SAMSKRUTI COLLEGE OF PHARMACY

(Kondapur (V), Ghatkesar (M), Medchal Dist.)

2.6.1. Program outcomes, program specific outcomes and course outcomes for all programs offered by the Institution (Stated and Displayed in Website of the Institution).

PROGRAM OUTCOMES (POs)

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 well-being.

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: Honor 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.

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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-asses and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO 1: - The students shall be able to apply the knowledge and skill gained from various subjects and the aptitude developed throughout the course of the program in performing a job either independently or as a member of a team in various fields of pharmacy profession.

PSO 2: - The students shall be able to make an initiation and achieve an innovation by properly integrating the input from various resources either independently or as a member of a team in various fields of pharmacy profession for betterment of the quality of life of the patients in the society.

COURSE OUTCOMES (Cos)

B.Pharmacy 1st year-1st Semester: University Regulation – R17.

Subject code	Name of the subject	Course outcomes
PS101	HUMAN ANATOMY AND PHYSIOLOGY- I	**CO1**-Explain the gross morphology, structure, and functions of various organs of the human body. **CO2**-Describe the various homeostatic mechanisms and their imbalances. **CO3**-Identify the various tissues and organs of different systems of human body. **CO4**-Perform the various experiments related to special senses and nervous system. **CO5**-Appreciate coordinated working pattern of different organs of each system.

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PS108	**HUMAN ANATOMY AND PHYSIOLOGY- I LAB**	CO1: Students will be able to remember anatomy of various organs through specimens and models. CO2: Students will demonstrate various blood tests experiments including blood group determination, RBC count, WBC count, Differential count etc. CO3: Students will be able to analyze various blood test results whether they fall in normal or abnormal limits. CO4: Students will be able to correlate abnormal blood test results to pathological conditions.
PS102	**PHARMACEUTICAL ANALYSIS -I**	**CO1**- understand the principles of volumetric and electro chemical analysis. **CO2** -carryout various volumetric and electrochemical titrations **CO3** -Develop analytical skills
PS109	**PHARMACEUTICAL ANALYSIS -I LAB**	CO1: Students will be able to analyse drugs by using nephlo-turbidity meter, flame photometer and flourimeter. CO2: Students will be able to determine p^H and conductivity of

		different solutions.
PS103	**PHARMACEUTICS- I**	**CO1** - Know the history of profession of pharmacy. **CO2** - Understand the basics of different dosage forms, pharmaceutical incompatibilities and pharmaceutical calculations. **CO3** -Understand the professional way of handling the prescription. **CO4** -Preparation of various conventional dosage forms.
PS110	**PHARMACEUTICS- I LAB**	CO1: Student will be able to select suitable ingredients to produce different dosage forms. CO2: Student will be able to select suitable technique to modify the dosage form. CO3: Student will be able to state and explain formulations aspects to design the different dosage forms CO4: Student should able to identify concentration of ingredients and change its concentration as per requirement.
PS104	**PHARMACEUTICAL INORGANIC CHEMISTRY-I**	**CO1** - know the sources of impurities and methods to determine the impurities in inorganic drugs and Pharmaceuticals . **CO2** -Understand the medicinal and pharmaceutical importance of inorganic compounds .

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PS111	**PHARMACEUTICAL INORGANIC CHEMISTRY-I LAB**	CO1: Students will be able to demonstrate preparation and purification of different inorganic compounds and can compare their properties. CO2: Students will be able to perform limit test andapply them in different pharmaceutical substance. CO3: Students will be able to calculate normality, molarity and can report them. CO4: Students will be able to analyze purity of samples using various analytical techniques.
HS115	**COMMUNICATION SKILLS**	**CO1** - Understand the behavioral needs for a Pharmacist to function effectively in the areas of pharmaceutical operation . **CO2** - Communicate effectively (Verbal and Non Verbal) . **CO3** -Effectively manage the team as a team player . **CO4** -Develop interview skills . **CO5** -Develop Leadership qualities and essentials .

