

Course Outcomes

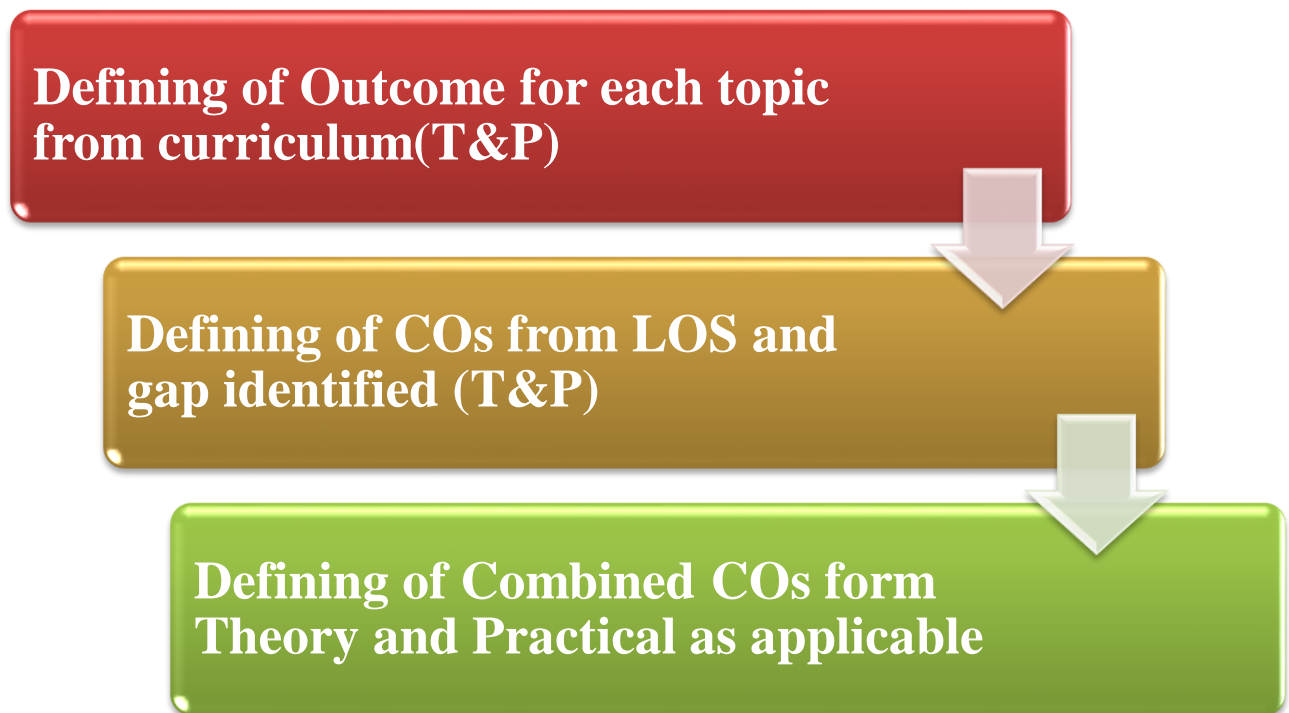
(2015 Pattern)

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Process of defining course outcomes





Pharmaceutics Department

Subject: Pharmaceutics I	Class: First Year B.Pharm
Subject Code: 1.1.1	
Course outcomes:	
1.1.1.1 Explain the history of Pharmacy, Pharmacy Profession, Pharmaceutical Industry and alternative system of medicine.	
1.1.1.2 Appraise role of ethics, Pharmacopeia, compendia, code of conduct of Pharmacy and applications.	
1.1.1.3 Formulate and evaluate various Pharmaceutical dosage forms and find the need for accuracy, thoroughness in manufacture of Pharmaceutical products and routes of drug administration.	
1.1.1.4 Summarise and evaluate various preformulation parameters.	
1.1.1.5 Predict the special requirements of preparations regarding the use, handling, storage conditions.	
1.1.1.6 Differentiate between quality assurance and quality control.	

Subject: Modern Dispensing Pharmacy	Class: First Year B. Pharm
Subject Code: 1.1.2	
Course outcomes:	
1.1.2.1 Interpret and assess prescriptions and other requests for medicines, including legal and clinical validation, dispensing, labelling and supply.	
1.1.2.2 Explain drug interactions, adverse drug reactions, pharmacovigilance and idiosyncrasy.	
1.1.2.3 Formulate and dispense various dosage forms with their label including storage instructions.	
1.1.2.4 Calculate the dose of drug and Perform pharmaceutical calculations accurately.	
1.1.2.5 Interpret the types of incompatibility and their remedies.	
1.1.2.6 Summarise the Role of pharmacists in community healthcare and patient counselling.	

Subject: Pharmaceutics-II	Class: First Year B. Pharm
Subject Code: 1.2.1	
Course outcomes:	
1.2.1.1 Design and develop new technologies (equipment based) in Pharmaceutical industry.	
1.2.1.2 Analyze the use of correct material for construction of Pharmaceutical plant.	
1.2.1.3 Practice the hazards and safety measures taken in industry.	
1.2.1.4 Predict the clinical significance of bioavailability and bioequivalence.	
1.2.1.5 Develop the practical knowledge while working in industry to apply theoretical principle of Manufacturing.	
1.2.1.6 Apply Pharmacopoeial standards for the preparation of various dosage forms.	

