Course Outcomes (COs)

Course Name	CO	
B. Pharm Istsem		
Pharmaceutics-I (Introduction to Pharmaceutics) 341116(41) - P 341126(41) - T	**C101.1**	Apply pharmacopoeial standards for the preparation of various dosage forms
	C101.2	Identify their professional role in the healthcare system
	C101.3	Classify different dosage forms and apply principles of pharmaceutical science in formulation and dispensing the various dosage forms.
	C101.4	Solve the problem through the application of fundamental principles of pharmaceutical metrology and conclude the decision
Pharmaceutical Chemistry-I (Inorganic) 341117(41) - T 341127(41) - P	**C102.1**	Outline pharmacopoeial standards for the qualitative and quantitative estimations of inorganic pharmaceuticals.
	C102.2	Describe acids, bases, buffers, water and different GIT agents and recall the fundamental principles of them.
	C102.3	Describe the major intra and extra cellular electrolytes, essential and trace elements, cationic and anionic components of inorganic drugs.
	C102.4	Explain topical agents, gases and vapours, dental products, pharmaceuticals aid and radio pharmaceuticals.
Pharmacognosy- I 341118(41) - T 341128(41) - P	**C103.1**	Recall the knowledge about modern concept and scope of Pharmacognosy.
	C103.2	Describe the plant kingdom, classification& source of crude drugs, taxonomy of medicinal plants and medicinal plant families
	C103.3	Describe the fundamental principles on cultivation, collection processing and evaluation of medicinal plants.
	C103.4	Discuss the phyto-chemical screening techniques and able to identify the phyto-constitutes of plants.
Anatomy, Physiology and Health Education- I (APHE-I) 341119(41) - T 341129(41) - P	**C104.1**	Recall the basics of the anatomy, physiology and the cell.
	C104.2	Explain the different types of tissues and importance of the blood.
	C104.3	Describe the cardiovascular system and lymphatic system.
	C104.4	Describe the osseous system and digestive system.
Pharmaceutical Chemistry- II (Organic Chemistry- 1)	**C105.1**	Recall and infer the fundamentals of atomic structure, bond, hybridization and addition compounds.
	C105.2	Identify and apply the knowledge of Reagents,

341110(41) - T		Reactions and Electron Displacement Effects.
	C105.3	Infer the rules of IUPAC nomenclature. Explain the Structure, occurrence & stability of ions and free radicals.
	C105.4	Infer the concept of Stereochemistry and also can Relate and value them.
Workshop 341120(41)	**C106.1**	Recall and describe the fundamental principles of periodic table.
	C106.2	Apply the principles of equipments and instruments with their working and uses in formulation of dosage forms.
	C106.3	Explain the calibration of weighing balances and Glassware.
	C106.4	Practice and apply the Pharmacopoeial principles for preparation of laboratory Reagents and distilled water.
B. Pharm IIndsem		
Pharmaceutics - II (Hospital and Community Pharmacy) 341216(41) - T 341226(41) – P	**C201.1**	Discuss about organization of a hospital, pharmacy & therapeutic committee and responsibilities of hospital pharmacist.
	C201.2	Define drug store management & inventory control. Explain different types of sterilization used in hospital.
	C201.3	Define various drug distribution system& explain briefly the methods followed dispensing to out-patient & in-patient.
	C201.4	Discuss computerized service for drug information, medication errors, patient medication profile & drug interaction/ adverse drug reaction.
Anatomy, Physiology and Health Education-II (APHE-II) 341217(41) - T 341227(41) – P	**C202.1**	Explain the fundamentals of elementary tissues of human body.
	C202.2	Discuss the skeletal system and haemopoietic system.
	C202.3	Demonstrate lymphatic system and cardiovascular system.
	C202.4	Demonstrate and apply the use of health education.
Pharmaceutics- III Drug Store and Business Management (DSBM) 341218(41) – T	**C203.1**	Discuss Principles of key concepts related to operational management
	C203.2	Explain the basic concepts within Human Resource Management that would support opportunities to become a positive role model
	C203.3	Set up their own business in the pharmaceuticals sector and Create the concepts learned into personal practice focusing on professionalism
	C203.4	Identify and integrate effective management methods that focus on quality assurance
Pharmaceutical Chemistry-III (Organic	**C204.1**	Recall, infer and use the knowledge of nomenclature, method of preparation, physical and chemical properties of Alkanes and alkenes.

