Indira Institute of Pharmacy, Sadavali

POs and COs

PROGRAM OUTCOMES

1. 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.

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

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

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

5. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

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

7. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate 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.

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

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

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

11. Life-long learning: Recognize the need for, and have the preparation 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.

Couse Outcomes

Class: FIRST YEAR B. PHARMACY **Semester- I** **Course:** Human Anatomy and Physiology I	
Upon completion of the course, the learner shall be able to:	
CO. No	Course Outcome
101.1	Explain the gross morphology, structure and functions of various cells, tissues and organs of the human body.
101.2	Summarize structure and functions of skin, special senses, autonomic nervous system and various blood vessels.
101.3	Demonstrate the coordinated working pattern of skeletal system and joints.
101.4	Interpret the various homeostatic mechanisms & their imbalances.
101.5	Illustrate the anatomy, physiology of various body systems.

Class: FIRST YEAR B. PHARMACY **Semester- I** **Course:** Pharmaceutical Analysis I	
Upon completion of the course, the learner shall be able to:	
CO. No	Course Outcome
102.1	Understand the principles of volumetric and electro chemical analysis
102.2	Carryout various volumetric and electrochemical titrations
102.3	Develop analytical skills
102.4	Outline the ionization, acidity, basicity and pKa of organic compounds.
102.5	Describe the Redox titrations

Class: FIRST YEAR B. PHARMACY **Semester- I** **Course: Pharmaceutics I**	
Upon completion of the course, the learner shall be able to:	
CO. No	Course Outcome
103.1	Summarize the history of profession of pharmacy
103.2	Explain the basics of different dosage forms
103.3	Interpret pharmaceutical calculations and pharmaceutical incompatibilities
103.4	Relate the professional way of handling the prescription
103.5	Outline the Preparation of various conventional dosage forms

Class: FIRST YEAR B. PHARMACY Semester- I Course: Pharmaceutical Inorganic Chemistry	
Upon completion of the course, the learner shall be able to:	
CO. No	Course Outcome
104.1	Summarize importance of inorganic compounds in pharmacy
104.2	Interpret the sources of impurities and methods to determine the impurities in inorganic drugs and pharmaceuticals
104.3	understand the medicinal and pharmaceutical importance of inorganic compounds
104.4	Explain measurements, calculations along with methods for buffers
104.5	Describe radiopharmaceuticals.

Class: FIRST YEAR B. PHARMACY Semester- I Course: Communication skills	
Upon completion of the course, the learner shall be able to:	
CO. No	Course Outcome
105.1	Understand the behavioral needs for a Pharmacist to function effectively in the areas of pharmaceutical operation
105.2	Communicate effectively (Verbal and Non Verbal)
105.3	Lear effective manage the team as a team player
105.4	Develop interview skills
105.5	Summarize body language and personality development

Class: FIRST YEAR B. PHARMACY Semester- I Course: Remedial Biology	
Upon completion of the course, the learner shall be able to:	
CO. No	Course Outcome
106BT.1	Know the classification and salient features of five kingdoms of life
106BT.2	Understand the basic components of anatomy.
106BT.3	Describe physiology of different systems of plants
106BT.4	Know the basic components of anatomy of animals with special reference to human body
106BT.5	Explain physiology of different systems of animals with special reference to humans.

Class: FIRST YEAR B. PHARMACY Semester- I Course: Remedial Mathematics	
Upon completion of the course, the learner shall be able to:	
CO. No	Course Outcome
106MT.1	Know the theory and their application in Pharmacy
106MT.2	Solve the different types of problems by applying theory
106MT.3	Appreciate the important application of mathematics in Pharmacy
106MT.4	Apply Analytical Geometry and calculus

106MT.5	Use of mathematics in solving Chemical kinetics and Pharmacokinetics equations

Class: SECOND YEAR B. PHARMACY **Semester I** **Course:** Human Anatomy and Physiology –Practical	
Upon completion of the course, the learner shall be able to:	
CO No	Course Outcome
107.1	Estimate formed elements of blood and correlate the results with clinical conditions
107.2	Identify locations of bone in human skeleton with their importance
107.3	Describe body tissue and organs based on structure and organization of cells
107.4	Compare the common diagnostic and biochemical test performed in clinical conditions and its Use in diagnosis and prognosis of diseases.

