Dr. B.C. Roy College of Pharmacy and Allied Health Sciences

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Dr. Meghnad Saha Sarani, Bidhannagar, Durgapur - 713206, West Bengal

# PROGRAM OUTCOMES : UG PHARMACY

| PO | KEY CONCEPT | EXPLANATION |
|---|---|---|
| **PO1** | Pharmacy Knowledge | Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices |
| **PO2** | 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 |
| **PO3** | 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 |
| **PO4** | Modern tool usage | Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations |
| **PO5** | 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 wellbeing. |
| **PO6** | 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). |
| **PO7** | Pharmaceutical Ethics | Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior 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. |
| **PO8** | 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 |
| **PO9** | 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. |
| **PO10** | 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. |
| **PO11** | Life-long learning | Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis. |

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# COURSE OUTCOME : B. PHARM (OLD SYLLABUS)

| NAME OF THE SUBJECT WITH CODE | OUTCOME |
|---|---|
| **HU 101** PROFESSIONAL COMMUNICATION IN ENGLISH | **CO.HU 101.1:** Students will be able to **enhance** their behavioural needs for a Pharmacist to **develop** better communication skills. |
| | **CO.HU 101.2:** Able to **appraise** effective Communication (both Verbal and Nonverbal) that would give an impetus to act as a team player in a team or in group discussions |
| | **CO.HU 101.3: Develop** essential interview skills and required soft skills. |
| **PT 101** PHARMACEUTICAL ANALYSIS | **CO.PT 101O.1:** Students will be able to **determine** impurities and sources of errors as well as they will be able to **prepare** different concentration of solution. |
| | **CO.PT 101O.2:** Students will be able to **utilize** the Principle behind different Pharmaceutical Analytical methods/techniques like gravimetric methods |
| | **CO.PT 101O.3:** Students will be able to **apply** different Pharmaceutical Analytical techniques like precipitation titrations for **analyzing** various pharmaceutical products. |
| | **CO.PT 101O.4:** Students will be able to **justify** and/or **distinguish** different Pharmaceutical Analytical methods/techniques such as redox and acid-base titrations |
| | **CO.PT 101O.5:** Students will be able to **evaluate** and **interpret** various results obtained using both titrimetric and instrumental methods of analysis |
| **M 103** REMEDIAL MATHEMATICS | **CO.M 103O.1: Summarize** the concepts and methods of elementary matrices with **applications** in pharmacy (pharmaceutical basic calculations) |
| | **CO.M 103O.2: Discuss** the eigen values and eigen vectors with **applications** (energy levels and molecular orbital's of chemical systems) |
| | **CO.M 103O.3: Elaborate** basic integration rules with same applications (growth and decay problems) |
| **PTB 101** REMEDIAL BIOLOGY | **CO.PTB 101O.1: Classification** of plants, Plant cell, mitosis, meiosis natural sexual and phyllogenetic system, Binomial nomenclature, taxa, taxon |

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| | **CO.PTB 101O.2: Describe** the process of Mitosis, Meiosis. Morphology and histology of root, stem. Bark, leaf, flower, fruit ,seed |
| | **CO.PTB 101O.3: Understand** Animal kingdom, structure, life history & pathogenecity of Parasites including amoeba, entamoeba, Trypanosoma, Plasmodium, Taenia, Ascaris, Schistosom, Oxyuris, Ancylostoma |
| | **CO.PTB 101O.4: Description** of study of general structure & life history of mosquito, housefly, mites (sarcoptes scabies) & silkworm |
| **PT 103** PHARMACEUTICAL CHEMISTRY (INORGANIC CHEMISTRY) | **CO.PT 103O.1: Determin**e the impurities in pharmaceutical inorganic substances. |
| | **CO.PT 103O.2: Prepare**buffered solution and **calculate** pH. |
| | **CO.PT 103O.3: Identify** and **determine** the pharmaceutical inorganic components of a substance |
| **PT 106** PHARMACEUTICS (DISPENSING PHARMACY) | **CO.PT 106O.1: Prepare** and **dispense** conventional solid and semi-solid dosage forms through proper understanding of the concept of incompatibilities. |
| | **CO.PT 106O.2: Prepare** and **dispense** different kinds of liquids dosage forms using vehicles, chemical stabilizers, adjuncts such as colouring, flavouring and sweetening agents, co-solvents and antimicrobial agents. |
| | **CO.PT 106O.3: Interpret** the prescriptions and dispense to the patient. **Calculate** the dose of drug according to physical and biological conditions, such as age, body weight, sex, metabolic activity, disease, drug-allergy history of the patients. |
| | CO.PT 106O.4: Identify the requirements for setting up a retail and wholesale pharmacy store |
| **PT 191** PHARMACEUTICAL ANALYSIS LAB | **CO.PT 191O.1:** Students will be able to **apply** different methods used to prepare and **standardize** the Pharmaceutical active ingredients and their formulations using acid-base, redox, precipitation and gravimetric procedures. |
| | **CO.PT 191O.2:** Students will be able to **utilize** the idea for **performing** assay of the Pharmaceutical active ingredients and their formulations using acid-base, redox, precipitation and gravimetric procedures |
| | **CO.PT 191O.3:** Students will be able to apply/perform techniques using Gravimetric Analysis for estimation of constituents present in a Pharmaceutical compound |
| **PT 193** PHARMACEUTICAL CHEMISTRY LAB | **CO.PT 193O.1: Identify** some inorganic compound and **detect** the impurities in inorganic compound. |
| | **CO.PT 193O.2:** To **do** the experiment cautiously with inorganic chemical and able to **report** the data scientifically. |

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| **PT 196** PHARMACEUTICS (DISPENSING PHARMACY) LAB | **CO.PT 196O.1:** To **prepare** and **dispense** liquid dosage forms such as mixtures, solutions, syrups, lotion, emulsion and suspension. |
| | **CO.PT 196O.2:** To **prepare** and **dispense** powders dosage forms such as compound, effervescent and divided powders. |
| | **CO.PT 196O.3:** To **prepare** and **dispense** semi-solid dosage forms such as ointments and pastes. |
| **PTB 191** REMEDIAL BIOLOGY LAB | **CO.PTB 191O.1:** –Using Microscope for **identifying** different slides of lower plants, animals |
| | **CO.PTB 191O.2: Preparing** slide of different parts of dicot and monocot plant |
| **PT 203** PHARMACEUTICAL CHEMISTRY (PHYSICAL CHEMISTRY) | **CO.PT 203O.1: Compare** the different physicochemical properties of molecules to **design** various dosage forms. |
| | **CO.PT 203O.2: Analyze** the kinetic equation to **evaluate** any chemical process and **develop** the formulation. |
| | **CO.PT 203O.2: Apply** phase rule to characterize and **develop** stable dosage form |
| | **CO.PT 203O.4: Predict** the correlation between Energy and Works in different thermodynamic process. |
| **M 203** ADVANCED MATHEMATICS & ENGINEERING MECHANICS | **CO.M 203O.1: Describe** briefly the basic concept of data by statistical of tests of significance, the student t-test, analysis of variance ,the chi-square test, linear regression and factorial design |
| | **CO.M 203O.2: Discuss** in depth about the Laplace transforms, which is powerful method for solving differential equations. |
| | **CO.M 203O.3: Summarize** the structure of composition and resolution of forces, equilibrium of concurrent forces, Polygon of forces, Friction, Sliding friction (simple problems) Centre of gravity arc, area, volume (use of calculus) simple problems, Motion under gravity, work, power, energy, conservation of Energy |
| **PT 204** PHARMACEUTICAL CHEMISTRY (ORGANIC CHEMISTRY) | **CO. PT 204O.1: Identify**, **classify**, **name** and structure the organic compound. |
| | **CO.PT 204.2: Illustrate** and name the reaction of organic compounds |
| | **CO.PT 204O.3: Correlate**s the isomers and **identify** the organic compound. |
| | **CO.PT 204O.4: Account** for reactivity/stability of compounds, 4. **identify/confirm** the identification of organic compound |
| **HU202** ENVIRONMENT & ECOLOGY | **CO.HU 202O.1:** To **understand** the need of conservation natural resources. |

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| | **CO.HU 202O.2:** To **explain** the structure and function of an ecosystem. |
| | **CO.HU 202O.3:** To **interpret** pollution data and design remedial action. |
| **PT 202** PHARMACOGNOSY | **CO.PT 202O.1:** To **explain** indigenous system of medicine |
| | **CO.PT 202O.2:** To **classify** crude drugs on the basis of phytochemistry, occurrence, distribution, organoleptic characters, chemical constituents and therapeutic efficacy. |
| | **CO.PT 202O.3:** To **judge** the presence of different types of adulterants and to **evaluate** crude drugs. |
| | **CO.PT 202O.4:** To **apply** the knowledge of therapeutics of different categories of crude drugs |
| **PT 205** PHYSIOLOGY | **CO.PT 205O.1: Identify** to draw contrast between physiological properties, characteristics & functions of blood, heart, respiratory, endocrine gland, excretory & digestive system of a human body. |
| | **CO.PT 205O.2: Evaluate** processes like, haemostastic, Hemolysis, respiration, Excreation, digestion etc. to **develop**ed their Scientific skills. |
| | **CO.PT 205O.3: Interpret** the factors and control of the various anomalies of regulation of heart's action, respiration, Renal circulation etc. to **Predict** their pathological state. |
| | **CO.PT 205O.4: Draw** the relationship of various systems in coordination with importance Of various organs and tissues. |
| **PT 292** PHARMACOGNOSY LAB | **CO.PT 292O.1:** To **develop** and **utilize** the knowledge of morphological characters of crude drugs eg. carbohydrate, lipid, glycosides, volatile oil, alkaloid etc. |
| | **CO.PT 292O.2:** To **utilize** the knowledge of physical, chemical & microscopical properties of crude drugs to **develop** pharmaceutical herbal preparations. |
| | **CO.PT 292O.3:** To **apply** the knowledge of fibers and surgical dressings to prepare pharmaceutical preparations. |
| **PT 293** PHARMACEUTICAL CHEMISTRY (PHYSICAL CHEMISTRY) LAB | **CO.PT 293O.1:** Able to **identify** various standard values physicochemical properties of drug molecules. |
| | **CO.PT 293O.2:** Students can **derive** equation and **identify** the half-life and shelf life for stability of formulation. |
| | **CO.PT 293O.3: Distinguish** the usefulness of mathematics in physical chemistry and their application. |