HS115	**COMMUNICATION SKILLS LAB**	Students should able to pronounce English words properly. CO2: Students will be able to communicate orally in English related to day today activities. CO3: They will be able to communicate better in written form such as official letters and circulars. CO4: The awareness of English Language Lab enriches their communication and soft skills contributing to their overall development and success
BS106	**REMEDIAL BIOLOGY**	**CO1** - know the classification and salient features of five kingdoms of life . **CO2** - understand the basic components of anatomy & physiology of plant **CO3** -know understand the basic components of anatomy & physiology animal with special reference to human .
BS113	**REMEDIAL BIOLOGY LAB**	CO1: Students will demonstrate an ability to understand and handle simple and compound microscope. CO2: Students will be able to handle microscope for the evaluation of specimen slides of plant and animal tissues.

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		CO3: Students will be able interpret morphological study of various plant and animal cell parts. CO4: Students will be able to analyze morphological study of various plant and animal cell parts.
BS107	**REMEDIAL MATHEMATICS**	**CO1** -Know the theory and their application in Pharmacy. **CO2** - Solve the different types of problems by applying theory. **CO3** -Appreciate the important application of mathematics in Pharmacy

B.Pharmacy 1st year 2 nd Semester: University Regulation – R17

Subject code	Name of the subject	Course outcomes
PS201	**HUMAN ANATOMY AND PHYSIOLOGY - II**	**CO1** - Explain the gross morphology, structure, and functions of various organs of the human body. **CO2** - Describe the various homeostatic mechanisms and their imbalances. **CO3** -Identify the various tissues and organs of different systems of human body. **CO4** -Perform the hematological tests like blood cell counts, hemoglobin estimation, bleeding/clotting time etc and also record blood

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		pressure, heart rate, pulse and respiratory volume. **CO5** - Appreciate coordinated working pattern of different organs of each system. **CO6** -Appreciate the interlinked mechanisms in the maintenance of normal functioning (homeostasis) of Human body
PS207	**HUMAN ANATOMY AND PHYSIOLOGY – II LAB**	CO1: Students will be able to remember anatomy of various organs through specimens and models. CO2: Students will demonstrate various blood tests experiments including blood group determination, RBC count, WBC count, Differential count etc
PS202	**PHARMACEUTICAL ORGANIC CHEMISTRY I**	**CO1** - Write the structure, name and the type of isomerism of the organic compound. **CO2**-Write the reaction, name the reaction and orientation of reactions. **CO3** -Account for reactivity/stability of compounds. **CO4**- Identify/confirm the identification of organic Compound.
PS208	**PHARMACEUTICAL ORGANIC CHEMISTRY I LAB**	CO1: Students will be able to write mechanisms involved in various reactions that could help the students to understand the synthesis of higher organic compounds.

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		CO2: Students will be able to acquire knowledge about pharmaceutical organic compounds, with emphasis on their synthetic process, physical and chemical properties and compare them with each other.
BS203	**BIOCHEMISTRY**	**CO1** -Understand the catalytic role of enzymes, importance of enzyme inhibitors in design of new drugs, therapeutic and diagnostic applications of enzymes. **CO2** - Understand the metabolism of nutrient molecules in physiological and pathological conditions. **CO3** -Understand the genetic organization of mammalian genome and functions of DNA in the synthesis of RNAs and protein
BS 209	**BIOCHEMISTRY LAB**	CO1: Students will be able to setup simple qualitative and quantitative experiments given the syllabus. CO2: Students will be able to demonstrate their ability to perform qualitative and quantitative experiments of biochemicals of blood and urine. CO3: Students will be

		able to use quantitative experimental values to calculate biochemicals of blood and urine. CO4: Students will be able to correlate and compare results obtained from quantitative experiments with that of normal biochemical values.
BS204	**PATHOPHYSIOLOGY**	**CO1** -Describe the etiology and pathogenesis of the selected disease states. **CO2** - Name the signs and symptoms of the diseases. **CO3** -Mention the complications of the diseases
CS205	**COMPUTER APPLICATIONS IN PHARMACY**	**CO1** - Know the various types of application of computers in pharmacy. **CO2** - Know the various types of databases. **CO3** - Know the various applications of databases in pharmacy
CS210	**COMPUTER APPLICATIONS IN PHARMACY LAB**	CO1: students will be able to demonstrate the use MS-Office packages and DBMS concepts in pharmacy. CO2: students will be able to demonstrate different software to calculate summary statistics (mean, mode, median, range, inter quartile range, standard

