# Dayananda Sagar University
# College of Pharmaceutical Sciences

**Course Outcomes- Pharm.D**

**1st Year Pharm. D**

| Sl No | Subject Code | Subject Name | Course Outcomes |
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| 1 | 15PD101 | Human Anatomy and Physiology | **Upon completion of the course the student shall be able to:**<br>1. Elaborate the various morphology, structure of various cells of body and to group the various tissues<br>of human body and cells and haematology.<br>2. Summarize about the functions and disorders of different organs of each system.<br>3. To assess the coordinated working pattern of different organs of each system.<br>4. To corelate the structure and functions of different<br>organs of different systems and sense organs.<br>5. To analyse the structure, functions and disorders of nervous system. |
| 2 | 15PD102<br>15PD172 | Pharmaceutics<br>(Theory and Practical) | **Upon the completion of the course the student should be able to:**<br>1. Illustrate the different parts of a prescription with their significance and various operational aspects in compounding and dispensing of a prescription.<br>2. Critique on different pharmaceutical calculation involved in formulation and explore<br>the rules to prepare and dispense of various types of powders<br>3. Elucidate the various excipients used in liquid orals and enumerate the identification, |

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| | | | precautions on instabilities of biphasic liquids<br>4. Estimate the percentage of solutions by allegation method, Convert the solutions to<br>proof spirit, find out the isotonicity of solutions<br>5. Designate various causes of incompatibility and their remedies with suitable example. |
| 3 | 15PD103<br>15PD173 | Medicinal Biochemistry (Theory and Practical) | **Upon completion of the subject student shall be able to –**<br>1. Outlining the concepts of catalytic activity of enzymes and importance of isoenzymes in diagnosis of diseases<br>2. Categorizing the metabolic pathways of biomolecules with their degradation process and also (metabolic disorders).<br>3. Summarizing the concepts of genetic organization of mammalian genome; protein synthesis; replication; mutation and repair mechanism<br>4. Interpreting the biochemical principles and results of organ function tests of kidney, liver and endocrine glands.<br>5. Discussing the Principle and procedure for determination of biomolecules in the body fluids. |
| 4 | 15PD104<br>15PD174 | Pharmaceutical Organic Chemistry (Theory and Practical) | **Upon completion of the subject student shall be able to impart a very good knowledge about**<br>1. Illustrates rules of IUPAC Nomenclature and its applications. Demonstrates Different Hybridization patterns of Organic compounds.<br>2. Describes Various Aspects and applications |

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| | | | of Important organic reactions like substitution, Elimination and Reaction intermediates.<br>3. Discusses and summarizes few classes of organic compounds along with the reactions they undergo, their orbital picture and applications.<br>4. Demonstrates various applications of Organic reactions in the field of Pharmacy like Aromatic substitution and Nucleophilic addition.<br>5. Explains several characteristic Properties, steps involved in their preparation and reaction and their application in synthetic chemistry. |
| 5 | 15PD105<br>15PD175 | Pharmaceutical Inorganic Chemistry (Theory and Practical) | **Upon completion of the course student shall be able to:**<br>1. Be familiar with the origins of impurities and techniques for identifying them in inorganic medicines and medications.<br>2. Recognize the significance of inorganic chemicals in medicine and pharmaceuticals<br>3. Acknowledge about the role of fluoride in dental caries and importance of maintaining dental hygiene<br>4. Familiarize with radiopharmaceuticals and its importance in therapy, diagnosis, treatment<br>5. Identifiying various ions predent in the electrolyte sand their role in maintining the physiological acid -base balance |

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**2nd Pharm. D**

| Sl No | Subject Code | Subject Name | Course Outcomes |
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| 1 | 15PD201 | Pharmacology -1 | **Upon completion of the subject student shall be able to (Know, do, appreciate) –**<br>1. Define pharmacology, its subfields, and the numerous drug delivery methods with their corresponding benefits and drawbacks.<br>2. Recognize the fundamental ideas behind the pharmacokinetics and pharmacodynamics of pharmacological compounds.<br>3. Describe the steps in the development of novel medications and the principles of drug discovery.<br>4. Examine how various drug categories affect important organ systems such the ANS, CVS, CNS, respiratory system, hormones, and opiates.<br>5. Analyze negative effects and (possible or likely) drug interactions after drug consumption. |
| 2 | 15PD202<br>15PD272 | Pharmaceutical Microbiology (Theory & Practical) | **Upon completion of the subject student shall be able to –**<br>1. Understand the microscopy, identification, growth factors and sterilization of microorganisms;<br>2. Know the mode of transmission of disease-causing microorganism, symptoms of disease, and treatment aspect;<br>3. Estimate RNA and DNA and there by identifying |