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| | **CO.PT 293O.4: Predict** the correlation between Energy and Works in different thermodynamic process. |
| **PT 294** PHARMACEUTICAL CHEMISTRY (ORGANIC CHEMISTRY) LAB | **CO.PT 294O.1: Obtain** various organic compounds like aspirin, p-bromoacetanilide, reduction of nitrobenzene etc. in an optimum yield. |
| | **CO.PT 294O.2: Identification** of several derivatives of organic compounds |
| | **CO.PT 294O.3:** Ability to **design** various organic compounds in the laboratory using stereo models. |
| **PT 295** PHYSIOLOGY LAB | **CO.PT 295O.1: Skill** of **performing** various experiments for **evaluation** of various biochemical and physical parameters using appropriate chemicals and apparatus |
| | **CO.PT 295O.2: Perform** and **interpret** various haematological parameters, body temperature, pulse rate, blood pressure and ECG report |
| | **CO.PT 295O.3:** have better **understanding** of the subject area by microscopic study of various tissues and macroscopic study of skeleton, organ and system of human body |
| **PT 304** PHARMACEUTICAL CHEMISTRY (ORGANIC CHEMISTRY) | **CO.PT 304O.1: Design** and **develop** chemical reactions to synthesize newer organic compounds.<br>**CO.PT 304O.2: Explain** organic reactions involving different parameters affecting the reaction.<br>**CO.PT 304O. 3: Know** about the electrophilic and nucleophilic aromatic substitution. |
| **PT 301** PHARMACEUTICAL ANALYSIS | **CO.PT 301O.1:** Students will be able to **apply** different analytical procedures which are used to **determine** the different components. |
| | **CO.PT 301O.2:** Students will **utilize** the detail idea about the electrochemical methods of analysis like potentiometer/ conductometry/amperometry etc. |
| | **CO.PT 301O.3:** Students will be able to **estimate** the analytes by applying theory of complexometric titration, Diazotization Titration, Kjeldahl method or Kjeldahl digestion, Karl Fischer titration and Oxygen flask combustion method which is used for elemental analysis. |
| **PT 306** PHARMACEUTICS (PHYSICAL PHARMACY) | **CO.PT 306O.1:** In the end, students will be able to **explain** about the properties of powders and liquids in designing a formulation, **understand** about complex formation of compounds and binding of drugs to proteins, **understand** the various mechanisms of degradation of formulations and assessment of their stability. |

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| **PT 306** PHARMACEUTICS (PHYSICAL PHARMACY) | **CO.PT 306O.2:** Students will **develop** sound knowledge regarding the practical applications of the various principles related to development of pharmaceuticals. |
| | **CO.PT 306O.3:** The course will enable students to be able to be **skill**ed in their mathematical treatment regarding formulations. |
| | **CO.PT 306O.4:** Students will **develop** knowledge to **evaluate** the effectiveness of a formulation on the basis of the fundamental properties of solid and liquid systems and their various parameters. |
| **PT 307** PHARMACEUTICAL ENGINEERING | **CO.PT 307O.1"** To **correlate** different measurement in unit & dimension and **evaluate** different unit operation based on their numerical data. |
| | **CO.PT 307O.2:** To **demonstrate** working principles, to **construct** & **operate** different equipment's of filtration, centrifugation, material handling (pumps, blowers, valves), used in pharmaceutical industries. |
| | **CO.PT 307O.3:** To **assess** pollutant level in industry & **recommended** a plant lay out for optimum use of resources. |
| **CS 303** BASIC ELECTRONICS & COMPUTER APPLICATION | **CO.CS 303O.1:** Student can **apply** their knowledge of softwares for various fields of pharmaceutical sciences like preparation of seminar slides, assignments, projects |
| | **CO.CS 303O.2:** Student can use their statistical concepts to **interpret** different analytical data in the field of pharmaceutical sciences. |
| | **CO.CS 303O.3:** Student can **design** different computer programs to solve their day to day problems related to their laboratory experiments. |
| **PT 305** ANATOMY, PHYSIOLOGY & HEALTH EDUCATION (APHE) | **CO.PT 305O.1: Orientation** to the study of tissues, joints, muscles, haemopoetic system, blood vascular system, lymphatic system, digestive system, respiratory system, nervous system, communicable disease and first aid measures. |
| | **CO.PT 305O.2: Identify** and **use** proper terminology for **describing** anatomical position of body |
| | **CO.PT 305O.3: Develop** and **understand** relating to family planning, infectious disease and emergency first aid measures |
| **PT 391** PHARMACEUTICAL ANALYSIS LAB | **CO.PT 391O1**: Students will be able to **perform** non aqueous titration, complexometric titration and diazotization method to **estimate** different compounds. |

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| | **CO.PT 391O.2**: Students will **utilise** the *Elctroanalytical methods like* potentiometry/conductometry/amperometry to **analyse** different types of ions |
| | **CO.PT 391.3**: Students will be able to **separate**, **detec**t and **estimate** the different types of compounds by applying theory of chromatography |
| **PT 394** PHARMACEUTICAL CHEMISTRRY (ORGANIC CHEMISTRY) LAB | **CO.PT 3940.1**: **Design** and **development** of synthesis involving various heterocyclic ring systems. |
| | **CO.PT 3940.2**: **Knowledge**of reactions and **synthesis** involving eletrophilic aromatic substitutions |
| | **CO.PT 3940.3**: **Idea** about the workshop on molecular modelling of different organic isomers. |
| **PT 396** PHARMACEUTICS (PHYSICAL PHARMACY ) LAB | **CO.PT 396O.1:** Students can **identify** various properties of powders and **implement** it to develop suitable dosage forms. |
| | **CO.PT 396O.2**: Students can **utilize** their knowledge to **prepare** and **evaluate** suspension and emulsion |
| | **CO.PT 396O.3:** Students can **gain** various information on rheological properties and **apply** their ideas for the **development** of various types of systems. |
| **PT 397** ENGINEERING DRAWING LAB | **CO.PT 397O.1**: **Gather** knowledge about sketching Conventions of drawing, lettering, scales with Orthographic Projection first and third angle concepts Isometric drawing and Dimensioning. |
| | **CO.PT 397O.2**: **Select**, **Construct** and **Interpret** appropriate ellipse, cycloid and spiral. **Draw** Orthographic projections of points, lines and planes |
| | **CO.PT 397O.3: Draw** orthographic projection of solids like cylinders, cones, prisms and pyramids including sections. Layout development of solids for practical situations. **Draw** isometric projections of simple objects |
| **CS 393** BASIC ELECTRONICS & COMPUTER APPLICATION LAB | **CO.CS 393O.1**: Student can **apply** the concepts of computer knowledge for creating reports, presentation and for various comparative analyses. |
| | **CO.CS 393.2:** Student can **interpret** different pharmaceutical data's by using the concept of different statistical tools |
| | **CO.CS 393.3:** By the concept of programming students can **construct** programs to **solve** and **evaluate** different practical problems |
| **PT 406** PHARMACEUTICS (PHARMACEUTICAL | **CO. PT 406O.1: Explain** the factors which **influence** the design of pharmaceutical solid, semisolid and liquid dosage forms with different packaging technology. |

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|---|---|
| TECHNOLOGY-I) | **CO. PT 406O.2**: **Apply** knowledge regarding Aerosol manufacturing and packaging methods with pharmaceutical application and testing |
| | **CO. PT 406O.3**: **Apply** Knowledge regarding ophthalmic preparation, evaluation and packaging. |
| | **CO. PT 406.4**: **Apply** concept of extraction concern with techniques applicable in pharmaceutical industries. |
| | **CO. PT 406O.5: Use** the concept of collection, processing and storage of biological products like blood and plasma substitutes. |
| **PT 402** PHARMACOGNOSY | **CO.PT 402O.1**: To **explain** &**evaluate** various crude drugs belonging to important categories like resin, fibers, tannins, volatile oil, pharmaceutical aids & natural colouring gents. |
| | **CO.PT 402O.2**: To **evaluate** different categories of glycosides &to **characterize** of traditional drugs like **Brahmi, Arjuna, Ashoka, Kantakari, Methi etc.** |
| | **CO.PT 402O.3**: To **develop**, **formulate** & **evaluate** different Ayurvedic preparations like Aristha, Asvas, Gutikas, Tailas, Churnas, Lehyas, Bhasmas etc |
| **PT 404** PHARMACEUTICAL CHEMISTRY (BIO-CHEMISTRY) | **CO.PT 404O.1:** Students will be able to get a detail **concept** of different biochemical reactions. |
| | **CO.PT 404.2:** Students will be able to **acquire** knowledge about the metabolism of lipid, carbohydrates and their clinical significance |
| | **CO.PT 404O.3**: They will be able to **outline** different transport processes across cell membrane and production of ATP |
| **PT 405** PHYSIOLOGY | **CO.PT 405O.1**: **Orientation** to the study of CNS, ANS PNS and mechanism involved in regulation of body temperature, reproductive system. |
| | **CO.PT 405O.2**: **Correlating** the effects and disorders of the nervous system with the physiology of the human system. |
| | **CO.PT 405O.3**: Students will be able to **develop** comprehensive knowledge about the physiological functioning of the reproductive system |
| **PT 407** PHARMACEUTICAL ENGINEERING | **PT 407O.1**: Students will be able to **utilize** and **implement** their knowledge for selection of different heat transfer modes, equipments and applications used for manufacturing of dosage forms. |

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| | **PT 407O.2:** Students will be able to **plan** for proper utilization of different equipments used in evaporation, size reduction and size separation as well as **selection** of construction materials in unit operations |
| | **PT 407O.3:** Students will be able to **choose** different mixers and crystallizers depending on the need of pharmaceutical industry in day to day process |
| **PT 492** PHARMACOGNOSY LAB | **CO.PT 492O.1**: To **apply** the knowledge of microscopical properties of crude drugs in **evaluation&identification** of crude drugs. |
| | **CO.PT 492O.2**: To **create** and **develop** pharmaceutical preparations by **utilizing** the knowledge of important chemical constituents present in crude drugs. |
| | **CO.PT 492O.3**: To **utilize** the knowledge of crude drugs belonging to the category of alkaloids, glycosides, steroids, flavonoids, tannins and resins in identification, standardization of crude drugs & to **use** them in herbal preparation. |
| **PT 494** PHARMACEUTICAL CHEMISTRY(BIOCHEMISTRY) LAB | **CO.PT 494O.1**: Students will be able to **identify** and **estimate** basic biochemical parameters such as carbohydrate, protein and lipid from any biological sample. |
| | **CO.PT 494O.2**: Students will be able to **analyse** (both qualitative and quantitative) the clinical parameters such as blood glucose, protein, cholesterol, non-protein $N_2$ etc. and thus can **interpret** the pathophysiological condition present in the respective subject |
| | **CO.PT 494O.3**: Particularly **outline** any relevant sugar/protein/lipid present in the biological sample which may help to **analyse** any relevant disease of the subject |
| | **CO.PT 494O.4**: Will help to **estimate** any drug action on a particular enzyme and **correlate** the change of enzyme activity with surrounding pathophysiological condition. |
| **PT 496** PHARMACEUTICS (PHARMACEUTICAL TECHNOLOGY LAB-1) | **CO.PT 496O.1**: Students will be able to **apply** different methods used to **prepare** and **evaluate** different Pharmaceutical formulation. |
| | **CO.PT 496O.2**: Students will be able to **utilize** the idea for the Pharmaceutical packaging technology for different dosage forms |
| | **CO.PT 496O.3**: Students will be able to **apply** techniques for the preparation pharmacopoeial extracts and galenical products |