Chemistry-II) 341219(41) - T 341229(41) – P	**C204.2**	Recall, infer and use the knowledge of nomenclature, method of preparation, physical and chemical properties of Alkynes and Alcohols.
	C204.3	Recall, infer and use the knowledge of nomenclature, method of preparation, physical and chemical properties of carbonyl compounds.
	C204.4	Recall, infer and use the knowledge of Special reactions (like sigmatropic and electrolytic reactions, etc.); and the nomenclature, method of preparation, physical & chemical properties of Carboxylic acids.
English Communication-I 341210(41) - T 341220(41) – p	**C205.1**	Demonstrate the correct utilization of tense with respect to time and aspect, also types of verbs. Express emotions in English.
	C205.2	Discuss verbal and non verbal communication, language functions, Bias free and plain English, formal and informal writing. Employ Language functions in various situations. Employ knowledge of long vowels, short vowels and friendly communication.
	C205.3	Employ English language to ask for information, help, and permission; to instruct command, request, accept, refuse, prohibit, persuade, and promise.
	C205.4	Employ knowledge of general communication, business letters, summarizing and abstracting, expressing ideas in restricted word limit, paragraph division, spellings, punctuation etc.
Field work 341228(41)	**C206.1**	Demonstrate teamwork skill by working collaboratively with a group of people in order to achieve a goal.
	C206.2	Demonstrate leadership skill by setting directions, helping, motivating and inspiring others to achieve a goal in disciplined manner
	C206.3	Demonstrate work ethics i.e. punctuality, responsibility, professionalism and respectability
	C206.4	Demonstrate creativity which is a key to the development of lifelong learning practices
B. Pharm IIIrdsem		
Pharmaceutics-IV (Physical Pharmacy-I) 341316(41) - T 341326(41) – P	**C301.1**	Describe the matter properties & viscosity with Newtonian flow systems and non-Newtonian flow systems.
	C301.2	Explain thixotropy& thermodynamics with their first, second and third laws.
	C301.3	Analyze the Buffer solution, buffer equations and buffer capacity with Freundlich and Gibbs' adsorption isotherms and Langmuir theory of adsorption.
	C301.4	Discuss the properties of solutions like colligative properties, partition coefficient with surface and

		interfacial phenomenon.
Pharmaceutical Analysis-I 341317(41) - T 341327(41) - P	**C302.1**	Discuss the fundamental of volumetric analysis, significance of quality control in pharmaceutical analysis and use methods of concentration expression and Employ different theories(indicator theory, law of mass action, Henderson Hassalbach equation) and identify various analytical skills through lab exercises in acid base Titration
	C302.2	Execute Mohr's Method, Volhard Method, Gay Lussac Method and Fajans Method for Set up precipitation titration.
	C302.3	Demonstrate adequate knowledge on basic principles and techniques of complexometric titration and non aqueous titration.
	C302.4	Plan gravimetric analysis and Write project reports on pharmaceutical analysis by using Indian pharmacopeia.
Computer Application 341318(41) - T 341328(41) – P	**C303.1**	Recall and infer the fundamentals of Computer, its components, structure and types.
	C303.2	Recall, infer and use the knowledge of MS-Word.
	C303.3	Identify and apply the knowledge of MS- Excel and MS- Power Point.
	C303.4	Identify and apply the knowledge of Internet, Graphics and Multimedia.
Pharmacognosy- II 341319(41) - T 341329(41) – P	**C304.1**	Demonstrate various pharrmacognostic parameters of crude drugs.
	C304.2	Apply the use of medicinal plant, cultivation, collection, processing and storage of plant with its industrial importance
	C304.3	Identify, classify, isolation, analyze, the medicinal plant and their properties.
	C304.4	Discuss the phyto chemical screening techniques and able to identify the phytoconstitutes of plants.
Mathematics 341331(41) – T	**C305.1**	Describe the concept of matrix. Definite and indefinite integral and its application in pharmacy
	C305.2	Explain the basic concept of graphical representation and diagrammatic representation of data.(Blooms cognitive level 2)
	C305.3	.Demonstrate the law of regression, standard deviation and correlation.
	C305.4	Apply the principle of probability, t-test and f-test in solving the numerical problems.
English Communication- II 341332(41) – T	**C306.1**	Describe the role of topic sentence, cohesion, coherence and sentence linkers in paragraph writing
	C306.2	Rewrite business proposal, business letters and e mail messages.
	C306.3	Generate their own C.V, recognize utilization of reference, notes and bibliographies, and recognize concept and relevance of public relations in a