Subject: Dosage Form Design Subject Code: 1.2.2	Class: First Year B. Pharm
Course objectives:	
1.2.2.1 Compare conventional and novel dosage forms.	
1.2.2.2 Describe fundamentals of manufacturing, evaluation stages and stability aspects for various dosage form.	
1.2.2.3 Summarise the details of radiopharmaceuticals.	
1.2.2.4 Discuss the methods to improve solubility and their role in dissolution study.	
1.2.2.5 Appraise the various aspect regarding dosage form design and explain the mechanism of granulation.	
1.2.2.6 Explain the structure of skin, mechanism of drug penetration and penetration enhancers in semisolid dosage form.	

Subject: Physical Pharmaceutics-I Subject Code: 2.3.1	Class: Second Year B. Pharm
Course outcomes:	
2.3.1.1 Explain various states of matter and their applications in pharmacy.	
2.3.1.2 Summarise concepts of phase rule and construct phase diagrams.	
2.3.1.3 Discuss and apply knowledge of colligative properties.	
2.3.1.4 Describe and apply knowledge of solubility of solids, distribution phenomena and thermodynamics in the design of dosage form.	
2.3.1.5 Justify role of BCS in dosage form Design.	
2.3.1.6 Investigate various theories, laws and equation related to states of matter.	

Subject: Pharmaceutical Microbiology and Immunology Subject Code: 2.3.2	Class: Second Year B. Pharm
Course outcomes:	
2.3.2.1 Explain in detail role of microbiology in pharmaceutical sector.	
2.3.2.2 Compare and execute various structural features, biological characteristics and application of microbes like bacteria, yeast, moulds, viruses etc.	
2.3.2.3 Summarise and measure various Microbial Limit tests, Sterility test, MIC, Antibiotic assay, and various staining techniques.	
2.3.2.4 Discuss and apply principles of sterilization, preservation, disinfection and its application	
2.3.2.5 Summarize the concept, applications of immunology and Antigen-antibody reaction.	
2.3.2.6 Perform different Inoculation techniques, motility testing.	

Subject: Physical Pharmaceutics-II
Subject Code: 2.4.1

Class: Second Year B. Pharm

Course outcomes:

2.4.1.1 Appraise and apply knowledge of physical properties of matter.

2.4.1.2 Illustrate the concept surface and interfacial phenomenon

2.4.1.3 apply knowledge of chemical kinetics including stability testing protocols and regulatory requirements in dosage form design

2.4.1.4 Explain and demonstrate knowledge of different properties, methods and stability of colloids

2.4.1.5 Appraise various instruments used to determine physicochemical properties of matter

2.4.1.6 Assess role various physicochemical properties in formulation of biphasic liquid dosage form

Subject: Pharmaceutical Engineering
Subject Code: 2.4.6

Class: Second Year B. Pharm

Course objective:

2.4.6.1 Illustrate principle, construction and working of equipment's for different unit operations.

2.4.6.2 Differentiate between traditional & advanced operating instruments.

2.4.6.3 Explain the fundamentals involved in mass transfer, fluid flow, and heat transfer.

2.4.6.4 Summarise the various mechanisms, factors influencing corrosion process and methods used for corrosion control in Pharmaceutical industries.

2.4.6.5 Compare various unit operations with respect to their applications in Pharmacy.

2.4.6.6 Relate the role of unit operations like Drying, Evaporation, Distillation, Crystallization etc. in dosage form design.

Subject Industrial Pharmacy-I
Subject Code: 3.5.1

Class : Third Year B. Pharm

Course outcomes:

3.5.1.1 Discuss various concepts of preformulation and perform experiments showing influence of various additives on dosage form design & stability.

3.5.1.2 Explain different physicochemical principles, guiding solid oral dosage forms like tablet, capsules, various additives used therein, manufacture & evaluation, equipments, defects and corrective approaches.

3.5.1.3 Explain the concept, types, pharmacopoeial specifications, techniques & equipments used in tablet coating.

3.5.1.4 Construct the Plant layout for tablet and capsule manufacturing.

3.5.1.5 Review different techniques used to formulate modified release dosage forms.

3.5.1.6 Review & compare different advances in manufacturing of Capsules.

Subject: Pharmaceutical Business Management & Disaster Management

Class: Third Year B. Pharm

Subject Code: 3.5.6

Course outcomes:

3.5.6.1 Summarise knowledge of Pharmaceutical business management strategy.

3.5.6.2 Discuss Pharmaceutical Marketing strategies and management.

3.5.6.3 Discuss human resource and development needs.

3.5.6.4 Describe disaster management and disaster preparedness plan.

3.5.6.5 Demonstrate the perspectives & Barriers in communication.

3.5.6.6 Explain the effects of disasters on the environment.

Subject Industrial Pharmacy-II

Class : Third Year B. Pharm

Subject Code: 3.6.1

Course outcomes:

3.6.1.1 Describe various concept of dispersed system along with formulation strategies and thermodynamics.

3.6.1.2 Describe mechanisms of formation of dispersed systems and make use of different concepts like structured vehicles, HLB, PIT tec. of dispersed systems inversion temperature.