Class: SECOND YEAR B. PHARMACY **Semester I** **Course:** Pharmaceutical Analysis Lab- I	
Upon completion of the course, the learner shall be able to:	
CO No	Course Outcome
108.1	Apply the practice of volumetric analysis with assay & standardization.
108.2	Experiment with given samples for volumetric, gravimetric and solvent extraction methods.
108.3	Utilize pharmacopoeial monographs to evaluate samples.
108.4	Demonstrate assay of sodium benzoate, sodium chloride and potassium chloride.

Class: FIRST YEAR B. PHARMACY **Semester- I** **Course: Pharmaceutics-I** Practical	
Upon completion of the course, the learner shall be able to:	
CO. No	Course Outcome
109.1	Read prescription and commonly used Latin terms in pharmacy practice
109.2	Interpret quantities of active and inactive ingredient required for formulation.
109.3	Relate compounding, labeling and dispensing of extemporaneous preparations.
109.4	Summarize patient counseling and patient education methods

Class: FIRST YEAR B. PHARMACY **Semester- I** **Course:** Pharmaceutical Inorganic Chemistry –Practical	
Upon completion of the course, the learner shall be able to:	
CO. No	Course Outcome
110.1	Apply limit tests for inorganic ions
110.2	Relate identification test for inorganic substances
110.3	Perform test for purity
110.4	Summarize Preparation of inorganic pharmaceuticals

Class: FIRST YEAR B. PHARMACY Semester- I Course: Communication skills –Practical	
Upon completion of the course, the learner shall be able to:	
CO. No	Course Outcome
111.1	Understand basic communication covering the Meeting People, Asking Questions, Making Friends What did you do? and Do's and Dont's
111.2	Relate pronunciation consonant sounds, nouns and vowel sounds
111.3	Read advanced learning
111.4	Summarize Interview handling skills, E-Mail etiquette and presentation Skills

Class: FIRST YEAR B. PHARMACY Semester- I Course: Remedial Biology – Practical	
Upon completion of the course, the learner shall be able to:	
CO. No	Course Outcome
112.1	Understand techniques of experimental biology.
112.2	Explain structure of cell and its components.
112.3	Determine blood group, blood pressure and tidal volume.
112.4	Study structure and function of parts of plants and frog using suitable techniques.

Class: SECOND YEAR B. PHARMACY Semester III Course: Organic Chemistry I	
Upon completion of the course, the learner shall be able to:	
CO No	Course Outcome
301.1	Summarize the basic concepts of organic chemistry for mono and polyfunctional compounds.
301.2	Explain the concepts of stereochemistry for organic compounds.
301.3	Outline the ionization, acidity, basicity and pKa of organic compounds.
301.4	Relate geometry, stability and properties of the reaction intermediate.
301.5	Illustrate the influence of structure on physicochemical properties of medicinal agents.

Class: SECOND YEAR B. PHARMACY Semester III Course: PHYSICAL PHARMACY	
Upon completion of the course, the learner shall be able to:	
CO. No	Course Outcome
302.1	Demonstrate various physical phenomena for design of dosage forms.
302.2	Identify various physical parameters of drugs and excipents.
302.3	Summarize state of matter, interfacial phenomena and buffers.
302.4	Interpret ionic equilibria, solubility and distribution phenomena in formulations.
302.5	Outline rheology and deformation of solids.

Class: SECOND YEAR B. PHARMACY Semester III Course: **Anatomy, Physiology & Pathophysiology III**	
Upon completion of the course, the learner shall be able to:	
CO. No	Course Outcome
303.1	Illustrate the anatomy, physiology and pathophysiology of various organ systems.
303.2	Explain anatomy, physiology and pathophysiology of male and female reproductive system.
303.3	Outline the anatomical, physiological and pathophysiological aspects of cardiovascular system.
303.4	Relate the composition and role of body fluids.
303.5	Summarize the anatomical, physiological and pathophysiological aspects of urinary and digestive systems.