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| **PT 497** (PHARMACEUTICAL ENGINEERING LAB) | **CO.PT 497O.1:** Students will be able to **handle** different equipments which are used in pharmaceutical industry. |
| | **CO.PT 497O.2**: Students can **determine** particle size, mixing index and crystallization of the supplied samples. |
| | **CO.PT 497O.3:** Students can **utilize** their knowledge to **analyze** the different factors of filtration |
| **PT 506** PHARMACEUTICS (PHARMACEUTICAL TECHNOLOGY-II) | **CO. PT 506.1:** To **formulate** different solid dosage form like Tablet and capsule with their acceptable quality control parameters to meet industrial requirements. |
| | **CO. PT 506.2**: **Apply** different coating technology for solid dosage form applicable in pharmaceutical industries. |
| | **CO. PT 506.3:** To **formulate** different cosmetic formulation concern with techniques applicable in pharmaceutical industries with their acceptable quality control parameters |
| **PT 508** PHARMACOLOGY | **CO.PT 508.1**: **Recognize** the fundamental principles of drug actions at their target sites (eg. receptors, enzymes etc). **Interpret** and **apply** the various drug pharmacodynamics and pharmacokinetic interactions in therapeutics |
| | **CO.PT 508.2**: **Evaluate** and **differentiate** the properties of the peripheral nervous system from central nervous system at anatomical, physiological and level pharmacological. **Identify** the diseases related to it |
| | **CO.PT 508.3**: **Assess** the functional roles of different neurotransmitters of central nervous system transmitters and be able to **justify** the use of clinically important drugs acting at this pharmacological system in numerous CNS and ANS disorders viz: Parkinsonism, anxiety, depression, insomnia, epilepsy, psychosis. Also **understand** the basis of screening procedure of the drug used for the treatmen |
| | **CO.PT 508.4**: **Interpreting** and **distinguishing** the dose and drug related toxicities and able to **compose** its treatment |
| **PT 509** PHARMACEUTICAL MICROBIOLOGY | **CO.PT 509.1**: To **prepare** work flow-sheets for cultivation, identification and isolation of microbes and to **calculate** and/or **predict** growth rate of microbes. |
| | **CO.PT 509.2**: To **design** effective sterilization protocols for different pharmaceuticals |

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| NAME OF THE SUBJECT WITH CODE | OUTCOME |
|---|---|
| | **CO.PT 509.3**: To **evaluate** antibiotics, disinfectants, vitamins, water quality and to **judge** presence of bacterial endotoxins in samples. |
| | **CO.PT 509.4:** To **explain** and **relate** various components of Immune system. |
| **PT 503** PHARMACEUTICAL CHEMISTRY (MEDICINAL CHEMISTRY) | **CO.PT 503.1:** Students will be able to **understand** and **apply** principles involved in drug action and **correlate** the Pharmacodynamic and pharmacokinetics aspects of biologically active molecules. They will also learn to **interpret** and **plan** synthetic procedures for the preparation of simple prototypical drug molecules and analyze the purity. |
| | **CO.PT 503.2**: **Know** the types of biological targets (proteins, nucleic acids, carbohydrates and lipids) and they **develop** demands for drugs interacting with them |
| | **CO.PT 503.3**: **Suggest** and **plan** structures of inhibitors, agonists and antagonists based on knowledge about natural substrates or ligands. **Interpret** SAR in evaluating leads |
| | **CO.PT 503.4**: They will **learn** designing QSAR analysis for creating new drugs, optimization of drug's activity and improving its bioavailability. They will also **learn** to use *in silico* docking in the process of drug discovery and to **measure** any drug's bioactivity for analysis purpose. |
| **PT 507** PHARMACEUTICAL ENGINEERING | **CO.PT 507.1**: To **evaluate** different conditions numerically based on gas-liquid and inter-phase mass-transfer systems. |
| | **CO.PT 507.2:** To **perform** various processes (extraction, drying and distillation) involved in pharmaceutical manufacturing unit |
| | **CO.PT 507.3**: To **understand** principle, working and construction of equipments and **implement** them for unit operation |
| | **CO.PT 507.4:** To **utilize** various instrumentation processes to measure several parameters such as temperature, pressure, flow rate, humidity, vacuum and level used for automated process control systems |
| **PT 504** PHARMACEUTICAL CHEMISTRY (BIO-CHEMISTRY) | **CO.PT 504.1**: **Evaluate** various biochemical pathways to diagnose the disease and identify the cause of the disease. |
| | **CO.PT 504.2**: **Analyse** the cause and etiology of any disease by **identifying** relevant macromolecules and micromolecules in biochemical pathways |
| | **CO.PT 504.3**: **Assess**, **diagnose** and **target** the disease through understanding DNA, RNA and proteins |

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|---|---|
| | **CO.PT 504.4**: **Create** newer therapies in target specific fashion, more **efficient** manner and in lesser side effects using genetic engineering |
| **PT 593** PHARMACEUTICAL CHEMISTRY (MEDICINAL CHEMISTRY) LAB | **CO.PT 593.1:** Student will be able to **understand** various parameters governing chemical synthesis including temperature, solvent and catalysis. |
| | **CO.PT 593.2**: Student will be able to **design** synthesis of newer drugs involving electrophiles and such reagents. |
| | **CO.PT 593.3:** Student will be able to **analyze** purity of synthesized compounds, also evaluate the nature of impurities present in it. |
| | **CO.PT 593.4**: Student will be able to **design** method of purification of newer chemical compounds |
| | **CO.PT 593.5**: Student will be able to **design** assay methods as an essential step of quality control of active pharmaceutical ingredients (API). |
| **PT 596** PHARMACEUTICS (PHARMACEUTICAL TECHNOLOGY II) LAB | **CO.PT 596.1**: **Knowledge** of solid dosage forms like tablets and capsules, their formulation and quality control serves as an important role for dosage form design. |
| | **CO.PT 596.2:** Apply **knowledge** to formulate solid, liquid and semisolid dosage forms and **evaluate** them for their quality development of pharmaceutical dosage forms. |
| **PT 597** PHARMACEUTICAL ENGINEERING LAB | **CO.PT 597.1**: Students will be able to **implement** different unit operations and process controls that are employed in pharmaceutical industry. . |
| | **CO.PT 597.2:** For manufacturing of drugs students can **evaluate** those drugs in different perspective with correct use of various equipments in pharmaceutical industry |
| **PT 599** PHARMACEUTICAL MICROBIOLOGY LAB | **CO.PT 599.1**:.**Identify** the type of microorganism and determine the potency of antibiotics |
| | **CO.PT 599.2**: **Develop** the skill of working in a aseptic area |
| | **CO.PT 599.3**: **Perform** the sterilization process in Laboratory set up |
| | **CO.PT 599.4**:.**Skill** in sterility testing of pharmaceutical products |
| | **CO.PT 599.5**: **Differentiate** antiseptic and disinfectant |
| **PT 603** PHARMACEUTICAL CHEMISTRY (MEDICINAL CHEMISTRY) | **CO.PT 603.1**: **Identify** the structural requirement for exerting biological activities. |
| | **CO.PT 603.2**: **Design** chemical process, selection of reagents, catalysts and reaction conditions for synthesizing selected medicinal compounds. |

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| NAME OF THE SUBJECT WITH CODE | OUTCOME |
|---|---|
| | **CO.PT 603.3**: **Construct** newer drugs through structure activity relationship for drug design. |
| | **CO.PT 603.4: Identification** of selected medicinal compounds through chemical reactions. |
| **PT 606** PHARMACEUTICS (PHARMACEUTICAL TECHNOLOGY) | **CO.PT 606.1**: **Prepare** and **dispense**parenteral products through proper understanding of the concept of formulation details, Pre-filling treatment, aseptic techniques, sterility testing. |
| | **CO.PT 606.2: Preparation** and sterilisation of several surgical products including wound dressing, absorbents, surgical cotton, and surgical gauze |
| | **CO.PT 606.3**: **Execute** generalize factors influencing choice of containers, legal and other official requirements for containers, packaging testing |
| | **CO.PT 606.4**: **Interpret** novel drug delivery system with brief description of micro-capsule and micro-pellet parenteral and implantable therapeutic systems, transdermal therapeutic systems, micro-particulate drug carrier system and micro-encapsulation. |
| **PT 611** PHARMACEUTICS (BIO-PHARMACEUTICS & PHARMACOKINETICS) | **CO.PT 611.1**: In the end, students will be able to **understand** the need and **application** of biopharmaceutical study to pharmaceutical dosage forms and drug delivery; **conceive** the preliminary idea that a dosage form development technology vividly influences the course of the drug *in vivo*. This knowledge would help a student to **estimate** the possible therapeutic outcomes of a formulation following its systemic administration. A student should be able to **estimate** the rate and extent of absorption of a drug candidate from its site of administration, and should confidently **extrapolate** the data to **deduce** both therapeutic and toxic effects of the drug. |
| | **CO.PT 611.2**: Students will also **learn** about the various methods to assess bioavailability by various pharmacokinetic and pharmacodynamic studies and their application for IVIVC studies. |
| | **CO.PT 611.3**: A student would **learn** to **demonstrate** the kinetics of a drug in physiological conditions through proper mathematical representation. Students will also know about the significance of dose-dependent kinetics and its causes and the various mathematical ways to express non-linear kinetics. A student would be able to **suggest** an apt dosage regimen for a patient, like drug interactions, renal or hepatic functions, and dosage adjustment & calculation in patients with and without renal and hepatic failure. |