3.6.1.3 Illustrate the concept of topical drug delivery with emphasis on anatomy & functions of Skin as a barrier and develop formulations followed by evaluation of semisolids.

3.6.1.4 Classify & compare various equipments used in manufacturing of dispersed systems and semisolids. Sketch & discuss the Plant layout for dispersed systems and semisolids.

3.6.1.5 Review various natural excipients used in topical formulations.

3.6.1.6 Prepare report on advances in formulation of dispersed systems.

Subject: Pharmaceutical Biotechnology

Class: Final Year B. Pharm

Subject Code:3.6.7

Course outcomes:

3.6.7.1 Summarise scope and applications in Pharmacy.

3.6.7.2 Compile the role of gene transfer and genetic engineering techniques in field of molecular biotechnology and application

3.6.7.3 Summarized rDNA technology and applications for biotechnological derived products, human genetherapy and monoclonal antibody.

3.6.7.4 Appraise application of genetic engineering in animals.

3.6.7.5 Categorise enzymes immobilization methods and organise its applications.

3.6.7.6 Appraise fermentation, downstream process, effluent treatment and its application.

Subject: Sterile Products Subject Code:4.7.1	Class: Final Year B.Pharm
Course outcomes:	
4.7.1.1 Summarise the requirements for Pre-formulation and formulation of sterile products,packaging material.	
4.7.1.2 Demonstrate GMP guidelines for Parenteral Production and discuss layout of parentrafacility along with its requirements.	
4.7.1.3 Classify ,formulate and evaluate parentrals on large and Pilot plant scale.	
4.7.1.4 Illustrate pre formulation, formulation, and evaluation of ophthalmic products, BloodProducts and Surgical Dressings.	
4.7.1.5 differentiate various advances in parenteral formulations.	
4.7.1.6 report various advancements in excipients used in parenterals.	

Subject: Biopharmaceutics& Pharmacokinetics Subject Code: 4.7.6	Class: Final Year B. Pharm
Course outcomes:	
4.7.6.1 Illustrate the concept of ADME of drug in human body.	
4.7.6.2 Describe mechanism of dissolution and concept of IVIVC.	
4.7.6.3 Analyze the different pharmacokinetic parameters on the basis of Non linear and compartment model analysis.	
4.7.6.4 Describe measures of bioavailability bioequivalence and review the various regulations required to develop BA -BE study protocol for the new drug molecule.	
4.7.6.5 Review of softwares and statistical models used in determination pharmacokinetic and Pharmacodynamic factors.	
4.7.6.6 Discuss the case studies of drugs-drug and drug-food interactions and enlist irrational combinations banned by FDA in India.	

Subject: Pharmaceutical Jurisprudence Subject Code: 4.7.7	Class: Final Year B. Pharm.
Course outcomes	
4.7.7.1. Recall the definitions, schedules in the various pharmaceutical laws and obey Pharmaceutical Code of Ethics.	
4.7.7.2. Summarise in detail various Pharmaceutical Acts in India and their executions.	
4.7.7.3. Explain Patents, procedure for patent application and IPR.	
4.7.7.4. Illustrate role of the regulatory systems for safety and effectiveness of medicine and their quality.	
4.7.7.5. Explain advance resources for intellectual property rights.	
4.7.7.6 Report revisions and amendments in various Pharmaceutical Acts.	

Subject: Advanced Drug Delivery System Subject Code: 4.8.1	Class: Final Year B.Pharm
Course outcomes:	
4.8.1.1 Elaborate various Novel Drug Delivery Systems with their formulation and evaluation.	
4.8.1.2 Explain the role of polymers in formulation of modified dosage forms.	
4.8.1.3 Describe the importance of optimization studies in formulation development.	
4.8.1.4 Explain the role of aerosols for delivery of drug, with its formulation and safety considerations.	
4.8.1.5 Compare full and fractional factorial design.	
4.8.1.6 Appraise the recent advances in aerosol technology.	

Subject: Cosmetic Science Subject Code: 4.8.2	Class: Final Year B.Pharm
Course outcomes:	
4.8.2.1. Describe the concepts of cosmetics, cosmeceuticals and its history.	
4.8.2. 2 Demonstrate the selection of excipients.	
4.8.2. 3 Formulate cosmetics for skin, hair, nail and dental care.	
4.8.2. 4 Evaluate cosmetics for skin, hair, nail and dental care.	
4.8.2.5 Select proper Packaging receptacle for cosmetics.	
4.8.2. 6 Appraise the selection of equipment and label information as per regulatory guidelines.	

