

## **Program : B.Voc. Pharmaceutical Chemistry**

### **PO(Program Outcome)**

- a. The Student of Pharmaceutical Chemistry comes across the detailed study of various basics and advance subjects in course related pharmaceutical companies.
- b. Pharmaceutical chemistry is the study of drugs, and it involves drug development. This includes drug discovery, delivery, absorption, metabolism, and more. There are elements of biomedical analysis, pharmacology, pharmacokinetics, and pharmacodynamics. Pharmaceutical chemistry work is usually done in a lab setting.
- c. It has broad areas of application in the field like health care, agriculture, and Chemical, Pharmaceutical and Herbal industry. Pharmaceutical chemistry includes two most common areas which includes analytical and synthetic chemistry in pharma aspects.
- d. The pharmaceutical chemist uses the knowledge of how chemicals interact with diseases and the human body to develop methods to treat diseases. As they develop new drugs, they analyze their effectiveness in particular populations, determining whether it is ready to be distributed on the market or it needs further development..
- e. Subject Outcome
  - i. The student should be able to carry out routine calculations involved in pharmaceutical chemistry profession. Draw and understand different graphs in basic pharmaceutical calculations.
  - ii. In pharmaceuticals, the student learn to narrate various dosage forms, routes of administration and their merits and demerits which describe importance of environmental factors on drug manufacturing and describe the importance of certain physical properties of drugs and excipients and their utilization in drug manufacturing.
  - iii. With the study of organic chemistry student is able to define and explain different types of chemical bonds, naming of organic compounds according to IUPAC nomenclature system with physical and chemical properties of different compounds representing different functional group. He/She can write chemical reactions depicting synthesis and chemical properties of these organic compounds.
  - iv. Students are aware by practical related to subject so it will easy to understand theory and application of practical.
  - v. Analytical Chemistry also gives basics information qualitative, and quantitative analysis and basic spectroscopic techniques and chromatographic techniques which will help to students in Job or Business.

- vi. Phytochemistry subject give insight knowledge of herbal drugs and their uses.
- vii. Pharmacology helps to narrate the principles involved in measurement of drug effects, Classify the drugs according to pharmacological classes and explain the mechanism of action, pharmacodynamic and pharmacokinetic effects of drugs, adverse effects, contraindications and therapeutic application of various classes of drugs.
- viii. By the end of this course, the student should have a good understanding of the basic concepts of Medicinal chemistry. Students should be able to describe in detail synthetic approaches, mechanisms of action as well as structure activity relationship of some important therapeutic class of Drugs. The course may help the students in understanding rational approaches towards the design of important therapeutic agents and their biological implications.
- ix. Understand how microorganisms survive where they do, how they are related, and how they interact with us microbiology is helpful. It can give a solid grasp of the scope of the microbial world and its role in human disease. How to control bacterial growth- use of chemical and physical agents to control microbe propagation How to provide a microbe-free environment for the health professional can be learnt.
- x. Biochemistry describes the structure and functions of various biochemical pathways occurring within the human body, the basic principles of enzymology and classifies the different enzymes.

### **Program : B.Voc. Pharmaceutical Chemistry**

#### **PSO(Program Specific Outcome)**

1. The program is designed to educate and create skilled manpower that can serve the society through the knowledge gained during the course of time. The student enrolling in the course will be benefitted in several ways.
2. The candidate will work in the college as well as with the industries during the time of his study. If a candidate successfully completes first year of study he would be awarded a diploma and he will be capable enough to serve as a laboratory assistant in any industry or academic institution.
3. A candidate completing two successful years in Bachelor of Vocation program will be awarded with advanced diploma. An advanced diploma qualified student in Pharmaceutical Chemistry will be fit for working in ADL, QC and Production department of any pharmaceutical industries.