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|---|---|
| | **CO.PT 611.4: Problem solving** techniques to numerical questions from various chapters will enable the students for practical evaluation of the various properties. |
| **PT 608** PHARMACOLOGY | **CO.PT 608.1**: Students will be able to **describe** the pharmacological concepts regarding Digitalis and cardiac glycosides, Antihypertensive drugs, Anti-anginal drugs, Anti-arrhythmic drugs, Anti-hyperlipedemic drugs, Coagulant and Anticoagulant drugs, Diuretics, Anti-diuretics and Anti-asthmatic drugs. Students will **learn** about the principles and protocols involved in bioassay of physiological molecules like acetylcholine, hydroxytryptamine, adrenaline, digitalis, noradrenaline and oxytocin. |
| | **CO.PT 608.2**: Students will be able to **identify** specific drugs of different classes along with the mechanism of action, pharmacological actions, clinical effects, indications, and adverse effects. |
| | **CO.PT 608.3:** Students will be able to **differentiate** the different types of ailments and would be able to identify the correct therapeutic options for the same. Students will learn to **evaluate** the possible adverse effects of the drugs used in treatment of those ailments. |
| **PT 609** PHARMACEUTICAL BIO-TECHNOLOGY & INDUSTRIAL MICRO-BIOLOGY | **CO.PT 609.1:** To **explain** and **relate** various components of Immune system and to **evaluate** specific antigen or antibody. |
| | **CO.PT 609.2:** To **apply** various recombination strategies in drug development |
| | **CO.PT 609.3**: To **design** fermenters and to **operate** fermentative processes of pharmaceuticals |
| | **CO.PT 609.4**: To **compare** and **select** relevant immobilization and biotransformation processes for pharmaceutical production |
| **PT 610 B** ELECTIVE-I: ADVANCED PHARMACEUTICAL BIOTECHNOLOGY | **CO610B.1:** to **Explain** the concept and application of biotechnology, especially micro & nanotechnology for medicine. |
| | **C610B.2**: To **visualize** the concept of Recombinant DNA technology and **summarize** the current applications of advanced techniques in the diverse areas such as pharmaceuticals. |
| | **CO610B.3**: To **demonstrate** and to provide examples of the production of pharmaceutical products by Genetic engineering. |
| | **CO610B.4**: To **illustrate** the principle, usage and to compare the various modern techniques used in biotechnology including PCR. |

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| | **CO610B.5**: To **relate** various bioinformatics databases like Nucleic acid, Protein etc with their structure and function. |
| **PT 610A** ELECTIVE-I: COMPUTER APPLICATION IN PHARMACEUTICAL TECHNOLOGY & IN CLINICAL PHARMACY | **CO.PT 610A.1**: Students can **apply** the concept of DBMS for clinical pharmacy, hospital pharmacy etc. |
| | **CO.PT 610A.2**: Students can **create** a database by **applying** the concept of Statistics in an experiment. |
| | **CO.PT 610A.3:** Students can **design** and **analyze** newer drugs using QSAR concept. |
| **PT 693** PHARMACEUTICAL CHEMISTRY (MEDICINAL CHEMISTRY) LAB | **CO.PT 693.1: Illustrate** the practical concepts involving the steriochemical aspect depending on **stereomodel** |
| | **CO.PT 693.2**: **Illustrate** the fundamental practical concepts in synthesis of drug intermediates and medicinal compounds involving multi step reaction of Benzil, Benzillicacid, Diphenyl hydantoin, Benzocaine. |
| | **CO.PT 693.3: Determine** the physicochemical properties and identification of synthesized drugs and medicinal compounds. |
| | **CO.PT 693.4: Calculate** and **judge** the yield of the synthesised drug and medicinal compounds. |
| | **CO.PT 693.5: Test** the knowledge in the field of medicinal chemistry in particular to **pharmacopoeial** sciences for the analysis of the formulation involving Propranolol HCL, warfarin sodium, verapamil hydrochloride, chlordiazepoxide, spironolactone, diazepam (any four). |
| **PT 696** PHARMACEUTICS (PHARMACEUTICAL TECHNOLOGY) LAB | **CO.PT 696.1:** Students will be able to **apply** different methods used to prepare and evaluate sustained release oral dosage form. |
| | **CO.PT 696.2**: Students will be able to **utilize** the idea for the Pharmaceutical packaging technology for different dosage forms. |
| | **CO.PT 696.3**: Students will be able to **apply** techniques for the preparation different dressing materials as per pharmacopoeial specifications |
| **PT 697** PHARMACUTICS (BIO-PHARMACEUTICS & PHARMACOKINETICS) LAB | **CO.PT 697.1**: Students will be able to **understand** the significance of release studies of various dosage forms under various experimental conditions. |
| | **CO.PT 697.2:** In the end, students will be able to **determine** the various pharmacokinetic parameters related to different type of dosage forms. |
| **PT 698** PHARMACOLOGY LAB | **CO.PT 698.1**: Students will able to **evaluate** bioactivity of drugs using isolated tissue preparations. |
| | **CO.PT 698.2**: Students will be able to **carry** out the bioassay of the bioactive substances like acetylcholine, serotonin, histamine, noradrenaline and oxytocin. |

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|---|---|
| | **CO.PT 698.3:** Students will learn to **carry** out experiments using different instrumental techniques and to **interpret** the results of the experiments. |
| **PT 691A** ELECTIVE-I: COMPUTER APPLICATION IN PHARMACEUTICAL TECHNOLOGY & IN CLINICAL PHARMACY LAB | **CO.PT 691A.1:** Student can **apply** the concept of Database Management System (MS ACCESS and ORACLE) to design, construct and analyze different pharmaceutical and clinical data's. |
| | **CO.PT 691A.2:** Student will be able to **Plan, compare and explain** different Pharmaceutical data's |
| **PT 691B** ELECTIVE-I: ADVANCED PHARMACEUTICAL BIOTECHNOLOGY LAB | **CO.PT 691B.1**: Students will be able to **estimate** basic molecular entities such as DNA, RNA and proteins in a given cell. |
| | **CO.PT 691B.2:** Students will be able to **analyse** specific proteins for e.g. recombinant proteins, proteins expressed in specific pathophysiological conditions- will be able to diagnose any disease. |
| | **CO.PT 691B.3**: Liver functionality of any individual, hepatotoxicity or hepato-protective capacity of any drug, chronic toxicity of a drug could be **interpreted** by SGPT, SGOT assay. |
| | **CO.PT 691B.4**: Pathophysiological conditions of a given cell can be **evaluated** by estimating marker enzyme/s activity under that condition |
| | **CO.PT 691B.5**: Hormone and protein associated disease, cells pathophysiology, drug's role on hormonal or protein synthesis pathway could be **analysed** by estimation of hormone and protein concentrations |
| **PT 682** SEMINAR | **CO.PT682.1:** To **identify** the aims and objectives of the study on the seminar topic |
| | **CO.PT682.2:** To **summarise** their findings |
| | **CO.PT682.3:** To **create** the effective presentation |
| | **CO.PT682.4:** To **present** their seminar with proper communication skills |
| **PT 706** PHARMACEUTICS (PHARMACEUTICAL TECHNOLOGY) | **CO.PT 706.1**: Student can **implement** the knowledge of preformulation study to develop various dosage form designing and get optimize stability. |
| | **CO.PT 706.2:** Students can able to **develop** their knowledge on GMP, Quality audit and Quality assurance to establish quality management system in pharmaceutical industry. |
| | **CO.PT 706.3**: Students can able to **prepare** and **evaluate** the different oral controlled released formulation |

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| | **CO.PT 706.4:** Students can **utilize** their knowledge in different methods of validation and also extend their knowledge about stabilization and their stability testing protocol. |
| **PT 703** PHARMACEUTICAL CHEMISTRY (MEDICINAL CHEMISTRY) | **CO.PT 703.1: Identify** the correlation between cause of a disease and importance of chemical structure of drug. |
| | **CO.PT 703.2:** To **describe** the metabolic biochemical pathway and explain the Chemical structure in therapeutic values of drug. |
| | **CO.PT 703.3:** To **relate** the structure activity relationship of different class of drugs for newer drug design. |
| | **CO.PT 703.4: Design** and **develop** the syntheses of some important drugs. |
| **PT 702** PHARMACOGNOSY | **CO.PT 702.1:** To **illustrate** & **analyze**biogenesis and pharmacological activity of medicinally important alkaloids, terpenes, glycosides, carotenoids & biogenetics of secondary metabolites. |
| | **CO.PT 702.2**: To **develop** & **design** plant tissue culture. CO.PT 702.3: To **analyze**, **categorize** & **relate**important medicinal agents from marine & plant sources. |
| | **COB.PT 702.4:** To **explain** the collection, identification, preservation & utilization of important medicinal herbs & Herbal Cosmetics. |
| | **CO.PT 702.5**: To **outline, utilize & correlate**different screening methods of flavonoids and polyphenols for isolation in plant extracts. |
| **PT 708** PHARMACOLOGY | **CO.PT 708.1**: Students will be able to **describe** the pharmacological concepts regarding antibiotics, antiviral drugs, anti-tubercular drugs, anti-leprosy drugs, anti-protozoal dugs, anti-fungal drugs, anti-cancer drugs, immunosuppressive drugs and drugs acting on the endocrine and gastrointestinal system. |
| | **CO.PT 708.2:** This will enable the students to **identify** specific drugs of different classes along with the mechanism of action, pharmacological actions, clinical effects, indications, and adverse effects. |
| | **CO.PT 708.3:** Students will be able to **differentiate** the different types of ailments and would be able to identify the correct therapeutic options for the same. Students will learn to **evaluate** the possible adverse effects of the drugs used in treatment of those ailments. |
| **PT 709 A** ELECTIVE-II: PACKAGING TECHNOLOGY | **CO.PT 709A.1:** Students will be able to **select** specific containers and closures (materials) for the given formulation/ dosage forms. |

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| | **CO.PT 709A.2**: Students will be able to **judge** specific tamper proof packaging to provide maximum security during the storage and transition. |
| | **CO.PT 709A.3**: Students can **select** the packing materials so that a better shelf-life can be achieved with the immense of stability which directly helps for the storage of the pharmaceutical Products. |
| | **CO. PT 709A.4**: Students will be able to **evaluate** the quality and standards of different types of packaging materials. |
| **PT 709 B** ELECTIVE-II: ADVANCED PHARMACOGNOSY | **CO.PT 709B.1**: To **enumerate** Ayurvedic system of medicine with indigenous systems of medicine & apply important techniques associated with quality control of herbal drugs. |
| | **CO.PT 709B.2**: To **apply, analyze & compare** important techniques like TLC/HPTLC, with different types of drug evaluation process in drug isolation and identification. |
| | **CO.PT 709B.3**: To **explain, relate & develop** extraction and isolation method, with quality assurance and stability testing of herbal drugs. |
| **PT 709 C** ELECTIVE-II: PHARMACEUTICAL MARKETING MANAGEMENT | **CO.PT709C.1**: **Demand** states, marketing task along with scope of different markets. Core Marketing concept along with needs wants etc.4P components of Marketing Mix. Strategic formulation, product planning along with SWOT analysis |
| | **CO.PT709C.2**: Various aspects of Market Research and Marketing Research along with **Forecasting** and Demand measurement. Consumer behaviour analysis, motivating Physicians towards brand. Knowledge of product positioning etc. |
| | **CO.PT709C.3**: Various aspects of Marketing strategies at different stages of product life cycle. **Market searching procedure, market testing** along with **product development**. Knowledge about different aspects of product strategies along with packaging labelling etc. |