Pharmaceutical Chemistry Department

Subject Name: Pharmaceutical Inorganic chemistry	Class: First Year B.Pharm
Subject Code: 1.1.3	
Course outcomes:	
1.1.3.1 Elaborate the concept of Inorganic chemistry along with various pharmacopoeias.	
1.1.3.2 Describe monographs of marketed formulations of Gastrointestinal agents, Topical agents, Inorganic gases and various other miscellaneous agents in I.P.	
1.1.3.3 Summarise and apply concept of determination of impurities, different pharmaceutical waters, essential and trace elements, electrolytes in body along with various therapies associated with it.	
1.1.3.4 Estimate quantities of various categories of inorganic pharmaceutical compounds and perform quality control tests.	
1.1.3.5 Predict various acidic and basic radicals from given unknown inorganic binary mixture.	
1.1.3.6 Investigate the given inorganic compounds by various quality control tests like limit tests, swelling power, acid neutralizing capacity and adsorption property.	

Subject Name: Pharmaceutical Organic Chemistry-I	Class: First Year B. Pharm
Subject Code: 1.1.4	
Course outcomes:	
1.1.4.1. Elaborate the basic concepts of organic compounds and its significance.	
1.1.4.2. Identify the IUPAC nomenclature of organic compounds.	
1.1.4.3. State the concept of isomerism and apply the knowledge in understanding the structure property relationship.	
1.1.4.4. Discuss different reagents in organic reactions and explain how addition and elimination reactions are performed with respect to alkenes and alkynes.	
1.1.4.5. Explain factors affecting strength of acids and bases.	
1.1.4.6. Analyse the synthesized organic compounds and explain their application.	

Subject: Pharmaceutical Organic Chemistry-II	Class: First Year B. Pharm
Subject Code: 1.2.3 T	
Course outcomes:	
1.2.3.1. Explain the reactions of organic compound containing different function groups and their identification by qualitative analysis.	
1.2.3.2. Illustrate in detail substitution nucleophilic reactions.	
1.2.3.3. Analyse the synthesized organic compounds and explain their application.	
1.2.3.4. Determine physicochemical properties of synthesized compounds.	
1.2.3.5 Describe the various active pharmaceutical ingredients synthesized from various functional groups.	
1.2.3.6 Construct the organic compounds with help of functional groups.	

Subject Name: Pharmaceutical Analysis-I	Class: First Year B.Pharm
Subject Code: 1.2.6	
Course outcomes	
1.2.6.1 Summarise the concept of Pharmaceutical analysis.	
1.2.6.2. Generalize basic principles of data treatment and data handling.	
1.2.6.3. Elaborate the principle and basic concepts of various types of titration methods like acid-base, non-aqueous, precipitation, Complexometric, redox and Gravimetric analysis.	
1.2.6.4. Determine the calibration factor for weighing balance and volumetric apparatus.	
1.2.6.5. Estimate the strength of given solutions using various types of titration techniques.	
1.2.6.6. Investigate the percentage purity of the given compounds using various types of titration techniques.	

Subject: Pharmaceutical Biochemistry	Class: Second Year B. Pharm
Subject code: 2.3.3	
Course outcomes	
2.3.3.1 Explain the scope of biochemistry in pharmacy and role of biochemical processes and cell metabolism.	
2.3.3.2 Discuss chemistry, structure, function, factors affecting the activities and biological importance of biomolecules.	
2.3.3.3 Estimate and characterise biomolecules by qualitative and quantitative tests.	
2.3.3.4 Elaborate the fundamentals of metabolism, processes, steps involved in metabolism of biomolecules, various metabolic pathways involved in metabolism of biomolecules.	
2.3.3.5 Explain the various organ function tests and advance diagnostic techniques.	
2.3.3.6 Demonstrate the isolation and estimation of DNA and analyse the contents of gastric juice.	

Subject: Pharmaceutical Organic Chemistry-III	Class: Second Year B. Pharm
Subject Code: 2.3.4	
Course outcomes:	
2.3.4.1 Discuss the stereochemical aspects of the organic compounds.	
2.3.4.2 Explain mechanism and applications of rearrangement of electron deficient & electron rich systems.	
2.3.4.3 Discuss the chemistry of amino acids and Carbohydrates.	
2.3.4.4 Analyze the unknown binary compounds having different functional groups by qualitative analysis.	
2.3.4.5 Identify various drugs synthesised with the help of Molecular rearrangements.	
2.3.4.6 Compare the activity of marketed drugs available in enantiomeric form.	

Subject: Pharmaceutical Organic Chemistry-IV Subject Code: 2.4.3	Class: Second Year B. Pharm
Course outcomes:	
2.4.3.1.1. Illustrate chemistry, methods of preparation & chemical reactions of heterocyclic, Polycyclic compounds and various Reagents used in organic synthesis.	
2.4.3.2. Design the retro-synthetic route of medicinal compounds.	
2.4.3.3. Explain in details nanochemistry, combinatorial chemistry and microwave assisted synthesis of compounds and their applications.	
2.4.3.4. Analyze the unknown binary compounds having different functional groups by qualitative and quantitative analysis.	
2.4.3.5 Summarise the heterocyclic compounds obtained from natural resources.	
2.4.3.6 Illustrate the properties of organic compounds from MSDS document.	

