develop the ability of students critically analyze drug therapy and apply to the optimum patient health outcome.
- PSO 3.** Assimilate the potential knowledge for interpersonal and interdisciplinary approach to contribute towards healthcare system.
- PSO 4.** Train the students to contribute towards pharmaceutical sciences and healthcare system for productive carrier for betterment of the society.

#### **M. Pharm Pharmaceutical Quality Assurance**

After successful completion of the program the graduate will be able to:

- PSO 1.** To impart fundamental knowledge and concepts about various quality management principles and systems utilized in the manufacturing industry.

- PSO 2.** To understand and practice quality control and quality assurance aspects of pharmaceutical industries.
- PSO 3.** To understand issues related to different kinds of hazard and their management in pharmaceutical industries.
- PSO 4.** To understand validation and its application in industry to improve the quality of the products.
- PSO 5.** To impart knowledge and skills necessary to train the students with the industrial activities during Pharmaceutical Manufacturing.

### **Doctor of Pharmacy [Pharm D]**

#### **Program Specific Outcomes (PSO)**

- PSO 1.** Provision of evidence based drug therapy for the purpose of achieving optimum pharmaceutical care to improve the quality of life of patient and inculcate leadership capabilities as a part of Healthcare team.
- PSO 2.** Develop designing of pharmaceutical care plan for patient therapy monitoring. Patient education and counselling through proper communication skills.
- PSO 3.** Identification of drug related problems through the core knowledge of disease, pathophysiology, Laboratory data interpretation and drug use evaluation.
- PSO 4.** Appraise the evidence from research studies and extend it to the areas of inpatient, ambulatory, community practice.