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| | **CO.PT709C.4**: **Management of channel dynamics** of marketing including selection, evaluation, conflicts, cooperation etc. Details of wholesale & and retail management. **Utilising** advertisement for sales promotion by proper handling of the advertisement tool. Public Relations management is also learnt. Different aspects of recruitment, training of Sales **Representative, Supervising, controlling, motivating & evaluating** them. |
| **PT 793** PHARMACEUTICAL CHEMISTRY (MEDICINAL CHEMISTRY) LAB | **CO.PT 793.1**: Students can **interpret** the drug receptor interaction with respect to pharmacological activity. |
| | **CO.PT 793.2:** They can also **estimate** and **analyses** the different metabolic product of drug molecules which may help in drug delivery system. |
| | **CO.PT 793.3:** They can improve the drug receptor interaction to get better pharmacological activity and also minimize the side effects. |
| | **CO.PT 793.4:** They can able to synthesis different derivatives of drug molecules with respect to better pharmacological activity with minimize. |
| **PT 796** PHARMACEUTICS (PHARMACEUTICAL TECHNOLOGY) LAB | **CO.PT 796.1:** Students will able to **determine** the various micromeritics properties of powders during formulation of a dosage form. |
| | **CO.PT 796.2**: Students will able to **develop** the analytical method of the supplied sample. |
| | **CO.PT 796.3**: Students can **utilize** their knowledge to prepare and evaluate tablets. |
| | **CO.PT 796.4**: Students will able to perform the dissolution study of dosage form, calculate the drug release from the dosage form and compare it with the marketed formulation. |
| **PT 782** SEMINAR ON ASSIGNED TOPIC | **CO.PT782.1:** To **identify** the aims and objectives of the study on the seminar topic. |
| | **CO.PT782.2:** To **summarise** their findings. |
| | **CO.PT782.3:** To create the power point presentation. |
| | **CO.PT782.4:** To present their seminar with proper communication skills. |
| **PT 783** SEMINAR | **CO.PT783.1:** To **identify** the aims and objectives of the study. |
| | **CO.PT783.2**: To **prepare** the plan of work and to demonstrate the execution of the plan. |
| | **CO.PT783.3:** To **analyze** and to summarise their findings. |
| | **CO.PT783.4**: To prepare the thesis report in their own words. |

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| **PT 812** PHARMACEUTICAL INDUSTRIAL MANAGEMENT | **CO.PT 812.1**: The students can be able to **define** the concept of management, Accountancy, Economics ,GLP,ISO 9000 and TQM. |
| | **CO.PT 812.2:** Students can **explain** Planning, organizing, Staffing, Directing and Controlling. |
| | **CO.PT 812.3:** Students can **compare** their level of understanding to interpret various situations in industry. |
| **PT 813** PHARMACEUTICAL JURISPRUDENCE & ETHICS | **CO.PT 813.1:** To **understand** different statutory body related to drug administration and their recommendations prevailing across the country. |
| | **CO.PT 813.2:** To **perform** in various operational activities as Pharmacist maintaining Professional Ethics. |
| | **CO.PT 813.3:** To **understand** the dangerous effects of Narcotic and Psychotropic substances and create awareness in the society. |
| | **CO.PT 813.4:** To **apply** MTP Act/Rules1971, Prevention of Cruelty to Animals Act/Rules 1960, Drugs and Magic Remedies Act/Rules , DPCO 1995 & Medicinal and Toilet preparation Act 1955 in their future as needed. |
| | **CO.PT 813.5**: To **apply** Factories Act/Rules1948 and the Patents Act/Rules1970 in future as needed. |
| **PT 818** HOSPITAL PHARMACY & CLINICAL PHARMACY | **CO. PT 818.1**: **Prepare** hospital formulary with information about each medication and design new approach to labeling, personnel requirements of dispensing of drugs to in-patients and out-patients. |
| | **CO. PT 818.2**: **Deduce** management of important Cardiovascular and CNS disorders of organ systems. |
| | **CO. PT 818.3: Indicate** rational use of drug in comparison to various drug interactions and recognize various stages of clinical trials. |
| | **CO. PT 818.4: Develop** GMP related protocols for manufacture of sterile and non sterile products. |
| **PT 801** PHARMACEUTICAL ANALYSIS | **CO.PT 801.1**: The students will be able to **define** the basic principle of UV-Visible spectroscopy and also able to estimate the $\lambda_{max}$. |
| | **CO.PT 801.2:** Students will be able to **detect/analyze** different elements with the help of Flame photometry and AAS. |
| | **CO.PT 801.3:** Students will be able to **compare** their level of **understanding** to **interpret** different compounds with the help of IR, Mass and NMR spectroscopy. |

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| NAME OF THE SUBJECT WITH CODE | OUTCOME |
|---|---|
| **PT 891** PHARMACEUTICAL ANALYSIS LAB | **CO.PT 891.1**: Students will able to **interpret** IR spectroscopy, arrange components in IR spectroscopy device. Students will able to interpret the NMR and Mass spectra. |
| | **CO.PT 891.2:** Students will be able to carry out different separation and purification techniques and their application in different pharmaceutical ingredients by different chromatographic and Radio-immune assay technique. |
| | **CO.PT 891.3**: Students will be able to **utilize** the idea to assay of the Pharmaceutical active ingredients. |
| **PT 884** VIVA-VOCE | **CO.PT884.1:** To **summarize** their learning from the entire programme. |
| | **CO.PT884.2:** To **identify** the relative strengths and weaknesses. |
| | **CO.PT884.3**: To **assess** their future area of excellence. |

## COURSE OUTCOME B. PHARM NEW SYLLABUS

| NAME OF THE SUBJECT WITH CODE | OUTCOME |
|---|---|
| **HU 181** COMMUNICATION SKILL | **CO.HU 181N.1:** Able to **associate** the importance of communication and the communication process. Know various perspectives in Communication and its effects. |
| | **CO.HU 181N.2:** Able to **communicate** properly for a flawless service to the industry as well as academics. |
| | **CO.HU 181N.3**: Able to **imbibe** essential interpersonal skills with proper professional attitude. |
| **PTB 184** REMIDIAL BIOLOGY | **CO.PT 184N.1: Grasp** the significance of the characters of living organism, diversity of living world, Binomial nomenclature, five kingdoms of life and basis of classification. Salient features of Monera, Protista, Fungi, Anamals, Plants & virus.<br>**CO.PT 184N.2**: **Appreciate** the various parts of plant-Root,stem, flower, leaf, fruit, seed. |
| | **CO.PT 184N.3: Appreciate** the significance of blood groups, coagulation of blood, composition and functions of lymph, human circulatory system, human heart, cardiac cycle, cardiac output &ECG. |
| | **CO.PT 184N.4**To **interpret** Digestion & Absorption, Breathing & respiration, Excretory products and their elimination, Neural control and coordination, Endocrine glands and their secretions, Human reproduction. |
| | **CO.PT 184N.5**: To **understand** Plants and mineral nutrition, photosynthesis, plant respiration, plant growth and development. |

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| NAME OF THE SUBJECT WITH CODE | OUTCOME |
|---|---|
| | **CO.PT 184N.6: Differentiate** the structure and functions of cell and cell organelles, Cell division & tissues. |
| **M 183**<br>REMIDIAL MATHEMATICS | **CO.M 183N.1: Develop and understand** differentiation(successive derivative) , integration<br>CO.M 183N.2 Basic concept of Laplace transform and its **application** in solving linear differential equations. Application in solving chemical kinetics and Pharmacokinetics equations |
| | **CO.M 183N.3**: An introductory treatment of first order differential equations. To cover solution of differential equations especially when treating exponential growth and decay applications. |
| **PT 101**<br>PHARMACEUTICAL ANALYSIS I | **CO.PT 101N.1**: Students will be able to **apply** different methods used in Pharmaceutical Analysis.<br>CO.PT 101N.2 Students will be able to **utilize** the Principle behind different Pharmaceutical Analytical methods/techniques like complexometric and non aqueous titrations. |
| | **CO.PT 101N.3**: Students will be able to **apply** different Pharmaceutical Analytical techniques like electrochemical methods for analyzing various pharmaceutical products. |
| | **CO.PT 101N.4**: Students will be able to **justify** and/or **distinguish** different Pharmaceutical Analytical methods/techniques such as redox and acid-base titrations. |
| | **CO.PT 101N.5**: Students will be able to **evaluate** and **interpret** various results obtained using both titrimetric and instrumental methods of analysis. |
| **PT 103**<br>PHARMACEUTICAL INORGANIC CHEMISTRY | **CO.PT 103N.1**: Student will be able to **determine** the impurities in pharmaceutical inorganic substances. |
| | **CO.PT 103N.2**: Student will be able to prepare buffer solution and measure its tonicity. |
| | **CO.PT 103N.3:** Student will be able to **identify** and **determine** the medicinal and pharmaceutical uses of various inorganic compounds. |
| **PT 105**<br>HUMAN ANATOMY & PHYSIOLOGY I | **CO.PT 105N.1: Describe** the cellular & tissue level of organization of integumentary system, Skeletal system, Blood & Lymphatic system, Peripheral Nervous system, Cardiovascular system of the human body |
| | **CO.PT 105N.2**: **Develop** an understanding of physiological function of integumentary system, Skeletal system, Blood & Lymphatic system, Peripheral Nervous system, Cardiovascular system. |
| | **CO.PT 105N.3: Explain** homeostatic mechanism, their imbalances and consequences. |

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|---|---|
| **PT 106** PHARMACEUTICS I | **CO.PT 106N.1: Interpret** the prescriptions and dispense to the patient. Calculate the dose of drug according to physical and biological conditions, such as age, body weight, sex, metabolic activity, disease, drug-allergy history of the patients. |
| | **CO.PT 106N.2:** Prepare and dispense conventional solid and semi-solid dosage forms through proper understanding of the concept of incompatibilities. |
| | **CO.PT 106N.3:** Prepare and **evaluate** liquid dosage forms using excipients such as surfactants, chemical stabilizers, co-solvents and antimicrobial agents and evaluate them in terms of physicochemical properties viz., droplet size, viscosity, electrophoretic mobility and stability. |
| **HU 182** COMMUNICATION SKILLS LAB | **CO.HU 182N.1:** Able to **associate** the importance of communication and the communication process. Know various perspectives in Communication and its effects. |
| | **CO.HU 182N.2**: Able to communicate properly for a flawless service to the industry as well as academics. |
| | **CO.HU 182N.3:** Able to **imbibe** essential interpersonal skills with proper professional attitude. |
| **PT 191** PHARMACEUTICAL ANALYSIS I LAB | **CO.PT 191N.1:** Students will be able to **apply** different methods used to prepare and standardization of Pharmaceutical compounds. |
| | **CO.PT 191N.2**: Students will be able to **utilize** the idea to assay of the Pharmaceutical active ingredients along with Standardization of Titrant. |
| | **CO.PT 191N.3**: Students will be able to **apply** different Pharmaceutical Analytical techniques like electrochemical methods for analyzing various pharmaceutical products. |
| **PT 193** PHARMACEUTICAL INORGANIC CHEMISTRY LAB | **CO.PT 193N.1**: **Identify** some inorganic compound and examine the purity & detect the impurities in inorganic compound. |
| | **CO.PT 193N.2**: Prepare or synthesize some inorganic compound in laboratory. |
| | **CO.PT 193N.3**: To do the experiment with inorganic chemical and able to report the data scientifically. |
| **PT 195** HUMAN ANATOMY & PHYSIOLOGY LAB | **CO.PT 195N.1:** Able to work with compound microscope |
| | **CO.PT 195N.2: Evaluate** and **differentiate** the properties of different tissues and bones. |
| | **CO.PT 195N.3**: **Evaluate, analyze and differentiate** the components of blood and the essential elements in blood clotting and bleeding time. |