Subject: Pharmaceutical Analysis –II Subject Code: 2.4.4	Class: Second Year B. Pharm
Course outcomes:	
2.4.4.1. Explain the concept of electroanalytical techniques	
2.4.4.2. Explain principle, instrumentation & application of various electroanalytical methods	
2.4.4.3. Illustrate skill of operation, calibration and inference of results of electroanalytical instruments together with safety measures to be followed.	
2.4.4.4. Develop practical hand in analytical methods by estimation of analyte concentration in pure form and in formulation with thorough understanding of principle and procedures used in different analytical techniques.	
2.4.4.5. Demonstrate the required level of professional competence in the planning, conducting, evaluation and reporting of the results of investigations	
2.4.4.6. Independently process, interpret the data obtained through experimentation and report the results as per regulatory requirements.	

Subject Name: Pharmaceutical Analysis III Subject Code: 3.5.2	Class: Third Year. B. Pharm
Course outcomes:	
3.5.2.1 Elaborate concept of Instrumental methods of analysis and electromagnetic spectrum.	
3.5.2.2 Explain types of sampling techniques and separation techniques used for analysis of pharmaceutical formulations.	
3.5.2.3 Elaborate principle, instrumentation and applications of different analytical Instrumental techniques.	
3.5.2.4 Analyze Active pharmaceutical Ingredients (API) and pharmaceutical formulations using different analytical instruments.	
3.5.2.5 Elaborate concept of recent advances in analytical Instrumental techniques.	
3.5.2.6 Explain analytical method validation parameters as per ICH guidelines used for analysis of Pharmaceutical formulations.	

Subject: Medicinal Chemistry-I Subject code: 3.5.3	Class: Third Year B. Pharm
Course outcomes:	
3.5.3.1 Discuss general aspects of the design and development of drugs including classification, nomenclature and Structure activity relationship (SAR) of agonists and antagonists.	
3.5.3.2 Examine the Drug receptor interaction including synthetic scheme of agonists and antagonists.	
3.5.3.3 Investigate the reported drugs as per pharmacopeia and MSDS Sheets.	
3.5.3.4 Explain recent developments of agonists and antagonists.	
3.5.3.5 Synthesize, recrystallize and understand reaction mechanism involved in synthesis of medicinally important organic compounds and evaluate their physicochemical properties.	
3.5.3.6 Develop the skills involved in thin layer chromatography techniques and purification of synthesised compounds by various techniques.	

Subject: Active Pharmaceutical Ingredients Technology Subject Code: 3.5.7	Class: Third Year B.Pharm
Course outcomes:	
3.5.7.1. Elaborate basics of chemical process kinetics with respect to various classes of chemical reactions with examples of API for each unit process.	
3.5.7.2. Explain equipments used in API manufacturing, layout design for API manufacturing, various regulatory guidelines for manufacturing of APIs .	
3.5.7.3. Elaborate various approaches for optimization of organic reactions and processes.	
3.5.7.4. Elucidate principle, industrial process, scale up techniques, Industrial manufacturing Process, flow charts of some important APIs, Polymorphism in APIs and Chirality in API industry with some examples.	
3.5.7.5. Discuss regulatory guidelines for testing of pharmaceuticals.	
3.5.7.6. Explain different types of instrumental techniques available for quality control of API & formulations.	

Subject Name: Pharmaceutical Analysis-IV Subject Code: 3.6.2	Class: Third Year B. Pharm
Course outcomes:	
3.6.2.1 Elaborate concept of chromatographic techniques and its applications.	
3.6.2.2 Summarize principle, instrumentation and applications of various analytical instrumental techniques.	
3.6.2.3 Analyze Pharmaceuticals by various analytical method validation parameters.	
3.6.2.4 Demonstrate working of different analytical instruments.	
3.6.2.5 Explain validation of different instruments.	
3.6.2.6 Elaborate recent advances in Chromatographic techniques.	

Subject: Medicinal Chemistry-II Subject code: 3.6.3	Class: Third Year B. Pharm
Course outcomes:	
3.6.3.1 Discuss general aspects of the design & development of drugs including classification, nomenclature, and MOA of agonists and antagonists.	
3.6.3.2 Examine the effect of functional group modification on Pharmacophore.	
3.6.3.3 Investigate the reported drugs as per pharmacopeia and MSDS Sheets.	
3.6.3.4 Explain recent developments including synthetic scheme of agonists and antagonists	
3.6.3.5 Develop the skill of separation of solvent by various techniques.	
3.6.3.6 Synthesise recrystallize and understand reaction mechanisms involved in synthesis of medicinally important organic compounds also evaluate their physicochemical properties.	

Subject: Bioorganic Chemistry and Drug Design Subject Code: 3.6.6	Class: Third Year B.Pharm
Course outcomes:	
3.6.6.1. Explain the concept of bioorganic chemistry & drug design and molecular adaptation and recognition.	
3.6.6.2. Describe general biochemical features, physiological role, substrates/ antagonist of enzymes, nucleic acid & receptors as drug targets with reference to mechanism of action.	
3.6.6.3. Describe the phases involved in drug design & discovery, methods of lead discovery & optimization.	
3.6.6.4. Explain the various approaches in ligand based & structure based drug design with suitable examples.	
3.6.6.5 Describe the various phases involved in clinical trial along with regulatory guidelines.	
3.6.6.6 Explain the concept of prodrug, different strategies for design of prodrug with suitable example based on biotransformation.	