Class: SECOND YEAR B. PHARMACY Semester III Course: Pharmaceutical Analysis- I	
Upon completion of the course, the learner shall be able to:	
CO No	Course Outcome
304.1	Explain the basic concepts of pharmaceutical analysis.
304.2	Summarize the errors of pharmaceutical analysis with basic numerals.
304.3	Outline the volumetric methods of pharmaceutical analysis.
304.4	Make use of electro-analytical techniques & miscellaneous methods.
304.5	Illustrate the gravimetric & liquid-liquid extraction techniques as analytical methods.

Class: SECOND YEAR B. PHARMACY Semester III Course: Pharmaceutical Engineering	
Upon completion of the course, the learner shall be able to:	
CO No	Course Outcome
305.1	Explain basics of unit operations and safety aspects in pharmaceutical industries.
305.2	Elaborate fluid flow and its measurement.
305.3	Illustrate types of pumps, heat measuring devices, conveyors and crystallizers.
305.4	Summarize process of evaporation, distillation and refrigeration.
305.5	Identify the materials of construction and corrosion.

Class: SECOND YEAR B. PHARMACY Semester III Course: Organic Chemistry Lab I	
Upon completion of the course, the learner shall be able to:	
CO No	Course Outcome
306.1	Build safety measures in the laboratory.
306.2	Utilize theoretical aspects for determination of physical constant and functional group.
306.3	Infer organic spotting of mono and bi-functional group samples.
306.4	Demonstrate the determination of Log P values.

Class: SECOND YEAR B. PHARMACY Semester III Course: PHYSICAL PHARMACY, Lab	
Upon completion of the course, the learner shall be able to:	
CO. No	Course Outcome
307.1	Illustrate testing of various physical parameters.
307.2	Summarize the principles for determination of physical parameters.
307.3	Explain methods for determination of physical parameters.
307.4	Demonstrate HLB number of surfactants.

Class: SECOND YEAR B. PHARMACY Semester I Course: Pharmaceutical Analysis Lab- I	
Upon completion of the course, the learner shall be able to:	
CO No	Course Outcome
108.1	Apply the practice of volumetric analysis with assay & standardization.
108.2	Experiment with given samples for volumetric, gravimetric and solvent extraction methods.
108.3	Utilize pharmacopoeial monographs to evaluate samples.
108.4	Demonstrate assay of sodium benzoate, sodium chloride and potassium chloride.

Class: SECOND YEAR B. PHARMACY Semester III Course: Pharmaceutical Analysis Lab- I	
Upon completion of the course, the learner shall be able to:	
CO No	Course Outcome
308.1	Apply the practice of volumetric analysis with assay & standardization.
308.2	Experiment with given samples for volumetric, gravimetric and solvent extraction methods.
308.3	Utilize pharmacopoeial monographs to evaluate samples.
308.4	Demonstrate assay of sodium benzoate, sodium chloride and potassium chloride.

Class: THIRD YEAR B. PHARMACY Semester V Course: ORGANIC CHEMISTRY –III	
Upon completion of the course, the learner shall be able to:	
CO No	Course Outcome
501.1	Explain the chemistry of heterocycles and biomolecules.
501.2	Interpret the nomenclature of heterocyclic compounds.
501.3	Examine the various named reactions of heterocycles.
501.4	Simplify the chemistry of steroids, peptides and polymers.
501.5	Apply Merrifield solid phase synthesis of DNA

Class: THIRD YEAR B. PHARMACY Semester V Course: Pharmaceutics II	
Upon completion of the course, the learner shall be able to:	
CO No	Course Outcome
502.1	Apply formulation aspects of various dosage forms.
502.2	Build formulation and evaluation of biphasic dosage form .
502.3	Analyze formulation and manufacturing aspects of semisolid dosage forms
502.4	Develop pressurized packaging system for drug delivery
502.5	Simplify the basic concepts of cosmetic science.