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|---|---|
| | **CO.PT 195N.4: Evaluate, analyze and differentiate** blood pressure, pulse pressure, heart rate and its importance in the physiology. |
| **PT 196** PHARMACEUTICS I LAB | **CO.PT 196N.1**: To prepare and dispense liquid dosage forms such as solutions, syrups, elixirs, emulsion and suspension. |
| | **CO.PT 196N.2:** To prepare and dispense solid dosage forms such as powders, granules and suppositories. |
| | **CO.PT 196N.3**: To prepare and dispense semi-solid dosage forms such as ointment and gels. |
| **PTB 185** REMIDIAL BIOLOGY LAB | **CO.PT 185N.1**:.Handle microscope and can perform microscopic study. |
| | **CO.PT 185N.2**: Identify the types of bones. |
| | **CO.PT 185N.3**: **Interpret** the importance of once blood pressure, blood group and tidal volume. |
| **HU 282** ENVIRONMENTAL SCIENCES | **CO.HU 282N.1**: To **understand** the need of conservation natural resources. |
| | **CO.HU 282N.2:** To **explain** the structure and function of an ecosystem. |
| | **CO.HU 282N.3:** To **interpret** pollution data and design remedial action. |
| **PT 213** PHARMACEUTICAL ORGANIC CHEMISTRY I | **CO.PT 213N.1: Design** and **develop** chemical reactions to synthesize newer organic compounds. |
| | **CO.PT 213N.2**: **Explain** organic reactions involving different parameters affecting the reaction. |
| | **CO.PT 213N.3:** Know the classification, nomenclature and isomerism of organic compounds. |
| **PT 214** BIOCHEMISTRY | **CO.PT 214N.1:** To **explain**and **understand** the chemistry and biological importance of biomolecules such as carbohydrate, amino acids and proteins, lipids, nucleic acids. |
| | **CO.PT 214N.2:** To **compare and identify** the importance of metabolism, bioenergetics in normal or various pathological conditions. |
| | **CO.PT 214N.3**: To **describe**the genetic organization of mammalian genome and appreciate the functions of DNA in the synthesis of RNAs and proteins. |
| | **CO.PT 214N.4:** To **illustrate** the catalytic role of enzymes, importance of enzyme inhibitors and coenzyme with examples, therapeutic and diagnostic applications of enzymes and isoenzyme. |
| **PT 215** HUMAN ANATOMY & PHYSIOLOGY II | **CO.PT 215N.1**:.**Understand** the gross morphology, and functions of nervous, reproductive, endocrine and respiratory system. |

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|---|---|
| | **CO.PT 215N.2: Describe** the physiological process of nerve conduction, reproduction, hormone regulation, urine formation and excretion, acid secretion and respiration. |
| | **CO.PT 215N.3**:.**Illustrate** the formation of ATP and understand the significance of BMR |
| | **CO.PT 215N.4**: **Describe** the structure of chromosome, DNA and explain the process of protein synthesis. |
| | **CO.PT 215N.5: Develop** as a leadership quality in fighting medical emergencies by resuscitation methods. |
| **PT 216** PATHOPHYSIOLOGY | **CO.PT 216N.1**: **Recognize** the fundamental aspects of pathogenesis. |
| | **CO.PT 216N.2: Analyze** and **compare** the different signs and symptoms for different diseases. |
| | **COB.PT 216N.3**: **Assess** the complications and identify the different stages of various diseases. |
| | **COB.PT 216N.4**: **Analyze** the basic pathophysiological mechanisms and relate it to the pharmacological applications. |
| **PTC 203** COMPUTER APPLICATION IN PHARMACY | **CO.PTC 203N.1**: Students will be able to **design, Implement and analyze** database system related to pharmaceutical and clinical studies with the concept of DBMS. |
| | **CO.PTC 203N.2:** With the concept of HTML and other webpage development tools, students can **design** and **develop** simple web pages about any topics. |
| | **CO.PTC 203N.3**: Students can **apply** the concept of computer / computer concept (drug design, electronic prescribing etc) in different fields of pharmaceutical studies. |
| **PT 296** PHARMACEUTICAL ORGANIC CHEMISTRY I LAB | **CO.PT 296N.1**: **Analysis** of unknown organic compounds by designing Preliminary test, Solubility test, Functional group test like Phenols, Amides/ Urea, Carbohydrates, Amines, Carboxylic acids, Aldehydes and Ketones, Alcohols, Esters, Aromatic and Halogenated Hydrocarbons, Nitro compounds and Anilines, Detection of elements and Melting point/Boiling point |
| | **CO.PT 296N.2**: **Designing** a reaction pathway for the preparation of the derivatives and confirmation of organic compounds. |
| | **CO.PT 296N.3**: **Visualizing** the three dimensional structure of various compounds using the art of constructing molecular models. |

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|---|---|
| **PT 297**<br>BIOCHEMISTRY LAB | **CO.PT 297N.1:** To **appraise** the qualitative and quantitative analysis of biological macromolecules *i.e.* Carbohydrate, amino acids and proteins, etc. in a given biological sample. |
| | **CO.PT 297N.2:** To **estimate** quantitatively biomolecules such as carbohydrate, proteins, lipids in body fluids like urine, blood in normal or various pathological conditions. |
| | **CO.PT 297N.3**: To **evaluate and interpret** the catalytic activity of enzymes, enzyme kinetics through performing various tests. |
| **PT 298**<br>HUMAN ANATOMY & PHYSIOLOGY II LAB | **CO.PT 298N.1**: **Verification** of Physiological processes which are discussed in theory classes through experiments on living beings |
| | **CO.PT 298N.2**: **Practical orientation** to the study of CNS, ANS PNS and mechanism involved in regulation of body temperature, reproductive system. |
| | **CO.PT 298N.3: Correlating** the effects and disorders of the nervous system with the physiology of the human system. |
| **PTC 293**<br>COMPUTER APPLICATION IN PHARMACY LAB | **CO.PTC 293N.1**: Students can **design** and develop web pages to display, store, and retrieve information about any topics. |
| | **CO.PTC 293N.2:** Students will be able to **plan, design and implement** databases. |
| | **CO.PTC 293N.3:** Students can **apply the concept** of internet and online tools for searching drug information or any other information. |
| **PT 314**<br>PHARMACEUTICAL ORGANIC CHEMISTRY II | **CO.PT 314N.1**: **Design and develop** chemical reactions to synthesize newer organic compounds. |
| | **CO.PT 314N.2**: **Explain** organic reactions involving different parameters affecting the action. |
| | **CO.PT 314N.3**: **Identication** and characterization of various Fats and oils. |
| **PT 316**<br>PHYSICAL PHARMACEUTICS I | **CO.PT 316N.1:** Upon the completion of the course student shall be able to **understand** various physicochemical properties of drug molecules important to designing dosage forms |
| | **CO.PT 316.2:** Students will be able to **analyze** the use of physicochemical properties in the formulation development and **evaluation** of dosage forms and will develop sound knowledge regarding the practical applications of the various principles related to development of pharmaceuticals. |

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|---|---|
| | **CO.PT 316N.3:** The course will enable students to be able to be **skilled** in their mathematical treatment regarding formulations. |
| | **CO.PT 316N.4**: Students will develop knowledge to **evaluate** the effectiveness of a formulation on the basis of the fundamental properties of solid and liquid systems and their various parameters. |
| **PT 317** PHARMACEUTICAL ENGINEERING | **CO.PT 317N.1**: To **prepare** work flow sheet involved in manufacturing of different dosage form in Industry. |
| | **CO.PT 317N.2**: To **predict** different type of error associated with unit operation and their corrective method. |
| | **CO.PT 317N.3**: To **develop** various preventive methods used for corrosion control in pharmaceutical industry. |
| **PT 319** PHARMACEUTICAL MICROBIOLOGY | **CO.PT 319N:** 1.Make use of the knowledge to prepare bacterial culture and proper handling of microscope to perform the various methods used in laboratory/industry. |
| | **CO.PT 319N.2: Explain** sterilization, disinfection, antiseptics, aseptic area & preservatives. |
| | **CO.PT 319N.3**: **Discuss** the cell culture technology and its applications in pharmaceutical industries. |
| **PT 394** PHARMACEUTICAL ORGANIC CHEMISTRY II LAB | **CO.PT 394N.1**: **Knowledge** about different laboratory techniques, like Recrystallization, Steam distillation, etc. |
| | **CO.PT 394N.2**: **Design and development** of synthesis involving various organic compounds. |
| | **CO.PT 394N.3**: **Practical idea** to determine Acid value, Saponification value & Iodine value. |
| **PT 396** PHYSICAL PHARMACEUTICS I LAB | **CO.PT 396N.1**: In the end, students will be able to **determine** the physicochemical parameters of drugs using various methods. |
| | **CO.PT 396N.2**: Students will be able to **understand** the methodology for carrying out the various experiments. |
| **PT 397** PHARMACEUTICAL ENGINEERING LAB | **CO.PT 397N.1**: To **illustrate & apply** the knowledge of Pharmaceutical Machinery and estimation of radiation constant, Steam distillation, heat transfer coefficient, drying curves, moisture content, humidity of air. |
| | **CO.PT 397N.2**: To **analyse and apply** the knowledge of size analysis by sieving, size reduction and other major equipments to plan develop pharmaceutical preparations. |
| | **CO.PT 397N.3** To **evaluate and apply** the knowledge of Factors affecting Rate of Filtration and Evaporation, effect of time on the Rate of Crystallization, uniformity Index. |