Subject: Pharmaceutical Analysis-V Subject code: 4.7.2	Class: Final Year B. Pharm
Course outcomes:	
4.7.2.1. Explain & apply different types of analytical instrumental technique available for quality control of pharmaceuticals. (API's & Formulations).	
4.7.2.2. Explain and apply various sampling techniques and data acquisition from analytical methods.	
4.7.2.3. Justify and apply the analytical and validation data for sample analysis.	
4.7.2.4. Analyze and Interpretation of analytical data procedures used in different analytical techniques.	
4.7.2.5. Investigate the recent advances in pharmaceutical analytical instrument & techniques.	
4.7.2.6. Remember and understand the electromagnetic spectrum and its interaction with matter.	

Subject: Medicinal Chemistry- III Subject code: 4.7.3	Class: Final Year B. Pharm
Course outcomes:	
4.7.3.1 Discuss general aspects of the design & development of drugs including classification, nomenclature and MOA of agonists and antagonists.	
4.7.3.2 Examine the effect of functional group modification on Pharmacophore.	
4.7.3.3 Investigate the reported drugs as per pharmacopeia and MSDS Sheets.	
4.7.3.4 Explain recent developments including synthetic scheme of agonists and antagonists.	
4.7.3.5 Synthesize, recrystallize and understand reaction mechanisms involved in synthesis of medicinally important organic compounds and evaluate their physicochemical properties.	
4.7.3.6 Interpret the spectral data obtained from IR and ¹ H-NMRs of separated compound.	

Subject: Pharmaceutical Analysis-VI Subject code: 4.8.3	Class: Final Year B. Pharm
Course outcomes:	
4.8.3.1. Explain & apply different types of analytical instrumental technique available for quality control of pharmaceuticals. (API's & Formulations).	
4.8.3.2. Explain and apply various sampling techniques and data acquisition from analytical methods.	
4.8.3.3. Justify and apply the analytical and validation data for sample analysis.	
4.8.3.4. Analyze and Interpretation of analytical data procedures used in different analytical techniques.	
4.8.3.5. Investigate the recent advances in pharmaceutical analytical instrument & techniques.	
4.8.3.6. Remember and understand the electromagnetic spectrum and its interaction with matter.	

Subject: Medicinal Chemistry- IV Subject code: 4.8.4	Class: Final Year B. Pharm
Course outcomes:	
4.8.4.1 Discuss general aspects of the design & development of drugs including classification, nomenclature and MOA of agonists and antagonists.	
4.8.4.2 Examine the effect of functional group modification on Pharmacophore.	
4.8.4.3 Investigate the reported drugs as per pharmacopeia and MSDS Sheets.	
4.8.4.4 Explain recent developments including synthetic scheme of agonists and antagonists.	
4.8.4.5 Synthesize, recrystallize and understand reaction mechanisms involved in synthesis of medicinally important organic compounds and evaluate their physicochemical properties.	
4.8.4.6 Interpret the spectral data obtained from IR of separated compound by chromatographic Techniques.	

Subject: Quality Assurance Techniques	Class: Final year B. Pharm
Subject code: 4.8.7	
Course outcomes:	
4.8.7.1 Describe the significance of quality in pharmaceutical manufacturing.	
4.8.7.2 Practice Current Good Manufacturing Practices along with various aspects of documentation, SOPs and records.	
4.8.7.3 Elaborate on the role of quality by design and validation in assurance of quality in pharmaceutical industry.	
4.8.7.4 Explain about ICH guidelines and QMS.	
4.8.7.5 Summarize various regulatory agencies involved in assurance of Quality in dosage form design.	
4.8.7.6 Differentiate between calibration and Qualifications of various equipments.	

Pharmacology Department

Subject: Human Anatomy & Physiology-I	Class: First Year B. Pharm
Subject Code: 1.1.5	
Course outcomes:	
1.1.5.1 Recognise anatomical terminologies specific to the human body and human health.	
1.1.5.2 Explain the progression of structural levels (cells, tissues, organs and system) contributes to the body's anatomy with their functions.	
1.1.5.3 Describe the anatomy and physiology of different organs of lymphatic system, cardiovascular system and Digestive system.	
1.1.5.4 Determine the haematological parameters and interpret its clinical significance.	
1.1.5.5 Promote health education in society.	
1.1.5.6 Summarise associated disorders of various organ in human body.	

Subject:-Human Anatomy and physiology-II	Class: First Year B. Pharm
Subject code:1.2.4	
Course outcomes	
1.2.4.1 Explain basic structure, function and mechanism of various organs involved in CNS and ANS alongwith its associated disorders.	
1.2.4.2 Describe structure, physiology and basic mechanism of various organ systems like endocrine system, urinary system, respiratory, reproductive system, sense organs etc along with its disorders.	
1.2.4.3 Determine and interpret the haematological parameters with its clinical significance.	
1.2.4.4 Apply the knowledge of HAP to understand the pathophysiology of diseases.	
1.2.4.5 Promote health education in society.	
1.2.4.6 Analyze associated disorders of various organ in human body.	