Class: THIRD YEAR B. PHARMACY Semester V Course: Pharmaceutical Biotechnology	
Upon completion of the course, the learner shall be able to:	
CO No	Course Outcome
503.1	Make use of biotechnology in development of Pharmaceutical Products.
503.2	Apply techniques, ethics and environmental safety involved in fermentation and recombinant DNA technology.
503.3	Importance of molecular biology and immunology in biotechnological products.
503.4	Utilize applications of rDNA, enzyme and cell immobilization technology in Pharmaceutical industry.
503.5	Analyze uses of cell culture, microbial biotransformation and bioinformatics uses in

	Pharmaceutical industry

Class: THIRD YEAR B. PHARMACY **Semester V** **Course:** Pharmacology-II	
Upon completion of the course, the learner shall be able to:	
CO No	Course Outcome
504.1	Build the basic pharmacological aspects of various disorders.
504.2	Explain pharmacology of drugs used in chemotherapy along with rational use of antimicrobials.
504.3	Analyze pharmacology of drugs used as immunomodulators.
504.4	Simplify pharmacology of drugs used in endocrine disorders.
504.5	Explain pharmacology of haematological disorders.

Class: THIRD YEAR B. PHARMACY **Semester V** **Course: Cosmeticology**	
Upon completion of the course, the learner shall be able to:	
CO. No	Course Outcome
512.1	Apply basic aspects of cosmetic products
512.2	Simplify raw materials for cosmetics
512.3	Appraise toxicological aspects of cosmetics
512.4	Categorize various cosmetic formulations along with functional evaluation
512.5	Examine sensorial parameters of cosmetics

Class: THIRD YEAR B. PHARMACY **Semester V** **Course: Packaging of Pharmaceuticals**	
Upon completion of the course, the learner shall be able to:	
CO. No	zCourse Outcome
513.1	Construct basic packaging materials for pharmaceuticals
513.2	Appraise Strip and Blister Packaging for pharmaceuticals
513.3	Importance of sterilization and stability aspects for packaging
513.4	Explain primary and ancillary packaging materials
513.5	Describe labelling aspects of pharmaceuticals

Class: THIRD YEAR B. PHARMACY **Semester V** **Course:** ORGANIC CHEMISTRY Lab–II	
Upon completion of the course, the learner shall be able to:	
CO No	Course Outcome
505.1	Assess the separation and quantification of binary mixtures.
505.2	Identify organic compounds by various physiochemical tests.
505.3	Make use of theoretical aspects of recrystallization for purification of compounds.
505.4	Test for confirmation of organic compounds by preparing their derivatives.

Class: THIRD YEAR B. PHARMACY **Semester V**

Course: Pharmaceutics II	
Upon completion of the course, the learner shall be able to:	
CO No	Course Outcome
502.1	Make use of formulation aspects for preparation of various dosage form.
502.2	Examine formulation and evaluation parameters of biphasic system.
502.3	Simplify Preparation and evaluation aspect of semisolids with cosmetics.
502.4	Inspect pharmaceutical aerosols.

Class: THIRD YEAR B. PHARMACY Semester- V Course: Experimental Techniques in Microbiology and Biotechnology Lab	
Upon completion of the course, the learner shall be able to:	
Co. No	**Course Outcome**
507.1	Develop hands on media sterilization techniques and aseptic preparations for microbiological screenings and morphological evaluation.
507.2	Utilize staining techniques, antimicrobial screenings and biochemical tests for microbiological evaluation.
507.3	Analyze quality of raw materials, food products and water for assessment of extent of microbial contaminating.
507.4	Relationship of TDT and TDP and its application in Pharmaceuticals.

Class: FINAL YEAR B. PHARMACY Semester VII Course: Pharmaceutical Chemistry II	
Upon completion of the course, the learner shall be able to:	
CO No	Course Outcome
701.1	Discuss the chemistry of medicinal agents.
701.2	Compile chemical classification, nomenclature and stereochemistry of medicinal agents.
701.3	Modify structure of drugs by reviewing SAR and metabolism.
701.4	Perceive MOA of different classes of medicinal compounds.
701.5	Design the synthesis of drugs.