		deviation, and variance) from raw data. CO3: students will be able to analyze different software results of statistics (mean, mode, median, range, inter quartile range, standard deviation, and variance) from raw data.
B. Pharmacy 1st year-2 nd Semester: University Regulation – R17.		
PS301	**PHARMACEUTICAL ORGANIC CHEMISTRY-II**	**CO1** -Write the structure, name and the type of isomerism of the organic compound. **CO2** - Write the reaction, name the reaction and orientation of reactions. **CO3** - Account for reactivity/stability of compounds. **CO4** - Prepare organic compounds.
PS305	**PHARMACEUTICAL ORGANIC CHEMISTRY-II LAB**	CO1: Students will be able to solve the synthetic schematic problems utilizing concepts of complex organic molecules dealt. CO2: Students will be able to solve the stereo chemical problems using concepts of stereochemistry for the

		molecules dealt or similar and analogues molecules.
PS302	**PHYSICAL PHARMACEUTICS-I**	**CO1** -Understand various physicochemical properties of drug molecules in the designing the dosage form. **CO2** - Know the principles of chemical kinetics & to use them in assigning expiry date for formulation. **CO3** - Demonstrate use of physicochemical properties in evaluation of dosage forms. **CO4** - Appreciate physicochemical properties of drug molecules in formulation research and development.
PS306	**PHYSICAL PHARMACEUTICS-I LAB**	CO1: Students will be able to Prepare different types of buffers and to determine the buffer capacity CO2: Students will be able to Determine the molecular weight by various method CO3: Students will be able to Preparation of different phase diagram and to study effect of impurities CO4: Students will be able to estimate the pH and percentage of composition in a given system
BS303	**PHARMACEUTICAL MICROBIOLOGY**	**CO1** - Understand methods of identification, cultivation and preservation of various

		microorganisms. **CO2** -Importance of sterilization in microbiology and pharmaceutical industry. **CO3** -Learn sterility testing of pharmaceutical products. **CO4** - Microbiological standardization of Pharmaceuticals. **CO5** - Understand the cell culture technology and its applications in pharmaceutical industries
BS307	**PHARMACEUTICAL MICROBIOLOGY LAB**	CO1: Student will be able to identify unknown microorganisms using various differential and selective microbiological techniques. CO2: Student will be able to apply basic microbiological principles and laboratory techniques. CO3: Student will be able to analyze various media requirements for growth of various microorganisms. CO4: Student will be able to apply techniques of recombinant DNA technology to produce drugs.
PC304	**PHARMACEUTICAL ENGINEERING**	**CO1** - To know various unit operations used in pharmaceutical industries. **CO2** -To understand

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		the material handling techniques. **CO3** - To perform various processes involved in pharmaceutical manufacturing process. **CO4** - To carry out various tests to prevent environmental pollution. **CO5** -To appreciate and comprehend significance of plant lay out design for optimum use of resources. **CO6** -To appreciate the various preventive methods used for corrosion control in pharmaceutical industries
PC308	**PHARMACEUTICAL ENGINEERING LAB**	CO1: Students will attain experience on experiments related to flow properties of fluids. CO2: Students will have good experience on experimental work relating to filtration, size reduction, drying, and centrifugation and mixing. CO3: Students can demonstrate experiments of dry bulb and wet bulb temperature.

B.Pharmacy 2nd year-2 nd Semester: University Regulation – R17

Subject code	Name of the subject	Course outcomes
PS401	PHARMACEUTICAL ORGANIC CHEMISTRY-III	**CO1** -understand the methods of preparation and properties of organic compounds **CO2** - explain the stereo chemical aspects of organic compounds and stereo chemical reactions. **CO3** -know the medicinal uses and other applications of organic compounds
PC402	MEDICINAL CHEMISTRY-I	**CO1** -Understand the chemistry of drugs with respect to their pharmacological activity. **CO2** -Understand the drug metabolic pathways, adverse effect and therapeutic value of drugs **CO3** - Know the Structural Activity Relationship (SAR) of different class of drugs . **CO4** - Write the chemical synthesis of some drugs .
PC406	MEDICINAL CHEMISTRY-I LAB	CO1: Students will be able to write mechanisms of various reactions that could help the students to understand the synthesis of Medicinal compounds. CO2: Students will be able to acquire knowledge about Medicinal compounds, with emphasis on their synthetic process, physical and chemical properties and compare them with each other.