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| | | | the source;<br>4. Cultivate and identify the microorganisms in the laboratory;<br>5. Test organisms by performing the diagnostic tests; and appreciate the behaviour of motility<br>and behavioural characteristics of microorganisms. |
| 3 | 15PD203<br>15PD271 | Pharmacognosy and Phytopharmaceuticals (Theory & Practical) | **Upon completion of the course student shall be able to:**<br>1. Annotate the basic principles involved in cultivation, collection and storage of crude drugs.<br>2. Identify the source, active constituents and uses of crude drugs and classify them.<br>3. Distinguish and recognize the diagnostic characters of plants and evaluate them.<br>4. Enumerate the various primary metabolites of the plant and the crude drugs under them.<br>5. Detect the adulteration and contamination in crude drugs and identify the plant fibers for surgical dressing. |
| 4 | 15PD204 | Community Pharmacy | **Upon completion of the course, the student shall be able to –**<br>a) Summarize the roles and responsibilities of a community pharmacist.<br>b) Prepare the requirements for community pharmacy management along with inventory control.<br>c) Implement pharmaceutical care services; provide general patient counseling and health screening services to the patient, and a check on improving patient medication adherence. |

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| | | | d) Choose the concept of rational drug therapy.<br>e) Implement the code of ethics for community pharmacist and respond to symptoms of minor ailments. |
| 5 | 15PD205 | Pathophysiology | **Upon completion of the subject student shall be able to –**<br>a) Present the basic pathogenesis of human disease<br>b) Define and explore the most common aetiologies and predisposing factors associated with human disease<br>c) Illustrate the basis for some laboratory tests and other diagnostic procedures<br>d) Correlate between pathophysiology and clinical skills they are learning in their allied health science programs.<br>e) Summarize how the various organ systems are interrelated, and use this understanding to promote a holistic approach towards the evaluation and treatment of patients. |
| 1. | 15PD206 | Pharmacotherapeutics-I | **Upon completion of the subject student shall be able to –**<br>**1**) Comprehend and retrieve the etiopathogenesis and pharmacotherapy of cardiovascular illnesses.<br>2) Highlight and infer the diagnostic parameters involved in the management of respiratory diseases and various therapeutics options for the management of<br>endocrine diseases.<br>3) Illustrate and utilize patient-centered treatment by adopting evidence-based medicine to diverse patient population. |

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| | | | 4) Outline the pathophysiological approach and management involved in ophthalmologic illnesses.<br>5) Summarize and demonstrate the role of pharmacist in essential and rational drug use. |

**3rd Year Pharm. D**

| Sl No | Subject Code | Subject Name | Course Outcomes |
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| 1 | 15PD301<br>15PD371 | Pharmacology II<br>(Theory & Practical) | **Upon completion of the subject student shall be able to:**<br>1. Underline drugs acting on blood, chemotherapy, anti-microbial agents, advanced gene therapy, immunotherapy.<br>2. Compare pharmacological aspects of drugs acting on blood and renal system and pharmacology of immunosuppressant and principles of animal toxicology.<br>3. Illustrate the chromosome structure and DNA replication<br>4. Interpret the fundamentals and importance of cell biology in cell signalling pathway<br>5. Analyse the principles and processes of Recombinant DNA technology. |
| 2 | 15PD302<br>15PD372 | Pharmaceutical Analysis<br>(Theory & Practical) | **Upon completion of the course the student shall be able to –**<br>1. Measure and estimate the amount of drug present in the sample and describe the |