Class: FINAL YEAR B. PHARMACY Semester- VII Course: Pharmacognosy III	
Upon completion of the course, the learner shall be able to:	
Co.No	**Course Outcome**
702.1	Discuss the Pharmacognosy of drugs containing alkaloids, glycosides and glycoproteins
702.2	Elaborate biosynthetic pathways of alkaloids from various amino acids.
702.3	Assess biopharmaeutical considerations for herbal drugs.
702.4	Develop alternative system of formulations using some natural excipients and their standardization along with regulatory aspects.
702.5	Interpret some important phytoconstituents by spectroscopic techniques.

Class: FINAL YEAR B. PHARMACY Semester VII Course: Pharmaceutical Analysis III	
Upon completion of the course, the learner shall be able to:	
CO No	Course Outcome
703.1	Explain the various methods used for the multicomponent analysis of drugs by UV spectroscopy
703.2	Discuss chromatographic and hyphenated techniques for qualitative and quantitative analysis.
703.3	Elaborate NMR and mass spectrometry.
703.4	Evaluate the spectral data for structural interpretation of chemical compound.
703.5	Assess analytical method validation

Class: FINAL YEAR B. PHARMACY Semester VII **Course:** Pharmacology-III	
Upon completion of the course, the learner shall be able to:	
CO No	Course Outcome
704.1	Adapt basic concepts of pharmacological and toxicological aspects of various disorders.
704.2	Assess involvement of autacoids along with therapeutics of inflammatory processes.
704.3	Justify the approaches to the treatment of respiratory disorders.
704.4	Explain the pharmacotherapy of gastrointestinal and CNS ailments.
704.5	Elaborate the concepts and general management of toxicity.

Class: FINAL YEAR B. PHARMACY Semester- VII Course: Pharmaceutical Jurisprudence	
Upon completion of the course, the learner shall be able to:	
Co. No	**Course Outcome**
705.1	Assess the Pharmaceutical legislations in India and rules therein.
705.2	Describe various regulatory procedures for drugs and cosmetics and other related acts.
705.3	Examine IPC & CRPC aspects along with the pricing of Pharmaceuticals.
705.4	Describe the process of filing Patent as per Indian Patent act
705.5	Analyze drug regulatory affairs in India along with some developed countries.

Class: FINAL YEAR B. PHARMACY Semester- VII Course: Intellectual Property Rights	
Upon completion of the course, the learner shall be able to:	
Co. No	**Course Outcome**
705.1	Discuss basics of IPR with respect to pharmaceuticals.
705.2	Perceive the knowledge of patents with case studies.
705.3	Adapt various harmonized practices and integrate the knowledge required for various intellectual properties.
705.4	Explain significance of rules and regulations pertaining to IPR.
705.5	Justify the role of IPR in pharmaceutical product launch.

Class: FINAL YEAR B. PHARMACY Semester- VII Course: Pharmacognosy Lab II	
Upon completion of the course, the learner shall be able to:	
Co. No	**Course Outcome**
706.1	Evaluate crude drugs based on morphological and microscopical characters.
706.2	Judge quality of crude drugs on the basis of qualitative chemical tests and powder microscopy
706.3	Determine the total aldehyde content/phenol content/ total alkaloids in crude drugs.
706.4	Apply knowledge of microscopic characters in ascertaining the quality of powdered drug.
706.1	Evaluate crude drugs based on morphological and microscopical characters.

Class: FINAL YEAR B. PHARMACY Semester- VII Course: Pharmaceutical analysis lab III	
Upon completion of the course, the learner shall be able to:	
Co. No.	**Course Outcome**
707.1	Evaluate the concentration of analyte by UV Spectroscopic multicomponent analytical methods.
707.2	Estimate different chromatographic techniques for qualitative and quantitative applications.
707.3	Assess validation parameters for analytical methods.
707.4	Predict the amount of drug in marketed formulation

Class: FINAL YEAR B. PHARMACY **Semester VII** **Course:** Pharmacology Lab II	
Upon completion of the course, the learner shall be able to:	
CO No	Course Outcome
708.1	Appraise the concepts of animal ethics and care.
708.2	Justify the use of alternative methods to *in vivo* animal models.
708.3	Estimate the concentration of unknown using bioassay technique.
708.4	Discuss the OECD and CPCSEA guidelines.