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|---|---|
| **PT 399** PHARMACEUTICAL MICROBIOLOGY LAB | **CO.PT 399N.1**:.**Identify** the type of microorganism and determine the potency of antibiotic |
| | **CO.PT 399N.2**:.**Develop** the skill of working in a aseptic area. |
| | **CO.PT 399N.3: Perform** the sterilization process in Laboratory set up. |
| | **CO.PT 399N.4**: **Skill** in sterility testing of pharmaceutical products. |
| | **CO.PT 399N.5**: **Differentiate** antiseptic and disinfectant. |
| **PT 412** PHARMACOGNOSY & PHYTOCHEMISTRY I | **CO.PT 412N.1:** To **apply** the knowledge of Pharmacognosy in explaining indigenous system of medicine & to classify crude drugs on the basis of alphabetical, morphological, taxonomical, chemical, pharmacological, chemo and sero-taxonomical classification of drugs |
| | **CO.PT 412N.2:** To **judge** the presence of different types of adulterants & different characteristics to evaluate crude drugs & apply the knowledge of different plant hormones, polyploidy, mutation and hybridization technique to create disease free, genetically modified and transgenic plants |
| | **CO.PT 412N.3**: To **develop** & **design** plant tissue culture. |
| | **CO.PT 412N.4**: To **apply** the knowledge of therapeutics of different crude drugs belonging to different categories of primary and secondary metabolites. |
| | **CO.PT 412N.5:** To **analyze, categorize & relate**important medicinal agents from marine sources. |
| **PT 413** INDUSTRIAL PHARMACY I | **CO.PT 413N.1**: **Evaluate** the physical and chemical parameters of a drug, and understand the role of those parameters during formulation of a dosage form. |
| | **CO.PT 413N.2**: **Prepare** different dosage forms such as tablets, capsules, liquids, and cosmetics through scalable techniques and **evaluate** them according to the quality tests mentioned in different national compendiums. |
| | **CO.PT 413N.3**: **Reviewing** the materials used for packaging of pharmaceuticals and identifying the chances of any adverse effect on packed products. |
| **PT 414** PHARMACEUTICAL ORGANIC CHEMISTRY III | **CO.PT 184N.2**: **Design** and **development** of newer bioactive organic compounds. |
| | **CO.PT 414N.2: Explain** organic reactions involving different parameters affecting the reaction. |

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| NAME OF THE SUBJECT WITH CODE | OUTCOME |
|---|---|
| | **CO.PT 414N.3**: **Knowledge** of stereoisomers of organic compounds. |
| **PT 416** PHYSICAL PHARMACEUTICS II LAB | **CO.PT 416N.1**: **Able** to identify various standard values physicochemical properties of drug molecules. |
| | **CO.PT 416N.2**: Students can **derive** equation and identify the half-life and shelf life for stability of formulation. |
| | **CO.PT 416N.3**: Able to **optimize** the mathematical equation in physical chemistry to improve the stability of formulation. |
| | **CO.PT 416N.4**: They can **formulate** the new drug release pattern from formulation. |
| **PT 418** PHARMACOLOGY I | **CO.PT 418N.1**: Students will be able to **describe** the pharmacological concepts regarding peripheral nervous system and central nervous system. |
| | **CO.PT 418N.2:** Students will be able to **identify** specific drugs of different classes related to the nervous system along with the mechanism of action, pharmacological actions, clinical effects, indications, and adverse effects. |
| | **CO.PT 418N.3**Students will be able to **differentiate** the different types of ailments involving the nervous system and would be able to identify the correct therapeutic options for the same. Students will learn to evaluate the possible adverse effects of the drugs used in treatment of those ailments. |
| **PT 492** PHARMACOGNOSY & PHYTOCHEMISTRY I LAB | **CO.PT 492N.1**: To **utilize** the knowledge of crude drugs belonging to the category of pharmaceutical aids & to apply them as excipients in different pharmaceutical formulations. |
| | **CO.PT 492N.2**: To **utilize** the knowledge of microscopical properties of crude drugs in standardization & identification of crude drugs. |
| | **CO.PT 492N.3**: To **apply** the knowledge of physical characteristics of crude drugs in evaluation & standardization of herbal drugs. |
| **PT 493** INDUSTRIAL PHARMACY I LAB | **CO.PT 493N.1**: To **prepare and evaluate** tablets containing different drug compounds and compare with respect to marketed products. |
| | **CO.PT 493N.2**: To **prepare** and store sterile solution in suitable containers. |
| | **CO.PT 493N.3:** To **assess** the different physical and chemical parameters related to preformulation studies of different drugs. |

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|---|---|
| **PT 496** PHYSICAL PHARMACEUTICS II LAB | **CO.PT 496N.1**: Able to **identify** various standard values physicochemical properties of drug molecules. |
| | **CO.PT 496N.2:** Students can **derive** equation and identify the half-life and shelf life for stability of formulation. |
| | **CO.PT 496N.3**: They can **analyze** the different equation to standardize and stabilize the drug dosage form. |
| | **CO.PT 496N.4:** They can formulate new drug delivery system. |
| **PT 498** PHARMACOLOGY I LAB | **CO.PT 498N.1**: Students would be able to administer drugs using different routes of administration of drugs in animal models. Students would be **aware** of common laboratory techniques like blood withdrawal, plasma and serum separation etc. |
| | **CO.PT 498N.2**: Students will able to **evaluate** bioactivity of drugs |
| | **CO.PT 498N.3**: Students will **learn** to carry out experiments using different instrumental techniques and to interpret the results of the experiments. |
| **PT 512** PHARMACOGNOSY & PHYTOCHEMISTRY II THEORY | **CO.PT 512.1**: To **discuss, describe**, **explain** and **identify** different secondary metabolic pathways for alkaloids, glycosides, steroids and flavonoids. |
| | **CO.PT 512.2:** To **recognize** and **relate** the phytochemical, pharmacological and commercial aspects of secondary metabolites. |
| | **CO.PT 512.3:** To **develop** and **design** extraction, isolation and purification techniques for crude drugs. |
| | **CO.PT 512.4:** To **apply** and **interpret** different techniques for identification and analysis of phytoconstituents. |
| **PT 513A** MEDICINAL CHEMISTRY I | **CO. PT 513A.1**: Identify the structural requirement for exerting biological activities. |
| | **CO. PT 513A.2**: Analyze drug's chemistry for stability, metabolism, activity and toxicity. |
| | **CO. PT 513A.3:** Construct future drugs through structure activity relationship for drug design. |
| | **CO. PT 513A.4**: Design chemical process, selection of reagents, catalysts and reaction conditions for synthesizing selected medicinal compounds. |
| **PT 513B** MEDICINAL CHEMISTRY II | **CO.PT 513B.1**: Students will be able to **understand** Histamine receptor in relation to biological action and **correlate** SAR synthesis MOA of H-1 antagonist, H-2 antagonists and antineoplastic agents, biological action. |

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| | **CO.PT 513B.2**: Know synthesis of medicinal drugs acting on Angina, Diuretics: SAR of anti-hypertensive agents, Calcium channel blockers develop demands for drug interacting with them |
| | **CO.PT 513B.3**: Suggest and plan structures of Anti-arrhythmic drugs, Antihyperlipidemic agents, Coagulants & Anticoagulants, Congestive heart failure agents: Interpret SAR of the following agents. |
| | **CO.PT 513B.4**: They will learn structure activity relationship and biosynthesis of drugs acting on Endocrine system. Antidiabetic agents and Local anaesthetics and determine the SAR of the above mentioned compounds. |
| **PT 516** PHARMACEUTICAL JURISPRUDENCE | **CO.PT 516N.1**: Student shall be able to **judge** different situations and be able to act according to important pharmaceutical legislations, pharmaceutical Act and Rules prevails in India as whenever it seems to be required |
| | **CO.PT 516N.2**: Student shall be able to **assess** the standards of educational regulations, compositions and functions of various regulatory authorities, committees and agencies, offences and guidelines imposed according to various pharmaceutical Acts and Rules. |
| | **CO.PT 516N.3**: Student shall be able to **implement** the code of ethics in their professional activities in pharmacy. |
| **PT 518** PHARMACOLOGY II | **CO.PT518.1**: **Interpret** the **relation** between various biomolecules resembles with physiological and pathophysiological activity essential to**formulates** safer choice of drug used in circulatory & cardiovascular, endocrinological and inflammatory disorders. |
| | **CO.PT 518.2: Justify** and **evaluate** the relation between mechanism of action and adverse drug reaction and contraindication of different drugs used in therapeutics of disease and disorder. |
| | **CO.PT 518.3: Interpret** the **importance** of various bimolecular and hormonal activities to assess their relative potency using animal tissue and intact animal. |
| **PT 592** PHARMACOGNOSY & PHYTOCHEMISTRY II PRACTICAL | **CO.PT 592.1:** To execute morphological, microscopic and chemical characterization of various crude drugs. |
| | **CO.PT 592.2**: To design and execute extraction and isolation of phytochemicals from crude drugs. |
| | **CO.PT 592.3**: To design and formulate chromatographic procedures for separation, isolation and identification of phytoconstituents. |
| **PT 593** MEDICINAL CHEMISTRY I | **CO.PT 593.1**: Design synthesis of heterocyclic rings by selecting reagents, catalysts and reaction conditions. |

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| NAME OF THE SUBJECT WITH CODE | OUTCOME |
|---|---|
| PRACTICAL | **CO.PT 593.2**: Design synthesis of specific drugs by selecting reagents, catalysts and reaction conditions. |
| | **CO.PT 593.3**: Develop assay methods of various drugs depending on their ring chemistry. |
| | **CO.PT 593.4**: Analyze partition coefficients of various drugs, compare their hydrophilic-lipopophilic chemistries from their partition coefficients. |
| **PT 598** PHARMACOLOGY II PRACTICAL | **CO.PT598.1**: Determine and evaluate different animal and tissue experiment and their mathematical association to assess the outcome and to draw the conclusion. |
| | **CO.PT598.2**: Interpret the correlation between different tissue isolation, their association with various types of bioassay of different essential biomolecules. |
| | **CO.PT598.3**: Interpret and predict the importance of bimolecular activities with various physiological and pathophysiological conditions related to different clinical & medical issues. |
| **PT 612** HERBAL DRUG TECHNOLOGY THEORY | **CO.PT 612N.1**: To **apply** the knowledge of herbal medicine, good agricultural practices in cultivation of medicinal plants including organic farming, pest management & biopesticides. |
| | **CO.PT 612N.2:** To **apply** the **knowledge** of indigenous systems of medicine & **to utilize** standardised Ayurvedic formulation as herbal medicine or, herbal formulation & different foods as nutraceuticals and **to evaluate** their effects in different diseases. |
| | **CO.PT 612N.3**: To **apply the knowledge** of different herbal drugs and their possible side effects and interaction & **to develop** & **design** different herbal formulations by utilizing the knowledge of herbal cosmetics & herbal excipients. |
| | **CO.PT 612N.4**: To **evaluate** crude drugs in preparation of standard herbal formulation. |
| | **CO.PT 612N.5**: To **apply** the knowledge of good manufacturing practices (Schedule T) to **formulate** different herbal formulations in herbal drug industry. |
| **PT 613** MEDICINAL CHEMISTRY III THEORY | **CO. PT 613.1**: Students will be able to understand and can correlate synthesis, SAR, MOA of β- Lactam Aminoglycosides, Tetracyclines |
| | **CO. PT 613.2**: Students should know the synthesis of Macrolide, Antimalarials and Miscellaneous agents, SAR and MOA of agents and be able to develop knowledge for drugs interacting with them. |