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		CO3: Students will be able to analyze various reactions for the synthesis of Medicinal compounds. CO4: Students will be able to apply various reactions for the synthesis of Medicinal compounds.
PS403	**PHYSICAL PHARMACEUTICS -II**	**CO1** - Understand various physicochemical properties of drug molecules in the designing the dosage form **CO2** - Know the principles of chemical kinetics & to use them in assigning expiry date for Formulation . **CO3** -Demonstrate use of physicochemical properties in evaluation of dosage forms. **CO4** -Appreciate physicochemical properties of drug molecules in formulation research and Development.
PS407	**PHYSICAL PHARMACEUTICS -II LAB**	CO1: Students will be able to Prepare different types of buffers and to determine the buffer capacity CO2: Students will be able to Determine the molecular weight by various method CO3: Students will be able to Preparation of different phase diagram and to study effect of impurities CO4: Students will be able to estimate the pH and percentage of

		composition in a given system
PC404	**PHARMACOLOGY - I**	**CO1** -Understand the pharmacological actions of different categories of drugs . **CO2** -Explain the mechanism of drug action at organ system/sub cellular/ macromolecular levels. **CO3** -Apply the basic pharmacological knowledge in the prevention and treatment of various diseases. **CO4** - Observe the effect of drugs on animals by simulated experiments . **CO5** - Appreciate correlation of pharmacology with other bio medical sciences .
	PHARMACOLOGY – I LAB	CO1: Students will learn about the techniques of handling common laboratory animals and about different routes of administration and different drug dilutions. CO2: Students will be able to describe the common laboratory animals and anesthetics used in animal pharmacology. CO3:Students will be able to construct the concentration response curves of various drugs on isolated muscle preparations and interpret the potency of drugs. CO4:Students will be able to design new

		models in experimentation on animals.
PC405	**PHARMACOGNOSY AND PHYTOCHEMISTRY - I**	**CO1** -to know the techniques in the cultivation and production of crude drugs . **CO2** - to know the crude drugs, their uses and chemical nature . **CO3** -know the evaluation techniques for the herbal drugs **CO4** - to carry out the microscopic and morphological evaluation of crude drugs
PC409	**PHARMACOGNOSY AND PHYTOCHEMISTRY – I LAB**	CO1: Students will be able to demonstrate the microscopic studies of alkaloids containing crude drugs. CO2: Students will be able to demonstrate the microscopic studies of glycosides containing crude drugs CO3: Students will be able to distinguish the chemical nature of tannins and mineral resources CO4: Students will be able to authenticate the realistic samples of various crude drugs.
MC400	**Gender sensitization lab**	CO1: Students will be sensitized in basic dimensions of the biological, sociological, psychological and legal aspects of gender. CO2: Students will be

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		able to develop a sense of appreciation of women in all walks of life. CO3: Students will be able to acquire insight into the gendered division of lab our and its relation to politics and economics. CO4: Students will attain a finer grasp of how gender discrimination works in our society and how to counter balance it.

B.Pharmacy 3rd year-1 st Semester: University Regulation – R17 .

PS502	**INDUSTRIAL PHARMACY-I**	CO1: Students will be able to define drug products as additives and their role and application in pharmaceutical dosage forms. CO2: Students will be able to explain about pro-drugs and its approach in solving problems. CO3: Students will be able to compare preparation methods, evaluation and characterisation of various cosmetic formulations. CO4: Students will be able to analyze the importance of ophthalmic preparations and aerosols with their ideal features of this dosage form.

PS509	**INDUSTRIAL PHARMACY-I LAB**	CO1: Students will be able to demonstrate an ability to prepare, evaluate and pack formulations like solutions, suspensions, emulsions and ointments. CO2: Students will be able to relate the importance and applications of dosage forms. CO3: Students will be able to Prepare the cosmetic formulations related to skin, hair dentifrices and manicure preparations, creams, lipsticks, nail lacquer remover, tooth paste. CO4: Students will be able to Compare the different cosmetic formulations and will interpret the use of different ingredients used in the formulations.
PS503	**PHARMACOLOGY II**	CO1: Students will be able to define various diseases and disorders and choose an appropriate drug therapy for diseases and disorders. CO2: Students will be able to describe various drug classifications and compare the efficacy of various drugs. CO3: Students will be able to explain various side effects of drugs and analyze the rational drug therapy. CO4: Students will be able to design new models in experimentation on animals and illustrate their applications.
PS510	**PHARMACOLOGY II LAB**	CO1: Students will learn about the techniques of handling common