4. The candidate completing all three years of the course successfully will be awarded with Bachelor of Vocation in Pharmaceutical Chemistry and is fit for getting absorbed in any division of Pharmaceutical Industries.
5. After B.Voc. Pharmaceutical Chemistry, one may go for M.Voc. Pharmaceutical Chemistry or related to interest of the Masters course. M.Voc. course will take two years to complete. After completing B.Voc. and M.Voc. Degrees, one may venture into M.Phil, PhD also.
6. This is a rapidly developing field. Many private businesses are exploring in this field and heavily investing in it so new startups will be open and emerging entrepreneur will come.
7. Various prominent industries where Pharmaceutical Chemistry professionals may find jobs are- Pharmaceuticals Industry, Healthcare sector, Chemical Industry and Research sector.
8. Research sector in particular is quite lucrative. One may build a rewarding career in this field.
9. Apart from these National level exams, the student can also appear for other State level Competitive Examinations as well e.g. GPSC, Talati, Gram Sevak, Lok Sevak, various Police Service Exams etc.

### **Program : B.Voc. Pharmaceutical Chemistry**

#### **CO(Course Outcome)**

##### **1. PC 111 Basic Pharmaceutical Calculations**

- a. Lots of calculations are required in pharmaceutical chemistry profession which involves basic mathematics and knowledge of simple physics and chemistry principles.
- b. The course is intended to teach the student how such calculations are done.
- c. The subject will be fundamental for many of the subjects the student will encounter in future.
- d. To make student learn the basic calculations a pharmaceutical chemistry professional is expected to do in his/ her professional life.

##### **2. PC -112: Pharmaceutics (Basic Principles)**

- a. To make student understand the different dosage forms and routes of administration.
- b. To understand the important physical properties of compounds and its impact in preparation and stability of drug formulation.
- c. To understand the common processes used in manufacturing of drug formulations.

##### **3. PC -113: Basic Computer Application**

- a. To learn proper usage of computers for preparing documents, conduct simple calculations and provide pictorial representation of data.

##### **4. PC -114: English & Communication Skill**

- a. To learn basic communication skills (oral and written)

## **5. PC -115: Human Anatomy Physiology**

- a. To understand structure and function of each body components from cellular level to system level.
- b. To understand how functions of each cell is integrated to make the entire body function with complete co-ordination.
- c. To understand the various diseases related to disturbances in the body function.
- d. To learn fundamentals of health, various dimensions of health, understanding of basic terminologies related to epidemiology and disease management and parameters for measuring health.
- e. To learn some simple first aid techniques and management of emergency situations.

## **6. PC 211 Fundamental of Organic Chemistry**

- a. To learn fundamentals of chemical bonds, stereochemistry.
- b. To learn basic chemical functional groups of compounds with respect to their physical and chemical properties.
- c. To learn the simple organic chemical reactions.
- d. To identify organic compounds by testing their physical and chemical properties

## **7. PC-212 : Physical Chemistry**

- a. To learn the important physical properties of drugs and chemicals, that can significantly affect the drug manufacturing.
- b. To quantify these physical properties and methods to alter the same so as to avail desired levels.

## **8. PC 213 : Fundamental Biochemistry**

- a. To learn the structure and function of various biochemical.
- b. To learn the basic metabolic processes occurring within the human body and factors regulating the same.

## **9. PC 214: Analytical Chemistry**

- a. To make student learn the basic principles of various assay techniques commonly used in quality control department of any pharmaceutical industry.
- b. To provide the hands-on experience by actually conducting these assays in the lab.

## **10. PC 215: Fundamentals of Pharmacognosy**

- a. To learn general morphological and microscopically characters of crude drugs.
- b. To understand general methods of checking purity of herbal drugs.

## **11. PC 311: Advanced of Organic Chemistry**

- a. To learn the simple organic chemical reactions.
- b. To learn fundamentals of symmetry and metal complexes.
- c. To identify organic compounds by testing their physical and chemical properties

## **12. PC 312: Advanced Analytical Chemistry-I**

- a. To make students familiar with the principles of analytical chemistry (Instrumental methods) and its application in pharmaceutical chemistry.
- b. To provide the hands-on experience by actually conducting these assays in the lab.

