

COURSE OUTCOMES
PROGRAMME: B. PHARMACY
SEMESTER-I

Course Name- HUMAN ANATOMY AND PHYSIOLOGY I (Practical)

Course Code: 23BP101P, I. B. Pharmacy

Upon completion of the course student will be able to

- CO 1** Understand the usage of compound microscope.
- CO 2** Classify various tissues based on their characteristics by observing them under microscope.
- CO 3** Identify different types of bones in human skeletal system.
- CO 4** Estimate the physiological conditions of human body by recording heart rate, pulse rate, blood pressure, bleeding and clotting time.
- CO 5** Determine the RBC and WBC in human blood.
- CO 6** Estimate the DLC and ESR of human blood sample.

Course Name: PHARMACEUTICAL ANALYSIS I (Practical)

Course Code: 23BP102P, I B. Pharmacy

Upon completion of the course student will be able to

- CO 1** Understand the importance of calibration, calibration of weights, pipette and burette.
- CO 2** Demonstrate standardization of solutions with different strengths.
- CO 3** Experiment with volumetric analysis such as acidimetry and alkalimetry, oxidation and reduction reactions, iodometry, complexometry, precipitation and non-aqueous titration.
- CO 4** Analyze gravimetric analytical techniques.
- CO 5** Analyze various electro chemical titrations.

Course Name: PHARMACEUTICS I (Practical)

Course Code: 23BP103P, I B. Pharmacy

Upon completion of the course student will be able to

- CO 1** Recall the principles used in the preparation of solid, liquid and semi solid dosage forms.
- CO 2** Experiment with monophasic liquid dosage forms for internal and external administration.
- CO 3** Prepare biphasic liquid dosage forms, semi solid dosage forms and powders.
- CO 4** Formulate suppositories.

Course Name PHARMACEUTICAL INORGANIC CHEMISTRY (Practical)

Course Code: 23BP104P, I B. Pharmacy

Upon completion of the course student will be able to

- CO 1** Recall the sources of limit tests, preparation and identification of compounds.
- CO 2** Apply knowledge to perform modified limit tests.
- CO 3** Analyze various inorganic pharmaceutical compounds.
- CO 4** Select suitable method for the preparation of inorganic pharmaceuticals.
- CO 5** Assess quality of inorganic pharmaceuticals.

Course Name: COMMUNICATION SKILLS (Practical)

Course Code: 23BP105P, I.B. Pharmacy

Upon completion of the course student will be able to

- CO 1** Use contextual expressions in English and sounds in English language.
- CO 2** Improve communication skills develop the knowledge of letters and sounds in English language.
- CO 3** Improve listening skills.
- CO 4** Improve and use the language skills.
- CO 5** Improve writing skills.
- CO 6** Apply listening, reading and writing skills while facing interviews.

Course Name: REMEDIAL BIOLOGY (Practical)

Course Code: 23BP106RBP, I.B. Pharmacy

Upon completion of the course student will be able to

- CO 1** Gain Knowledge on Microscope and its types, section cutting and preparation of permanent slide.
- CO 2** Understand the parts and structure of the cell and its inclusions.
- CO 3** Learn microscopic examination of tissues & different parts of the plant along with their modifications.
- CO 4** Detailed study of frog using computer models.

SEMESTER-II

Course Name- HUMAN ANATOMY AND PHYSIOLOGY-II (Practical)

Course code: 23BP201P, I B. Pharmacy

Upon completion of the course student will be able to

- CO 1** Recall the physiology of special senses with the help of models, charts and specimens.
- CO 2** Develop the knowledge on coordinating working of organs of various systems with the help of models, charts and specimens.
- CO 3** Analyze the functions of cranial nerves by various sensory and motor functions.
- CO 4** Evaluate body temperature and body mass index and to determine tidal volume and vital capacity.
- CO 5** Assess the knowledge on family planning devices, pregnancy diagnostic tests, tissues of vital organs and gonads.

Course Name: PHARMACEUTICAL ORGANIC CHEMISTRY I (Practical)

Course Code: 23BP202P, I B Pharmacy

Upon completion of the course student will be able to

- CO 1** Explain the qualitative analysis and preparation of pharmaceutical organic compounds.
- CO 2** Identify the extra elements, present in the pharmaceutical organic compounds.
- CO 3** Appraise the rules concerned with reactivity and orientation of organic compounds.
- CO 4** Analyze unknown pharmaceutical organic compounds by determining their melting point/boiling point.

Course Name: BIOCHEMISTRY (Practical)

Course Code: 23BP203P, I B. Pharmacy

Upon completion of the course student will be able to

- CO 1** Study qualitative analysis of biomolecules that gives practical knowledge for better understanding of compositions of blood and urine samples
- CO 2** Study quantitative analysis of blood sugars, creatinine and cholesterol levels helps to be aware of the health conditions like diabetes and jaundice etc.
- CO 3** Gain knowledge on different buffer preparations that helps in research applications.
- CO 4** Study enzymes like Amylases give knowledge related to enzyme applications in industries.