		business organization.
	C306.4	Describe the knowledge of organizing a meeting, chairing the meeting, preparing an agenda, writing minutes, making an oral presentation and facing an interview.
B. Pharm IVthsem		
Pharmaceutics -V (Physical Pharmacy -II) 341416(41) - T 341426(41) – P	**C401.1**	Students are able to assess particle size, shape and surface area & develop analytical skills in physics of particle.
	C401.2	Differentiate and analyze disperse system in different pharmaceutical preparation and their stability.
	C401.3	Students are able to assess half-life and expiry date of drug product.
	C401.4	Describe solubility & complex phenomenon of substance in different state.
Pharmaceutics -VI (Pharmaceutical Engineering-I 341417(41) - T 341427(41) – P	**C402.1**	Explain various unit operations in the design and manufacture of dosage forms and describe preventive measures of corrosion and concept of fluid flow.
	C402.2	Discuss about various material handling systems.
	C402.3	Write about humidity, air-conditioning, refrigeration and automated process control systems.
	C402.4	Employ correct material in construction of pharmaceutical plant and comply GLP, GMP and OECD guidelines in lab or pilot plant to avoid the accidental situations, biological and environmental hazards.
Pharmaceutical Chemistry-IV (Organic chemistry-3) 341418(41) - T 341428(41) – P	**C403.1**	Write nomenclature, preparation and properties of ester and amines.
	C403.2	Write nomenclature, preparation and properties of benzene and cycloalkanes.
	C403.3	Write nomenclature, preparation and properties of aniline, phenols, and aromatic carboxylic acids.
	C403.4	Write synthetic routes to prepare organic compounds and nomenclature, preparation and properties of heterocyclic compounds.
Pharmaceutical Biochemistry 341419(41) - T 341429(41) – P	**C404.1**	Recall the biochemical organization of the cell, transport process and describe enzymes and isoenzymes in the field of clinical diagnosis. metals and Vitamins as co-enzymes and their significance in human body.
	C404.2	Explain the metabolism of carbohydrate, lipid, protein and their role in our body.
	C404.3	Analyze carbohydrate, lipid, protein, the generation of ATP and isolate RNA and DNA from different sources.
	C404.4	Illustrate various mechanism related to genetics, PCR, repair mechanism.
Pharmaceutical	**C405.1**	Recall the knowledge about modern concept and

Microbiology 341410(41) - T 341420(41) – P		scope of Microbiology and describe the fundamental principles of microbial taxonomy and their classification.
	C405.2	Employ the methods/ techniques on cultivation, isolation and staining of microorganism
	C405.3	Employ general information on sterilization, disinfection, Mutation, and defensive system of body.
	C405.4	Plan the experiment related to microbial assay and sewage treatment and sewage disposal, and prevention of foods from microbes.
B. Pharm Vthsem		
Pharmaceutics-VII (Pharmaceutical Engineering-II) 341516(41) - T 341526(41) – P	**C501.1**	Describe phenomenon of size reduction and separation as well as evaporation for effective practices on pharmaceutical field
	C501.2	Develop rigorous experimental and analytical skills for extraction and drying of sample in laboratory
	C501.3	Analyze fundamentals of centrifuge for particle separation as well as mixer for particle mixing in pharmacy practice
	C501.4	Describe various processing like crystalization, filtration and distillation utilize for synthesis of pharmaceutical active ingredient as well as manufacturing of finished good
Medicinal Chemistry-I 341517(41) - T 341527(41) – P	**C502.1**	Recall the basic principles of medicinal chemistry and develop a brief software concept on QSAR
	C502.2	Employ the fundamental principles of cholinergic and adrenergic system of drugs.
	C502.3	Employ the core subject knowledge of neuromuscular blockers, local anaesthetics and the drugs affecting uterine motility.
	C502.4	Apply the core theoretical knowledge and explain the rational use of autacoids and related drugs. Plan different experiments for synthesis of drugs and also recall the structure of some important drugs.
Pharmacognosy-III 341518(41) - T 341528(41) – P	**C503.1**	Recall the fundamental principles of plant Biosynthesis and Primary and Secondary metabolic pathway and Extraction, isolation and chemistry of medicinal plant those contain Glycoside, Lignans, Quassinoids and Flavonoids with their importance in pharmaceutical dosage form.
	C503.2	Explain the Chemistry, isolation and extraction of Alkaloids and Xanthine bases with their medicinal utility in dosage form preparations.
	C503.3	Explain the Chemistry, isolation and extraction of Terpenoids with their medicinal utility in dosage form preparations.
	C503.4	Illustrate the natural plant pesticides, toxic mushrooms, Plant bitters, sweeteners and Indian