		laboratory animals and about different routes of administration and different drug dilutions. CO2: Students will be able to describe the common laboratory animals and anesthetics used in animal pharmacology. CO3: Students will be able to construct the concentration response curves of various drugs on isolated muscle preparations and interpret the potency of drugs. CO4: Students will be able to design new models in experimentation on animals.
PS504	**PHARMACOGNOSY AND PHYTOCHEMISTRY**	CO1: Students able to explain about the natural products which are having medicinal importance, toxicity adverse reaction on humans &mammalians CO2: Students will be able to develop practical skill about extraction & isolation of different phytoconstituents like alkaloids, terpenoids, volatile oil, steroids, vitamins, & hormones for market uses CO3: Students should able to analyze & interpret the synthetic procedure of phytocompounds like steroids, hormones, vitamins & alkaloids CO4: Students should able to recognize the biological function, uses & conversation reaction of steroids, sex hormones &

		vitamins
PS511	**PHARMACOGNOSY AND PHYTOCHEMISTRY LAB**	CO1: At the end of the academic year the students should be confident enough in the field of isolation & extraction of Phyto compounds from natural sources as in mentioned in the university syllabus. CO2: The students should know how to identify & analysis of different natural Phyto-compounds from natural sources. CO3: Students should be able to design the evaluation methods of Phyto compounds. & also design their biological uses, adverse reaction & toxicity
PS505	**GENERIC PRODUCT DEVELOPMENT**	CO1: - Student will be able to know Generic product development Co2: - Students will be able to know rule and regulations of generic product. CO3: - Students will be able to know the Stability Studies of Generic drugs.
PS506	**GREEN CHEMISTRY**	CO1: - Students able to know the environmental pollution factors. CO2:- Students will be able to understand the different greener approaches along with their principles.
MC 500	**Environmental Sciences [ES]**	CO1: Students will be able to differentiate the various components and problems in ecosystem

		CO2: Students will be able to compare the importance of natural resources and biodiversity. CO3: Students will be able to decide on realistic threats to biodiversity ecosystems. CO4: Students will be able to use knowledge to compare about pollution control techniques and environmental policy and legislation.

B.Pharmacy 3rd year-2 st Semester: University Regulation – R17 .

Subject code	Name of the subject	Course outcomes
PS601	**MEDICINAL CHEMISTRY-III**	**CO1**-Understand the Importance of the drug design and different techniques of drug design **CO2** -understand the chemistry of drugs with respect to their biological activity **CO3** -know the metabolism adverse effects and therapeutic values of drugs **CO4**- know the importance of SAR of drugs
PS609	**MEDICINAL CHEMISTRY-III LAB**	CO1: Students will be able to perform the analysis of various medicinal compounds that could help the students to understand structure of Medicinal compounds. CO2: Students will be able to acquire knowledge about Medicinal compounds, with emphasis on their analytical process, physical and chemical properties and compare them with

		each other. CO3: Students will be able to analyze various Medicinal compounds. CO4: Students will be able to apply various reactions for the synthesis of Medicinal compounds.
PS602	**PHARMACOLOGY-III**	**CO1**- Understand the mechanism of drug action and its relevance in the treatment of different infectious diseases **CO2** -comprehend the principles of toxicology and treatment of various poisonings and appreciate correlation of pharmacology with related medical sciences
PS610	**PHARMACOLOGY-III LAB**	CO1: Student will be able to isolate the tissue from the animals. CO2: Student will be able to perform screening of various pharmacological compounds. CO3: Student will be able to apply techniques of routes of drug administration in screening various pharmacological compounds. CO4. Student will be able to interpret the data acquired in the laboratory.
PS603	**HERBAL DRUG TECHNOLOGY**	**CO1** -Understand raw material as source of herbal drugs from cultivation to herbal drug product. **CO2**- know the WHO and ICH guidelines for evaluation of herbal drugs **CO3**- know the herbal cosmetics, natural sweeteners, nutraceuticals **CO4** -Appreciate patenting of herbal drugs, GMP