### **13.PC 313: Cell Biology**

- a. To learn the structure and function of DNA/RNA.
- b. To learn the basic cell biology processes occurring within the human body and factors regulating the same.

### **14. PC 314: Indian Drugs Regulatory Guidelines**

- a. To make students familiar with basic principle of Laboratory & Research practice as well as new drug development in human

### **15.PC 315: Pharmaceutical Inorganic Chemistry**

- a. To learn the structure, preparation, properties and medicinal uses of various inorganic compounds.
- b. To learn the methods used to determine purity and quality of inorganic medicinal compounds.

### **16. PC 411 : Medicinal Chemistry –I**

- a. To learn the structure, Structure activity relationship, physicochemical properties and drug design and docking of drug.

### **17. PC 412: Microbiology**

- a. This course will cover topics in the history of microbial morphology and physiology, bacterial metabolism, genetics, and the classification of microorganisms.
- b. This course will increase your awareness and appreciation for microscopic organisms in your environment and their relationships to humans in health and disease.
- c. This course will also provide you with tools for a better understanding of microbial pathogenesis, means of control and treatment.

### **18.PC 413 : Advanced Analytical Chemistry-II**

- a. Understand basic principles of instrumental analysis of drugs and drug products.
- b. Know basic principles of advance chromatographic analysis.
- c. Know theoretical interpretation of the analytical results.

### **19. PC 414: Pharmaceutics-Unit operation**

- a. To study unit operations like size reduction, size separation, mixing and crystallization. These Unit operations have applications in manufacturing and compounding of dosage forms. Some unit operations also have applications in manufacturing of bulk drugs.
- b. It is also intended to make students familiar with process control systems, industrial hazards and safety precautions.

**20.PC 415 : Pharmacy Practice**

- a. To learn the structure, preparation, properties and medicinal uses of various inorganic compounds.
- b. To learn the methods used to determine purity and quality of inorganic medicinal compounds.

**21. PC 511: Medicinal Chemistry –II**

- a. To learn the structure, Structure activity relationship, physicochemical properties and therapeutic uses of drugs belonging to various therapeutic classes.

**22.PC 512 : Advanced Analytical Chemistry-III**

- a. Understand basic principles of instrumental analysis of drugs and drug products.
- b. Know basic principles of spectrophotometry and chromatographic analysis.
- c. Know theoretical interpretation of the analytical results.

**23. PC 513: Pharmacology-I**

- a. To learn general concepts how the drug produces effect and what factors can contribute in producing the drug effects.
- b. To learn the mechanism of action, pharmacological effects, pharmacokinetics, adverse effects, therapeutic application of various classes of drugs.

**24.PC 514 : Introduction to Drug Delivery Systems**

- a. To get acquaint knowledge of newly formed drug molecules of various types.

**25. PC 611: Basic Principles of Cosmetic Products**

- a. Understand rheology & solubilization of cosmetic products.
- b. Understand basic principles of cosmetic products.
- c. Know basic principles of novel concept of cosmetic formulation.
- d. Understand plant scale up technique for cosmetic products.

**26.PC 612: Medicinal Chemistry-III**

- a. The course is designed to make students familiar with the principles of medicinal chemistry as applied to pharmaceuticals and to study the synthetic approaches and structure activity relationship of different therapeutic class of drugs.

**27.PC 613: Advanced Analytical Chemistry-IV**

- a. To make student learn the basic principles of various assay techniques commonly used in quality control department of any pharmaceutical industry.
- b. To provide the hands on experience by actually conducting these assays in the lab.

**28.PC 614: Pharmacology II**

- a. To learn the mechanism of action, pharmacological effects, pharmacokinetics, adverse effects, therapeutic application of various classes of drugs with special attention to drugs acting on cardiovascular, urinary, gastrointestinal system.

**29.PC 615: Phytochemistry**

- a. To make students familiar with Pharmacognostic study of tannin, resin and volatile oil containing crude drugs, utilized as medicine.