Subject:- Pharmacology - I	Class: Second Year B. Pharm
Subject code: 2.3.5	
Course outcomes:	
2.3.5.1 Demonstrate the knowledge of Sources of drug, routes of administration, drug discovery and development process etc.	
2.3.5.2 Recognize the clinical significance of various pharmacokinetic parameters and factors affecting it to rationalise the drug treatment.	
2.3.5.3 Elaborate Pharmacodynamic aspects like different targets for drug action, receptors, its types, SAR, combined effect of drugs, factors modifying drug action etc. to understand the mechanism of drug actions.	
2.3.5.4 Discuss pharmacotherapeutics aspect related to adverse drug reactions, drug interactions, drug toxicity and its role to determine pharmacotherapy.	
2.3.5.5 Explain pharmacology of Autacoids and their antagonist.	
2.3.5.6 Justify rational drug treatment in pediatric, geriatric patients and in pregnancy.	

Subject:- Pathophysiology & Clinical Biochemistry	Class: Second Year B. Pharm
Subject code: 2.4.2 T	
Course outcomes:	
2.4.2.1 Apply principles of normal anatomy and physiology of human body systems to the pathophysiologic processes of common health problems.	
2.4.2.2 Elaborate different etiological factors, types, clinical manifestations, of common pathophysiological conditions of various organ systems.	
2.4.2.3 Recognise the clinical importance and principle of diagnostic tests used in diagnosis of various pathophysiological conditions.	
2.4.2.4 Practice critical thinking when analyzing pathophysiological report and understanding of treatment strategies for various pathophysiological conditions.	
2.4.2.5 Explain the principle and application of various instruments used in clinical biochemistry and techniques of biological fluid collection and separation.	
2.4.2.6 Demonstrate an ability to follow experimental procedures to carry out estimation of various markers present in biological samples and its interpretation for investigation of kidney, liver, G.I.T. and heart diseases by using clinical lab instruments.	

Subject: Pharmacology–II	Class: Third Year B.Pharm
Subject Code: 3.5.4	
Course outcomes:	
3.5.4.1 Explain mechanism of action, pharmacological actions, adverse effect, drug interaction, contradiction and therapeutic uses of prototype drug acting on autonomic nervous system.	
3.5.4.2 Describe mechanism and pharmacology of prototype drugs acting on cardiovascular, respiratory tract disorders and explain their clinical use.	
3.5.4.3 Illustrate bioassay methods using suitable isolated tissue preparations.	
3.5.4.4 Demonstrate various techniques of routes of drug administration and experimental animal handling.	
3.5.4.5 Relate the social, cultural and environmental factors for neurological disorders.	
3.5.4.6 Evaluate the various drug effects using suitable computerized simulated software programme.	

Subject: Pharmacology–III	Class: Third Year B.Pharm
Subject Code: 3.6.4	
Course outcomes:	
3.6.4.1 Describe pharmacology of prototype drug of General anesthetic, Local anesthetics, Anti-epileptic, Anti-depression, Anti-Psychosis, Anti-parkinsonism etc.	
3.6.4.2 Discuss the pharmacotherapy of COPD, Cough, constipation, diarrhea, Ulcer, Rheumatoid Arthritis, Osteoarthritis, Gout etc.	
3.6.4.3 Explain preclinical screening of drugs using computer simulation and its interpretation.	
3.6.4.4 Demonstrate bioassay methods using suitable isolated tissue preparations.	
3.6.4.5 Analyse GABA-benzodiazepines receptor-chloride channel complex as neurological disorder target.	
3.6.4.6 Relate concept of central nervous system with its receptors. i.e dopaminergic and opioid receptor etc.	

Subject: Pharmacology - IV	Class: Final Year B. Pharm
Subject Code.: 4.7.4	
Course outcomes:	
4.7.4.1 Describe classification, Mechanism of action, indications, antibacterial spectrum mechanism of resistance, pharmacokinetics, contraindications, most common adverse reactions, and important drug-drug interactions of various antibiotics and chemotherapeutic agents.	
4.7.4.2 Illustrate the biosynthesis, receptors involved, mechanism of action, regulation of secretion and physiological role of various endocrine gland hormones disorders.	
4.7.4.3 Discuss recent pharmacotherapy including pharmacology and clinical management of various endocrine gland hormones disorders.	
4.7.4.4 Use suitable isolated tissue preparation for bioassay methods.	
4.7.4.5 Justify rationality of prescription and standard treatment protocol.	
4.7.4.6 Appraise the marketed fixed dose drug combinations (FDC).	