PS604	**BIOPHARMACEUTICS AND PHARMACOKINETICS**	**CO1**- understand the basic concepts in biopharmaceutics and pharmacokinetics **CO2** -use plasma data and derive the pharmacokinetics parameters to describe the process od drug absorption , distribution , metabolism and elimination **CO3** -critically evaluate bio pharmaceutic studies involving drug product equivalency **CO4**-Design and evaluate dosage regimens of the drugs using pharmacokinetics and biopharmaceutics parameters
PS605	**Pharmaceutical Quality Assurance**	**CO1**-Understand the cGMP aspects in a pharmaceutical industry. **CO2**-Appreciate the importance of documentation. **CO3**- Understand the scope of quality certifications applicable to pharmaceutical industries. **CO4**-Understand the responsibilities of QA & QC departments.
PS606	**Pharmaceutical Biotechnology**	**CO1**-understanding the importance of immobilized enzymes in pharmaceutical industries. **CO2**- Genetic engineering applications in realtion to production of pharmaceuticals **CO3**- Impoprtance of monoclonal antibodies in industries. **CO4**-Appreciate the use of microorganisms in fermentation

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		technology.
PS607	**Bioinformatics**	**CO1**-Foudation of bioinformatics **CO2**-Sequence comparisons method **CO3**-Genomic applications **CO4**-Proteomic and metabolic applications.
PS608	**Screening methods in pharmacology**	**CO1**-This subject is designed to impart the knowledge on preclinical evaluation of drugs and recent experimental techniques in the drug discovery and development. **CO2**-The subject content helps the student to understand the maintenance of laboratory animals as per the guidelines.
MC600	**Human values and Professional Ethics**	CO1:- Students will be able to Understand the importance of ethics and values. CO2: Students will be able to Understand the importance of ethics and values in society. CO3 :- Students will be able to Understand ethical vision which will help them achieve harmony in life CO4:- Students will be able to Understand moral responsibility which will further mould them as better professionals.

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Subject code	Name of the subject	Course outcomes
PS701	**Instrumental methods of analysis**	**CO1-** Understand the interaction of matter with electromagnetic radiations and its applications in drug analysis. **CO2-**Understand the chromatographic separation and analysis of drugs. **CO3-**Perform quantitative & qualitative analysis of drugs using various analytical instruments.
PS8702	**Industrial pharmacy-II**	**CO1-** know the process of pilot plant and scale up of pharmaceutical dosage form. **CO2-**Understand the process of technology transfer from lab scale to commercial batch. **CO3-** Know different laws and acts that regulate pharmaceutic al industry in india and US. **CO4-** Understand the approval process and regulatory requirements for drug products.
PS703	**Pharmacy practice**	**CO1-** Know various drug distribution methods in a hospital. **CO2-** Appreciate the pharmacy stores management and inventory control. **CO3-**Know pharmaceutical care services **CO4-**Do patient counseling in community pharmacy.

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PS704	**Novel drug delivery systems**	**CO1**-To understand various approaches for development of novel drug delivery systems. **CO2**- To understand the criteria for selection of drugs and polymers for the development of novel drug delivery systems, their formulation and evaluation.
PS705	**Pharmaceutical marketing**	**CO1**- Provide an understanding of marketing concepts and technique and the application of the same in the pharmaceutical industry.
PS706	**Pharmaceutical regulatory science**	**CO1**-Know about the process of drug discovery and development **CO2**-Know the regulatory authorities and agencies governing the manufacture and sale of pharmaceuticals. **CO3**- Know the regulatory approval process and their registration in Indian and international markets
PS707	Pharmacovigilance	CO1-Why drug safety monitoring is important CO2- History and development of pharmacovigilance. C03-National and international scenario of pharmacovigilance. CO4-International

		standards for classification of diseases and drugs. CO5- Adverse drug reaction reporting systems and communication in pharmacovigilance.
PS708	Quality control and standardization of herbals	CO1-Know WHO guidelines for quality control of herbal drugs CO2- Know quality assurance in herbal drug industry. CO3-Know the regulatory approval process and their registration in Indian and international markets.
PS709	**INSTRUMENTAL METHODS OF ANALYSIS LAB**	CO1:- Students will be able to analyze drugs by using instruments like UV/VIS, IR, & NMR spectroscopy, Mass spectrometry, Gas chromatography, and HPLC. CO2: - Students will be able to handle instruments.
PS710	**PRACTICE SCHOOL**	CO1: - Students will be able to institutionalized linkage between

		university /college and industry CO2: - Students involvement in real life projects continues internal evaluation and monitoring the faculty help by student understand the practical issues.

B.Pharmacy 4th year 2nd sem : University Regulation – R17 .