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|---|---|
| | **COB. PT 613.3**: Students will be able to suggest and plan structures and synthesis of Anti-tubercular Agents, Urinary tract anti-infective and Antiviral agents. Interpret SAR of the following agents |
| | **COB. PT 613.4**: Students will learn structure activity relationship, synthesis and MOA of Antifungal agents, Sulphonamides and Sulfones and be able to determine the SAR of the above-mentioned compounds. |
| | **CO. PT 613.5**: Students will be able to evaluate and interpret various results of Pharmacophore modelling and docking along with application to the combinatorial chemistry. |
| **PT 616** BIOPHARMACEUTICS & PHARMACOKINETICS THEORY | **CO. PT 6161**: To build an understanding about the concepts of biopharmaceutics and pharmacokinetics. |
| | **CO. PT 616.2**: To develop the ability to estimate pharmacokinetic parameters by using various mathematical models. |
| | **CO. PT 616.3:** To be able to explain the requirement of bioavailability and bioequivalence studies. |
| | **CO. PT 616.4:** To be able to develop concepts of pharmacokinetic principles in clinical settings. |
| **PT 618** PHARMACOLOGY III THEORY | **CO.PT618.1**:.**Interpret** the **relation** between various biomolecules resembles with physiological and pathophysiological activity essential to **choose** safe drug/drug regimen used to treat infectious diseases, cancer and transplantation. |
| | **CO.PT618.2: Evaluate** different types of side effects, adverse drug reaction; and iatrogenic and other types of toxicities. |
| | **CO.PT618.3**: **Interpret** the **importance** of mechanism of action drugs acting on infectious diseases, cancer and transplantation; and **investigation** of drug effects as a function of biologic timing and rhythm characteristics. |
| **PT 619** PHARMACEUTICAL BIOTECHNOLOGY THEORY | CO.PT 619.1: **Apply** solitary and immobilized enzymes in industries for various productions especially pharmaceuticals. |
| | **CO.PT 619.2: Construct** genetically engineered organisms and transgenic floras for desired applications involving industrial productions. |
| | **CO.PT 619.3: Analyze** pathophysiology of organism and apply various biological remedies such as monoclonal antibodies for specific applications |
| | **CO.PT 619.4: Create** various protocols for fermentations with specific microorganisms. |
| **PT 611** QUALITY ASSURANCE THEORY | **CO.PT 611.1:** The students will be able to **define** the basic concept of Quality control, Quality assurance and GMP, TQM, ICH Guidelines. |

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| | **CO.PT 611.2:** Students will be able to **become aware of** different elements of QbD program, tools,NABL accreditation,ISO 9000 & ISO14000. |
| | **CO.PT 611.3**: Students will be able to **utilize** their level of **understanding** regarding Quality Control, Good Laboratory Practices, Document maintenance in pharmaceutical industry & Calibration and Validation. |
| **PT 692** HERBAL DRUG TECHNOLOGY PRACTICAL | **CO.PT 692.1**: To identify different chemical constituents present in drugs. |
| | **CO.PT 692.2:** To analyze chemical components such as alcohol or alkaloid indifferent herbal drugs and traditional dosage forms. |
| | **CO.PT 692.3**: To analyze monographs of plants used in preparation of herbal formulations. |
| | **CO.PT 692.4** To design and execute formulation and evaluation of dosage forms with herbal extracts. |
| **PT 693** MEDICINAL CHEMISTRY III PRACTICAL | **CO.PT 693.1**: Design and development of synthesis involving various drugs. |
| | **CO.PT 693.2**: Knowledge of assay methods involving various drug molecules |
| | **CO.PT 693.3**: Preparation of medicinally important drug molecules using modern techniques |
| | **CO.PT 693.4**: Create and design newer structure of medicinal compounds and reactions in software for further analysis. |
| | **CO.PT 693.5**: Determination of physicochemical properties such as logP, MR, molecular weight of drugs using drug design software. |
| **PT 698** PHARMACOLOGY III PRACTICAL | **CO.PT 698.1**: To perform various calculations required for pharmacological experiments and determination of statistical significance of the study. |
| | **CO.PT 698.2:** To perform and evaluate various animal models to determine effects of various drugs. |
| | **CO.PT 698.3:** To interpret OCED guidelines. |
| | **CO.PT 698.4:** To establish the significance of various biochemical parameters and be more competent to draw inference of the effects of various drugs from various experimental models. |
| **PT 711** INSTRUMENTAL METHODS OF ANALYSIS THEORY | **CO. PT 711.1**: The students can be able to define the basic principle of UV-Visible spectroscopy and also able to estimate the λmax. |
| | **CO. PT 711.2**: Students can organize the outline to analyze different elements with the help of Flame photometry, AAS Fluorimetry and Nepheloturbidometry. |

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| | **CO. PT 711.3**: Students can compare their label understanding to interpret different compounds with the help of IR, other instrumental and chromatographic techniques. |
| **PT 716A** INDUSTRIAL PHARMACY II THEORY | **CO. PT 716A.1:** To build a large-scale production plant along with increased production rate. |
| | **CO.PT716A.2:** Apply technology transfer knowledge innovative process may be developed. |
| | **CO. PT 716A.3:** To plan and develop an affordable health care system by utilizing law and regulation of the industry. |
| | **CO.PT 716A.4:** To formulate product ensuring that drugs, both brand-name and generic, work correctly and that their health benefits outweigh their known risks. |
| **PT 716B** NOVEL DRUG DELIVERY SYSTEM THEORY | **CO.PT 716B.1:** Student can implement their concept and knowledge to design various novel drug delivery systems. |
| | **CO.PT 716B.2:** Students can utilize their knowledge for selection of drugs and polymers for the development of novel drug delivery systems. |
| | **CO.PT 716B.3:** Students can able to prepare and evaluate different novel drug delivery systems. |
| **PT 718** PHARMACY PRACTICE THEORY | **CO.PT 718.1:**Students will develop knowledge and ability to use principles of hospital and community pharmacy to cater to the needs of heath care system. |
| | **CO.PT 718.2:** Plan and manage the drug distribution, drug store and inventory control. |
| | **CO.PT 718.3:** Develop economical, social, administrative, managerial skills for creating community and hospital pharmacy. |
| | **CO.PT 718.4:** Analyze, interpret results of laboratory test, various adverse drug reactions and apply the information for use of appropriate medicines, provide and propose unbiased information to doctors and counsel patients. |
| | **CO.PT 718.5:** Design education and training programes and execute the role of pharmacist and develop the professional ethics. |
| **PT 791** INSTRUMENTAL METHODS OF ANALYSIS PRACTICAL | **CO. PT 791.1:** Students will able to interpret spectroscopic data, arrange components in UV spectroscopy device. |
| | **CO. PT 791.2:** Students will be able to carry out different separation and purification techniques and their application in different pharmaceutical ingredients by different chromatographic technique. |

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| | **CO. PT 791.3:** Students will be able to utilize the idea to assay of the Pharmaceutical active ingredients. |
| **PT 781**<br>PRACTICE SCHOOL | **CO.PT781.1**: To comprehend the significance of realistic learning through practice in different areas such as dispensing and community pharmacy, pharmacovigilance, drug testing and manufacturing, quality assurance, packaging etc. |
| | **CO.PT781.2:** Todevelop the planning and technical proficiency through practical learning in the domain of interest. |
| | **CO.PT781.3:** To evaluate the problems faced during realistic practice and imply theoretical knowledge to rectify those problems. |
| | **CO.PT781.4:** To utilize their knowledge achieved in isolation, identification, standardization, formulation, manufacturing and evaluation of pharmaceuticals and cosmetics. |
| **PT 810A**<br>PHARMACEUTICAL MARKETING MANAGEMENT | **CO.PT 810A.1:** The students can be able to define the concept of management, Analyzing consumer buying behaviour; industrial buying behaviour. |
| | **CO.PT 810A.2:** Students can take decisions for Product Branding, packaging and labelling. |
| | **CO.PT 810A.3:** Students can compare their level of understanding to interpret various situations in industry. |
| **PT 810B**<br>COMPUTER AIDED DRUG DESIGN | **CO.PT 810B.1:** know the steps and methodologies of lead design and discovery. |
| | **CO.PT 810B.2:** Understand the implementation methodologies of lead design into drug discovery. |
| | **CO.PT 810B.3:** Apply the concept of QSAR and docking in new molcule design and development. |
| | **CO.PT 810B.4:** Construct and apply various startegies involving ligand design, QSAR and docking in designing new drug like molecules. |
| | **CO.PT 810B.5:** Create new molecules by various modelling approaches and using various molecular modelling software. |
| **PT 810C**<br>ADVANCED INSTRUMENTATION TECHNIQUES | **CO.PT810C.1:** To explain significance and concept of advanced instrumentation i.e., MASS and NMR spectroscopy, XRD, LC-MS/MS, GC-MS/MS and also able to implement the knowledge of choosing the right instruments for the analysis of drug. |
| | **CO.PT810C.2**: To realize the difference between various thermal methods and its applications in drug analysis. |

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| | **CO.PT810C.3:** To comprehend the general principles and instrumentation of radioimmunoassay and its applications of advance instrument for analysis. |
| | **CO.PT810C.4:** To build idea about general principles and procedures involved in extraction techniques. |
| | **CO.PT810C.5**: To know the requirement of calibration and validation for analytical instruments and also develop the idea about the importance of ICHQ2A and USFDA review guideline. |
| **PT 817** BIOSTATISTICS AND RESEARCH METHODOLOGY | **CO.PT817.1:** To build idea about the importance of biostatistics and its application in solving problems associated with the research. |
| | **CO.PT817.2:** To strategize and execute a research hypothesis independently. |
| | **CO.PT817.3**: To demonstrate expertise in operating M.S. Excel, SPSS, R and MINITAB®, DoE (Design of Experiment) and its applications in designing and analysis of experiments. |
| **PT 818** SOCIAL AND PREVENTIVE PHARMACY | **CO. PT 818.1**: Students will be able to Evaluate alternative ways of solving problems related to health |
| | **CO. PT 818.2**: Students will Develop a critical way of thinking based on current healthcare development. |
| | **CO. PT 818.3**: Students will be capable of Identifying National health programs its objectives functioning and outcomes. |
| | **CO. PT 818.4**: Students can recognize the community services in rural, urban and school health. |
| | **CO. PT 818.5**: Students will be able to explain the general measures and strategies to be followed in social and preventive pharmacy. |
| **PT 883** PROJECT WORK | **CO. PT 883.1:** Students will be able to identify their area of interest and learn literature survey. |
| | **CO. PT 883.2**: Students will be able to plan and execute the experimental procedures to carry out the topic. |
| | **CO. PT 883.3**: Students will be able to communicate and defend their findings in the form of thesis and seminar. |