Subject: Pharmacology –V (Including Biostatistics)	Class: Final Year B. Pharm
Subject Code.: 4.8.5 T	
Course outcomes:	
4.8.5.1 Illustrate different types of drug-drug interactions, Adverse drug reactions with their mechanism, risk factors, epidemiology etc.	
4.8.5.2 Outline the basic concept of drug safety and pharmacovigilance in relation to monitoring and reporting of ADR	
4.8.5.3 Summarize functioning of hospital pharmacy, methods of assessment of patient compliance and non-compliance	
4.8.5.4 Discuss Clinical trial, its role in drug development, regulatory requirements, ethical issues and responsibilities of various stake holders involved in clinical trial	
4.8.5.5 Use suitable isolated tissue preparations for bioassay methods and carry out neurobehavioral characterization.	
4.8.5.6 Solve the statistical problem using different methods and computer software	

Pharmacognosy Department

Subject: Pharmacognosy	Class: First Year B. Pharm
Subject code:1.2.5	
Course outcomes:	
1.2.5.1 Explain the significance of plant classification and its relevance to Pharmacy.	
1.2.5.2 Explain principles of genetics & their application on crop improvement process.	
1.2.5.3 Elaborate Pharmacognostic study of plant tissues and their identification.	
1.2.5.4 Summarize the ecosystem and its effect on environment.	
1.2.5.5 Explain remedies to get rid from ecosystem and environment degradation.	
1.2.5.6 Explain Pharmacognosy development and linkage to other branches of science.	

Subject: Communication & Soft Skill Development	Class: First Year B. Pharm
Subject Code:1.1.6	
Course outcomes:	
1.1.6.1 Elaborate the elements, styles and barriers of communication and methods to overcome them.	
1.1.6.2 Reflect communication etiquettes and excellent presentation skills.	
1.1.6.3 demonstrate the behavioral needs for a Pharmacist to function effectively in the areas of pharmaceutical operation through effective communication.	
1.1.6.4 Develop interview skills , Leadership qualities and essentials of group discussions	
1.1.6.5 practice good writing skills	
1.1.6.6 Identify, classify and apply relevant soft skills.	

Subject: Pharmacognosy & Phytochemistry–I	Class: Second Year B.Pharm
Subject code: 2.3.6 T	
Course outcomes:	
2.3.6.1 Elaborate the concept of metabolites.	
2.3.6.2 Elaborate the metabolites by studying its Pharmacognostic parameters.	
2.3.6.3 Determine extracted metabolites by quantitative method.	
2.3.6.4 Analyse the qualitative aspects of crude drugs.	
2.3.6.5 Deduce the significance of metabolites and its role in Phytochemistry.	
2.3.6.6 Explain the Pharmaceutical utility of primary metabolites.	

Subject: Pharmacognosy & Phytochemistry –II	Class: Second Year B.Pharm
Subject code:2.4.5	
Course outcomes:	
2.4.5.1 Elaborate the concept of metabolites.	
2.4.5.2 Summarise the pharmacognostic study of various categories of metabolites.	
2.4.5.3 Determine extracted metabolites by quantitative method.	
2.4.5.4 Analyse the qualitative aspects of crude drugs.	
2.4.5.5 Deduce the use of marketed derivatives of alkaloids.	
2.4.5.6 Explain the industrial applications of secondary metabolites	

Subject: Analytical Pharmacognosy & Extraction Technology	Class: Third Year B.Pharm	Subject code:3.5.5
Course outcomes:		
3.5.5.1 Explain various types of extraction methods with applications for Phytopharmaceuticals.		
3.5.5.2 Discuss principle and applications of chromatographic and non-chromatographic separation for various phytoconstituents.		
3.5.5.3 Explain micrometric analysis for crude drugs.		
3.5.5.4 Evaluate quality control parameters for various phytoconstituents.		
3.5.5.5 Discuss various guidelines for separation of phytoconstituents by chromatographic and non-chromatographic methods.		
3.5.5.6 Explain efficacy and safety parameters for herbal drug analysis.		

Subject: Natural Product Chemistry	Class: Third Year B.Pharm
Subject Code:3.6.5	
Course outcomes:	
3.6.5.1 Explain structural elucidation of phytoconstituents with its contribution in drug discovery.	
3.6.5.2 Elaborate on marine drugs and its significance.	
3.6.5.3 Discuss various natural products used as pharmaceutical excipients as allied industrial utility.	
3.6.5.4 Describe various techniques used in biosynthetic study for natural products with its applications.	
3.6.5.5 Explain Industrial utility of drugs used as binders, adhesives, mucilage, dyes etc.	
3.6.5.6 Elaborate on marine drugs and its market status.	

Subject: Natural Drug Technology	Class: Final Year B.Pharm
Subject Code:4.7.5	
Course outcomes:	
4.7.5.1 Discuss various Traditional Systems of Medicines along with crude drugs in detail	
4.7.5.2 Elaborate various Ayurvedic dosage forms and nutraceuticals	
4.7.5.3 Discuss development of NDDS in herbals	
4.7.5.4 Develop and evaluate cosmetic & nutraceutical formulations	
4.7.5.5 Explain current scenario of nutraceuticals in India	
4.7.5.6 Elaborate on manufacturing of novel drugs delivery systems in herbals	

Subject: Natural Products: Commerce, Industry & Regulations	Class: Final Year B.Pharm	Subject Code:4.8.6
Course outcomes:		
4.8.6.1. Explain importance of herbal drug industry in global contest.		
4.8.6.2. Explore entrepreneurship skills in of herbal drug industry.		
4.8.6.3. Explain Pharmacovigilance of herbal medicines.		
4.8.6.4. Elaborate the concept of plant allergens.		
4.8.6.5 Explain various regulatory guidelines and ethical issues for herbal drug regulation in India.		
4.8.6.6. Explain current status of Clinical trials in India.		