PS801	**BIOSTATISTICS AND RESEARCH METHODOLOGY**	CO1: students will be able to learn the application of statistical methods to medical, biological and health related problems. CO2: students will be able to calculate summary statistics (mean, mode, median, range, inter quartile range, standard deviation, and variance) from raw data. CO3: students will be able to learn the basic concepts of CRD, RBD and Latin Square Designs. **CO4-** The student will be known the Biostatistics arrangement, presentation and formation of tables and charts. They also know the correlation and regression & application of different methods, analysis of data and also learn how to write dissertation, thesis and Research paper

PS802	**SOCIAL AND PREVENTIVE PHARMACY**	CO1: - Student will be able to Acquire high consciousness of current issues related health and pharmaceutical problems within the country and worldwide CO2: Student will be able to develop critical way of thinking based on current health care development. CO3:- Student will be able to evaluate alternative ways of solving problems related to health and pharmaceutical issues.
PS803	**Pharmaceutical Jurisprudence**	CO1: student will be able to practice pharmacy profession as per the Pharmaceutical Act and different laws related to drugs. CO2: student will be able to apply knowledge in the area of pharmaceutical legislation, rules, laws, ethics, acts and amendments related to drugs CO3: student will be able to apply the broad pharmaceutical solutions in a global and economical context.
PS804	**COMPUTER AIDED DRUG DESIGN**	CO1: - Students will be able to know design and discovery of lead molecules. CO2: - Students will be able to know the role of drug design in drug discovery process. CO3: - Students will be able to develop the concept of QSAR and Docking CO4: - Students will be to

		develop Various Strategies to develop new drug like molecules.
PS805	**NANO TECHNOLOGY**	CO1: - Students will be able to select the right kind of materials. CO2: - Students will be able to develop nano formulations with appropriate technologies. CO3: - Students will be able to evaluate the product related test and for identified diseases.
PS806	**EXPERIMENTAL PHARMACOLOGY**	CO1: - Students will be able to Appraise the regulations and ethical requirement for the usage of experimental animals. CO2: - Students will be to describe the various animals and newer screening methods used in the drug discovery. CO3: - Students will be to understand the Research methodology to be followed by Bio-Statistical data interpretation of the assays.

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M. Pharmacy 1st Year 1st Semester (Pharmaceutical Analysis): University Regulation –R17

Subject code	Name of the subject	Course outcomes
6412AA	**ADVANCED PHARMACEUTICAL ANALYSIS (Professional Elective –I)**	**CO1**-The quantitative determination of various organic compounds is clearly understood. The spectral analysis, dissolution parameters and microbial assays are also learned.
6412AB	**PHARAMACEUTICAL FOOD ANALYSIS (Professional core–II)**	CO1-At completion of this course student shall be able to understand various analytical techniques in the determination of food constituents, food additives, finished food products, Pesticides in food And also student shall have the knowledge on food regulations and legislations.3
6412AC	**MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES (Professional core -1)**	**CO1**- Appreciable knowledge will be gained by the students in the Modern Analytical Techniques and can apply the theories in the Analysis of various bulk drugs and their formulations. The students will also be in a position to apply their knowledge in developing the new methods for the determination and validate the procedures.

6412AE	**Drug Regulatory Affairs (Core Elective – I)**	CO1- The clear information about the patent laws, intellectual property rights and drug regulation in India and abroad is gained by the students.
	PHYTO CHEMISTRY	CO1: - Students will be able to know knowledge on various types of Phytoconstituents present in the plants. CO2: - Students will be able to know knowledge on various types of Phytoconstituents evaluation in the plants
	QUALITY CONTROL AND QUALITY ASSURANCE	CO1: - Students will be able understand the CGMP accepts in a pharmaceutical industry. CO2: - Students will be able appreciate the importance of documentation. CO3 :- Students will be able to understand the scope of quality certifications applicable to Pharmaceutical Industries.
	COSMETICS AND COSMECEUTICALS	CO1: - Students shall be able to know Regulatory biological aspects of cosmetics, excipients. CO2: - Students shall be able to know the designing of cosmeceuticals and herbal products.
	STABILITY OF DRUGS AND DOSAGE FORMS	CO1: - Students shall be able to describe the evaluation of stability of solutions ,solids and formulations against