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| | | | construction and working of UV and IR Spectroscopy.<br>2. Separate and identify the mixture of samples by various Chromatographic techniques.<br>3. Select and apply a suitable concentration to construct the calibration curve by Fluorimetry and Flame Photometry.<br>4. Demonstrate the different types of titrations under Electrometric methods.<br>5. Discuss the concepts of quality control and validation according to the guidelines. |
| 3 | 15PD303<br>15PD373 | Pharmacotherapeutics II<br>(Theory & Practical) | **Upon completion of the subject student shall be able to –**<br>a) Summarizing the causes of resistance to antimicrobials and antibiotics, combination treatment profile, its Drug Interaction (DI), and Adverse Drug Reactions (ADR), as well as the therapeutic choice of prophylaxis/treatment.<br>b) Comprehensive measures of various protozoa, viral, and fungi infections, along with their co-morbid situation of proliferation, and an approaches towards the preventions, treatments, and management aspects of the same, together with their DI and ADR<br>c) Learning more about the clinical knowledge relating to the causes of muscle and cartilage disorders, with a focus on the preventions, treatments, and management of DI and ADR event outcomes. |

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| | | | d) Categorizing & correlating acute and chronic renal disease and disorders, sepsis and its complications, and the treatment associated dialysis. A concrete focus on the antibiotic regimen, validating drug induce renal affects and its DI and ADR characteristics.<br>e) Determining the various stages/levels of cancer and establishment of effective chemotherapy including ADR, DI, and the instant of recovery. |
| 4 | 15PD304 | Pharmaceutical Jurisprudence (Theory) | **Upon completion of the subject student shall be able to (Know, do, and appreciate) –**<br>a. Practice the Professional ethics;<br>b. Retrieve the various concepts of the pharmaceutical legislation in India;<br>c. Estimate the various parameters in the Drug and Cosmetic Act and rules;<br>d. Summarize the Drug policy, DPCO, Patent and design act;<br>e. Choose the labelling requirements and packaging guidelines for drugs and cosmetics;<br>f. Gather the concepts of Dangerous Drugs Act, Pharmacy Act and Excise duties Act; and<br>g. Interpret other laws as prescribed by the Pharmacy Council of India from time to time including International Laws.<br>h. Summarize prescription and non-prescription products |
| 5 | 15PD305<br>15PD374 | Medicinal Chemistry (Theory & Practical) | **Upon completion of the course, students are able –**<br>1. To visualise the concepts of drug design |

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| | | | techniques (includes CADD)<br>2. To predict the concepts of Structural activity relationship for medicinal drugs. (Includes structural relationship with respect to biological activity)<br>3. To validate medicinal compounds structurally and therapeutically.<br>4. To Memorising the medicinal class of agents with simple and advanced techniques.<br>5. Summarize the mechanism of action, mode of resistance, therapeutic uses and side effects of medicinal drugs. |
| 6 | 15PD306<br>15PD375 | Pharmaceutical Formulations (Theory & Practical) | **Upon completion of the subject student shall be able to (Know, do, appreciate) –**<br>1. Outline the principle involved in formulation of various pharmaceutical dosage forms<br>2. Demonstrate the formulation and characterization of tablet dosage form.<br>3. Illustrate the production and filling of capsules.<br>4. Explicate the formulation and evaluation of emulsions and suspensions.<br>5. Elaborate the production and quality control test for parenterals.<br>6. Discuss the concepts and approaches used for preparing various novel drug delivery systems. |

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**4th Year Pharm. D**

| Sl No | Subject Code | Subject Name | Course Outcomes |
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| 1 | 15PD401<br>15PD471 | Pharmacotherapeutics III | **Upon completion of this subject it is expected that students will be able to understand –**<br>a) Design the dosage regimen for diseases;<br>b)Illustrate the preparation of individualized therapeutic plans based on diagnosis;<br>c) Identify and determine the patient-specific parameters relevant to initiating drug therapy,<br>d)Summarize the therapeutic approach to manage the diseases condition<br>e) Assess the rationality of drug therapy |
| 2 | 15PD402<br>15PD472 | Hospital Pharmacy | **Upon completion of the course, the student shall be able to –**<br>a. Categorize various types of hospitals and summarize the organization and management of hospital pharmacy<br>b. Implement budget preparation and promote hospital drug policy.<br>c. Present unbiased drug information to the doctors and hospital pharmacy services.<br>d. Implement the manufacturing practices of various formulations in hospital set up.<br>e. Promote hospital drug policy and summarize the handling and packaging of radio pharmaceuticals.<br>f. Implement continuous pharmacy education and professional development programs.. |
| 3 | 15PD403<br>15PD47 | Clinical Pharmacy | **Upon completion of the subject student shall be able to (Know, do, appreciate) –** |