Course Name: COMPUTER APPLICATIONS IN PHARMACY (Practical)

Course Code: 23BP204P, I B. Pharmacy

Upon completion of the course student will be able to

- CO 1** Introduction to MS word, MS excel, MS power point, etc.
- CO 2** Describe how to design a HTML web page.
- CO 3** Retrieve the information of a drug and its adverse effects using online tools.
- CO 4** Work with MS access.
- CO 5** Exporting Tables, Queries, Forms and Reports to web pages and HTML.
- CO 6** Creating tables, databases regarding patient information.

SEMESTER-III

Course Name: PHARMACEUTICAL ORGANIC CHEMISTRY II (Practical)

Course Code: 23BP301P, II B. Pharmacy

Upon completion of the course student will be able to

- CO 1** Gain the knowledge on different recrystallization and steam distillation techniques.
- CO 2** Remember and recall the different laboratory techniques used in pharmaceutical chemistry.
- CO 3** Identify the purity of fats and oils by acid value, saponification value and iodine value.
- CO 4** Perform various reaction like diazotization, oxidation reactions.
- CO 5** Analyze named reactions like Perkin and Claisen Schmidt reactions by using carbonyl compounds.
- CO 6** Test the knowledge on different electrophilic aromatic substitutions reactions like bromination, nitration in mono substituted aromatic compounds.

Course Name: PHYSICAL PHARMACEUTICS I (Practical)

Course Code: 23BP302P, II B. Pharmacy

Upon completion of the course student will be able to

- CO 1** Determination of solubility of various drugs and apply Henderson –Hassel Balch equation for interpretation of pKa value of drugs.
- CO 2** Determination of partition coefficient, % composition, surface tension and HLB number of the compounds.
- CO 3** Determine Freundlich-Langmuir constant using activated charcoal and critical micellar concentration of surfactants. To estimate the stability constants of complexes by solubility and pH titration methods
- CO 4** Explain the complexation phenomena.
- CO 5** Study the adsorption of oxalic acid on charcoal.

Course Name: PHARMACEUTICAL MICROBIOLOGY (Practical)

Course Code: 23BP303P, II B. Pharmacy

Upon completion of the course student will be able to

- CO 1** Recall different techniques of sterilization.
- CO 2** Demonstrate various staining methods – simple, gram staining and acid-fast staining.
- CO 3** Interpret the results of microbial testing.
- CO 4** Test for possible microbial contaminants.
- CO 5** Choose the correct method to evaluate the microbes to be tested.

Course Name: PHARMACEUTICAL ENGINEERING (Practical)

Course Code: 23BP304 P, II B Pharmacy

Upon completion of the course student will be able to

- CO 1** Understand the basic principles involved in unit operations such as size reduction, size separation, distillation and drying.
- CO 2** Demonstrate and explain about the construction, working and applications of pharmaceutical equipment's such as colloid mill, planetary mixer, fluidized bed dryer and freeze dryer.
- CO 3** Experiment with the process variables of filtration, evaporation and infer the same.
- CO 4** Determine radiation constant of brass, iron, unpainted and painted glass and overall heat transfer coefficient by heat exchanger.
- CO 5** Estimate moisture content, loss on drying and construct drying curves for calcium carbonate and starch.

SEMESTER-IV

Course Name: MEDICINAL CHEMISTRY I (Practical)

Course Code: 23BP401P, II B Pharmacy

Upon completion of the course student will be able to

- CO 1** Recall the basic requirements for synthesis and assay of drugs.
- CO 2** Explain the techniques involved in isolation and purification of drugs intermediates.
- CO 3** Synthesize, characterize and purify medicinal compounds and intermediates.
- CO 4** Analyze the selected drugs present in dosage forms and to determine the percentage purity.
- CO 5** Determine the physicochemical property of drugs and signify its importance.

Course Name: PHYSICAL PHARMACEUTICS II (Practical)

Course Code: 23BP402P, II B. Pharmacy

Upon completion of the course student will be able to

- CO 1** Choose a good suspending agent to formulate a stable suspension.
- CO 2** Interpret the shelf life of a given formulation by accelerated stability studies.
- CO 3** Make use of derived and flow properties of powders to ensure a stable solid formulation.
- CO 4** Distinguish the rate constants as per the chemical reaction.
- CO 5** Determine the viscosity using Ostwald's and Brookfield's viscometer.

Course Name- PHARMACOLOGY I (Practical)

Course Code: 23BP403P, II B. Pharmacy

Upon completion of the course student will be able to

- CO 1** Learn about basic instruments, common laboratory animals used in experimental pharmacology and to organize animal house as per the CPCSEA guidelines.
- CO 2** Demonstrate the common laboratory techniques like routes of administration, blood withdrawal, anesthetics and euthanasia used for animal studies.
- CO 3** Interpret the effects of various drugs on rabbit eye and ciliary motility of frog esophagus in correlation with humans.
- CO 4** Analyze the effect of drugs acting as enzyme inducers, skeletal muscle relaxants and affecting locomotor activity in laboratory animals.
- CO 5** Evaluate the stereotypic and anticholinergic activity of drugs in rats/mice.