		toxic plants.
Pharmacology-I 341519(41) - T 341529(41) – P	**C504.1**	Describe the pharmacology of drugs acting on central nervous system.
	C504.2	Employ the basic principles of cell injury and adaptations and pathophysiology of common diseases and its treatment
	C504.3	Describe the pharmacology of drugs acting on peripheral nervous system
	C504.4	Employ drugs used in management of pain.
Pharmaceutics VIII (Cosmetic technology) 341510(41) - T 341520(41) – P	**C505.1**	Demonstrate the basic principles, ideal characteristics and evaluation techniques of Face and skin preparations.
	C505.2	Plan and Employ the concept of cosmetic in formulation, packaging and evaluation of shampoo, shaving and bath preparations.
	C505.3	Apply the knowledge of cosmetic in the formulation and evaluation of Dentrifice and Hair Preparations.
	C505.4	Recall the concept of Foot and Manicure preparations and also Apply the knowledge of herbs in the formulation of herbal cosmetics.
B. Pharm VIthsem		
Pharmaceutic-IX (Pharmaceutical Technology- I) 341616(41) - T 341625(41) – P	**C601.1**	Revise and apply the basic knowledge of preformulation parameters for the development of new formulations.
	C601.2	Explain the concept, Formulation, evaluation and packaging of various semisolid dosage forms.
	C601.3	Plan and design any experimental work related to manufacturing, packaging and evaluation of liquid dosage form as well as aerosol preparation.
	C601.4	Discuss the collection, processing and storage of biological products like blood and plasma substitutes.
Medicinal Chemistry-II 341617(41) - T 341626(41) – P	**C602.1**	Explain the Structure Activity Relationship, mechanism of action, synthesis and use of General Anaesthetic, Opoid analgesics & Hypnotic and Sedative.
	C602.2	Summarize a category of Drugs used in treatment of Convulsions, Parkinsonism and Depression.
	C602.3	Describe structure, mechanism of action and uses of Sulphonamides, Vitamins, Thyroids, Antithyroids, Anticoagulant and Antiplatelet Drugs.
	C602.4	Discuss the chemistry of psychopharmacological agents and also recall the fundamental principles of combinatorial chemistry.
Pharmacology – II 341618(41) - T 341627(41) – P	**C603.1**	Describe the drugs acting on cardiovascular system
	C603.2	Describe the drugs acting on urinary system

	C603.3	Explain the autocoids and drugs used for the treatment of respiratory and blood disorders
	C603.4	Predict symptoms of various poisonings and to support patients.
Pharmaceutical Analysis II 341619(41) - T 341628(41) - P	**C604.1**	Employ the concept of oxidation & reduction titrations in analysis of drugs.
	C604.2	Demonstrate the principle, instrumentation & application of pH, potentiometer, Conductometry, polarogarphy, amperometry and miscellaneous methods
	C604.3	Explain the concept and application of RIA, ELISA, Electrophoresis&Immunoelectrophoresis.
	C604.4	Apply the theoretical consideration of Thermoanalytical methods in drug analysis
Pharmaceutical Biotechnology 341610(41) - T 341629(41) – P	**C605.1**	Discuss about various antigen-antibody reactions with their application. Explain enzyme immobilization techniques & mechanism of cell mediated immunity &humoral immunity.
	C605.2	Describe in detail about fermentor, fermentation process & isolation of mutants.
	C605.3	Describe in detail about gene cloning, hyridoma technology & DNA fingerprinting with their applications.
	C605.4	Discuss about Biotransformation process with special reference to steroids.
B. Pharm VIIthsem		
Pharmaceutics -X (Pharmaceutical Technology -II) 341716(41) - T 341725(41) – P	**C701.1**	Develop dosage form and related concern for design of capsule dosage form.
	C701.2	Describe different Tablet dosage form, coating and related concern for design & development of tablet dosage form
	C701.3	Develop sterile dosage form and sterile criteria concern with techniques applicable in pharmaceutical industries
	C701.4	Apply device fundamentals on in process quality control in pharmaceutical manufacturing to effectively predict the measured behavior for acceptance of the product as well as packaging with stability theoretically as well as practically
Pharmaceutics-XI (Biopharmaceutics & Pharmacokinetics) 341717(41) - T 341726(41) - P	**C702.1**	Assess the Biopharmaceutics and Pharmacokinetics and their role in formulation development and clinical setting.
	C702.2	Interpret plasma drug concentration measurement by the application of compartment model.
	C702.3	Estimate the Non-linear pharmacokinetics with special reference to its assessment.
	C702.4	Predict the clinical significance of bioavailability and bioequivalence.