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| | 3 | | a. Monitor & Finding drug therapy of patient through medication chart review and clinical review;<br>b. Obtain & organising medication history interview and counsel the patients;<br>c. Identify and resolve drug related problems;<br>d. Detect, assess and monitor adverse drug reaction;<br>e. Interpret selected laboratory results (as monitoring parameters in therapeutics) of specific disease states; and<br>f. Retrieve, analyse, interpret and formulate drug or medicine information |
| 4 | 15PD404 | Biostatistics & Research Methodology | **Upon completion of the course the student shall be able to:**<br>a. Know the various statistical methods to solve different types of problems<br>b. Operate various statistical software packages<br>c. Understand the importance of Computer in hospital and Community Pharmacy<br>d. Appreciate the statistical technique in solving the pharmaceutical problems |
| 5 | 15PD405<br>15PD474 | Biopharmaceutics & Pharmacokinetics | **Upon completion of the course the student shall be able to :**<br>1. Enumerate the various mechanisms involved in absorption, distribution, metabolism and excretion with emphasis on the various factors affecting them.<br>2. Annotate the basic concept of plasma concentration-time profile with the study of various kinetic models.<br>3. Applications of pharmacokinetic principles to one compartment and multicompartment |

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| | | | model.<br>4. Analyze and design the dosage regimen for patients with hepatic disease and renal failure.<br>5. Evaluation and assessment of bioavailability and bioequivalence studies |
| 6 | 15PD406 | Clinical Toxicology | **Upon completion of the course student shall be able to –**<br>1) Highlight and demonstrate the general working knowledge of clinical toxicology concepts and techniques.<br>2) Illustrate the clinical manifestations and management of acute poisoning with agents.<br>3) Demonstrate and utilize knowledge of fundamental concepts in general toxicology and clinical management involved in snake bite and heavy metals.<br>4) Comprehend and identify possible preventative measures to decrease accidental poisonings.<br>5) Outline and build the ability to contribute as a part of the medical team in situations involving substance abuse and dependence. |

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**5th Year Pharm. D**

| Sl No | Subject Code | Subject Name | Course Outcomes |
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| 1 | 15PD501 | Clinical Research | **Upon completion of this course, the students will be able to –**<br>a) Categorise & summarizing the concept of the new drug development process.<br>b) Understand the regulatory and ethical requirements.<br>c) Judge the clinical trials following the regulatory and ethical requirements.<br>d) Coordinate & facilitate the clinical trials and promote quality drug trial research.<br>e) Adapt the safety monitoring and reporting in clinical trials |
| 2 | 15PD502 | Pharmacoepidemiology and Pharmacoeconomics | **Upon completion of this course, the students will be able to -**<br>a) Assessing the versatile ranges, various units of measurement, and patient adherence to medication doses with regard to prevalence, incidence, and incidence rate.<br>b) Comprehensive rating of different pharmacoepidemiological risks, concepts for gathering diverse case studies/reports, their analysis, and their record-keeping procedures.<br>c) Gaining statistical interpreting knowledge of |

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| | | | the data system's unique applications based on risk management and medication safety.<br>d) Implementing a wealth of knowledge about efficient Pharmacoeconomic assessment and judgments based on community pharmacy through a variety of approaches and hands-on study of diverse methods using case studies.<br>e) Executing of software applications that the student could interpret case studies based on them. |
| 3 | 15PD503 | Clinical Pharmacokinetics and Therapeutic Drug Monitoring | **Upon completion of the course, the student shall be able to –**<br>a. Design the drug therapy regimen for individual patient and summarize the concepts of clinical pharmacokinetics<br>b. Interpret and correlate the plasma drug concentration with patient's therapeutic outcome.<br>c. Calculate dosage for patients with renal/ hepatic impairment.<br>d. Identify and manage drug –drug interactions.<br>e. Predict the causes of unexpected drug responses using the concept of population pharmacokinetics and pharmacogenetics |