Course Name: PHARMACOGNOSY AND PHYTOCHEMISTRY I (Practical)

Course Code: 23BP404P, II B. Pharmacy

Upon completion of the course student will be able to

- CO 1** Remember different morphological and microscopical characteristic features of crude drugs.
- CO 2** Understand the cellular structure of crude drugs.
- CO 3** Evaluate the crude drugs by quantitative evaluation methods.
- CO 4** Evaluate the crude drugs by physical methods of evaluation.
- CO 5** Evaluate the crude drugs by chemical methods of evaluation.

SEMESTER-V

Course Name: INDUSTRIAL PHARMACY I (Practical)

Course Code: BP506P, III B. Pharmacy

Upon completion of the course student will be able to

- CO 1** Interpret the preformulation studies on drugs.
- CO 2** Explain the preparation, evaluation and coating of tablets.
- CO 3** Design parenteral and ophthalmic products.
- CO 4** Describe the preparation of creams.

Course Name- PHARMACOLOGY-II (Practical)

Course Code: BP507P, III B. Pharmacy

Upon completion of the course student will be able to

- CO 1** Illustrate the diuretic activity of drugs in mice/rats.
- CO 2** Identify the dose response relationship, effect of drugs on DRC and to construct the drug concentrations by various bioassay methods using animal simulator software.
- CO 3** Categorize the PA₂ and PD₂ value of drugs using rat anococcygeus muscle and guinea pig ileum.
- CO 4** Interpret the effect of spasmogens and spasmolytics using rabbit jejunum.
- CO 5** Predict various screening models for analgesic and anti- inflammatory.

Course Name: PHARMACOGNOSY AND PHYTOCHEMISTRY II(Practical)

Course Code: BP508P III B Pharmacy

Upon completion of the course student will be able to

- CO 1** Analyze the macroscopy, microscopy and powder characteristics of crude drugs for detection and test for isolation, identification of phytoconstituents.
- CO 2** Understand the separation techniques of sugars and herbal extracts by paper and thin layer chromatography.
- CO 3** Distinguish separation, detection techniques of volatile oils and unorganized crude drugs by various chemical tests.
- CO 4** Demonstrate extractive values, moisture content, swelling index and foaming of crude drugs.

SEMESTER-VI

Course Name: MEDICINAL CHEMISTRY III (Practical)

Course Code: BP607P, III B. Pharmacy

Upon completion of the course student will be able to

- CO 1** Study preparation of drugs and intermediates.
- CO 2** Study assay of drugs.
- CO 3** Study preparation of medicinally important compounds or intermediates by Microwave irradiation technique.
- CO 4** Draw structures and reactions using chem draw. Determination of physicochemical properties such as logP, clogP, MR, Molecular weight, Hydrogen bond donors and acceptors for class of drugs course content using drug design software Drug likeliness screening (Lipinskies RO5).

Course Name- PHARMACOLOGY III (Practical)

Course Code: BP608P, III B. Pharmacy

Upon completion of the course student will be able to

- CO 1** Identify the dose calculation range in pharmacological experiments.
- CO 2** Study & regulate the effect of anti-ulcer activity & anti allergic activity.
- CO 3** Determine the effect of drug by acute oral toxicity, skin irritation.
- CO 4** Estimate the effect of serum bio-chemical parameters by semi-auto analyzer.
- CO 5** Gain knowledge on biostatistics methods used in experimental pharmacology.
- CO 6** Study the effect of Agonist & Antagonistic drugs on different isolated tissue preparations.

Course Name: HERBAL DRUG TECHNOLOGY (Practical)

Course Code: BP609P III B Pharmacy

Upon completion of the course student will be able to

- CO 1** Remember different preliminary phytochemical screening of crude drugs.
- CO 2** Evaluate the various herbal formulations.
- CO 3** Apply mono graphic analysis of herbal drugs as per pharmacopoeias.
- CO 4** Evaluate parameters such as aldehyde and phenol contents & assess the total alkaloid content.

SEMESTER-VII

Course Name: INSTRUMENTAL METHODS OF ANALYSIS (Practical)

Course Code: BP705P, IV. B Pharmacy

Upon completion of the course student will be able to

- CO 1** Learn the concepts of quantitative estimation techniques.
- CO 2** Gain knowledge of handling of the instruments like HPLC, GC.
- CO 3** Apply the concepts of separation methods for sugars, amino acids, pigments etc.,
- CO 4** Gain knowledge on qualitative determination of organic compounds.
- CO 5** Perform assay of dosage forms by the application of UV/Vis spectrophotometry.

SEMESTER-VIII

Course Name: PROJECT WORK

Course Code: BP813PW, IV B Pharmacy

Upon completion of the course student will be able to

- CO 1** Generate the topic for the project and Collect the information from the relevant sources.
- CO 2** Assemble the information into a more realistic draft ethically and conclude the contents.
- CO 3** Prepare the presentation and explain outcome of their project along with further scope for research. This develops their oratory and leadership skills.

Course Name: COMPREHENSIVE VIVA VOCE

Upon completion of the course student will be able to

- CO 1** This will test the student's learning and understanding during the course of their programme.
- CO 2** In doing so, the main objective of this course is to prepare the students to face interview both at the academic and the industrial sector.