Medicinal Chemistry- III 341718(41) - T	**C703.1**	Employ the rational use of Steroidal and antiviral drugs.
	C703.2	Explain the concept on the chemistry of Cardiovascular and Oral Hypoglycemic Drugs.
	C703.3	Prepare themselves for the lifelong learning of Antibiotics (used in chemotherapy).
	C703.4	Discover the new updates on the Antineoplastic and Antimalarial drugs and also able to describe the chemistry and use of Diuretics and structures of some important drugs.
Pharmacology- III 341719(41) - T 341727(41) - P	**C704.1**	Discover the new updates on chemotherapeutic agents and preclinical & clinical research regularly.
	C704.2	Analyze the problems associated with the drugs used for the treatment various microbial infections and cancer.
	C704.3	Explain the pharmacology and rational use of drugs used for the treatment various endocrine disorders.
	C704.4	Evaluate the effects of drugs using animal models of G.I. diseases.
Pharmacognosy- IV 341710(41) - T 341728(41) - P	**C705.1**	Design the macro/microscopic characteristics of powdered crude drugs.
	C705.2	Develop different techniques to evaluate herbal medicines e.g. chromatographic techniques
	C705.3	Explain national and international economy of medicinal plants and applications in evaluation of herbal and medicinal drugs by using different techniques and cultivation and collection and general principles in extraction and isolation of active components
	C705.4	Prepare and standardize of different traditional herbal medicine.
Industrial Training and report writing 341729(41)	**C706.1**	Identify the role of Pharmacy professional in Pharma industry.
	C706.2	Explain the theoretical aspects directly viewing production and other activity live in industry and can decide his career.
	C706.3	Develop the practical knowledge while working in industry to apply theoretical principle of Manufacturing.
	C706.4	Demonstrate the planning and implementation of skill in Pharma industry.
B. Pharm VIIIthsem		
Pharmaceutics XI (Pharmaceutical Technology II) 341811(41) – T 341821(41) - P	**C801.1**	Explain the basic concept and design of controlled drug delivery system.
	C801.2	Describe the concept behind, formulate and evaluate sustained release formulation with suitable examples like TDDS, microencapsulation etc.
	C801.3	Describe the concept behind, formulate and evaluate

		targeted release formulation with suitable examples.
	C801.4	Explain the selection of specific packaging material for any particular formulation.
Pharmaceutics XII (Bio-pharmaceutics and Pharmacokinetics) 341812(41) – T 341822(41) - P	**C802.1**	Assess the Biopharmaceutics and Pharmacokinetics and their role in formulation development and clinical setting.
	C802.2	Interpret plasma drug concentration measurement by the application of compartment model.
	C802.3	Estimate the Non-linear pharmacokinetics with special reference to its assessment.
	C802.4	Predict the clinical significance of bioavailability and bioequivalence.
Pharmaceutical Analysis III 341813(41) – T 341823(41) - P	**C803.1**	Evaluate the quality of different dosage form as per I.P. monographs.
	C803.2	Design, develop and validate new analytical procedure for its effectiveness in drug delivery.
	C803.3	Rewrite the protocols for documentation of new drugs approval, GLP, ISO, WHO and USFDA and Explain the processing of patent.
	C803.4	Predict and explain the steps to eliminate the IPQC problems in pharmaceutical industries; and discuss the process of sampling.
Pharmacology IV (Clinical and Drug Interactions) 341814(41) - T	**C804.1**	Describe clinical pharmacy and its principals to predict symptoms of various poisonings and to support patients.
	C804.2	Describe the basic principles of cell injury and adaption.
	C804.3	Predict the basic mechanism involved in the process of inflammation and repair.
	C804.4	Explain the basic concepts of pharmacotherapy and therapeutic drug monitoring.
Quality Assurance and Packaging Technology 341831 (41) - T	**C805.1**	Explain the concepts of quality control and quality assurance during entire manufacturing practices.
	C805.2	Describe new concepts in pharmaceutical packaging and their control.
	C805.3	Explain the pharmacopoeial testing, defects and stability of blister and strip packaging materials.
	C805.4	Demonstrate sterilization of packaging materials used in parenterals, ophthalmic and aerosols as per their legal requirement.
Major Project 341824 (41)	**C806.1**	Generate the topic for the project.
	C806.2	Collect the information from the relevant sources.
	C806.3	Assemble the information into a more realistic draft ethically and conclude the contents.
	C806.4	Prepare the presentation and explain it to the audience.