		adverse conditions. CO2: - Students shall be able to suggest the measure to retain stability and storage conditions for retaining the efficacy of the products.
	RESEARCH METHODOLOGY & IPR	CO1: - Upon completion of the subject student shall be able to Understand the research problem. CO2: - Upon completion of the subject student shall be able to know the literature studies, Plagiarism and ethics. CO3: - Upon completion of the subject student shall be able to get the knowledge about technical writing. CO4: - Upon completion of the subject student shall be able to know the Patient rights.
	PHARAMACEUTICAL FOOD ANALYSIS LAB	CO1:- Students will be able to analyze drugs by using instruments like UV/VIS, IR, & NMR spectroscopy, Mass spectrometry, Gas chromatography, and HPLC. CO2: - Students will be able to handle instruments.
	MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES LAB	CO1:- Students will be able to analyze drugs by using instruments like UV/VIS, IR, & NMR spectroscopy, Mass spectrometry, Gas chromatography, and HPLC. CO2: - Students will be able to handle instruments.

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M.Pharmacy 1st Year 2 nd semester (Pharmaceutical Analysis): University Regulation-R19.		
	ADVANCED INSTRUMENTAL ANALYSIS -I	**CO1**-By the completion of topics the students will come out with the thorough knowledge of various spectral aspects of X-Ray, IR, SEM, ORD etc which help them in further projects works and also industrial opportunities.
	MODERN BIO-ANALYTICAL TECHNIQUES	Upon completion of the course, the student shall be able to understand **CO1**-Extraction of drugs from biological samples. **CO2**- Separation of drugs from biological samples using different techniques. CO4-Guidelines for BA/BE studies
6412AD	**PHARMACEUTICAL VALIDATION (Core Elective – I)**	Upon completion of the subject student shall be able to **CO1**-Explain the aspect of validation. **CO2**- Carryout validation of manufacturing processes. **CO3**- Apply the knowledge of validation to instruments and equipments. **CO4**-Validate the manufacturing facilities.
6412AF	**DRUG REGULATORY AFFAIRS (Open Elective - I)**	**CO1**-Students will come to know the different competent regulatory authorities globally. **CO2**-Students be aware of technical aspects pertaining to the marketing authorization application (MAA). **CO3**-The regulatory guidelines and directions framed by the regulatory authorities will be helpful to place the drug products in market for marketing approvals.
6412AG	**PHARMACOEPIDEMIOLOGY & PHARMACOECONOMICS (Open Elective - I)**	**CO1**- Understand the various epidemiological methods and their applications. **CO2**- Understand the fundamental principles of

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		Pharmacoeconomics. **CO3-** Identify and determine relevant cost and consequences associated with pharmacy products and services. **CO4-**Perform the key Pharmacoeconomics analysis methods. **CO5-**Understand the Pharmacoeconomic decisionanalysis methods and its applications. **CO6 -** Describe current Pharmacoeconomic methods and issues. **CO7 -** Understand the applications of Pharmacoeconomics to various pharmacy settings.
6412AJ	**HERBAL COSMETICS**	**CO1** -Students will learn about the raw materials used in herbal cosmetics and get exposed to various preparations herbal cosmetics.

Subject code	Name of the subject	Course outcomes
6412A	**ADVANCED INSTRUMENTAL ANALYSIS -II (Professional course IV)**	**CO1**-By the completion of topics the students will come out with the thorough knowledge of various spectral aspects of X-Ray, IR, SEM, ORD etc which help them in further projects works and also industrial opportunities.
6412AN	**QUALITY CONTROL AND QUALITY ASSURANCE (Professional course V)**	**CO1**-The study of this subject

		builds the confidence in the minds on the students to develop and formulate high quality pharmaceutical products.
6412AR	**SPECTRAL ANALYSIS (Professional Elective - IV)**	CO1- By the completion of topics the students will come out with the thorough knowledge of various spectral aspects of X-Ray, IR, SEM, ORD etc which help them in further projects works and also industrial opportunities.
6412AT	**SCREENING METHODS IN PHARMACOLOGY (Open Elective - II)**	CO1- The expected outcomes are students will know how to handle animals and know about various techniques for screening of drugs for different pharmacological activities, guidelines, and regulations for screening new drug molecules on animals.
6412AU	**STABILITY OF DRUGS AND DOSAGE FORMS (Open Elective - II)**	**CO1-** The students should describe the evaluation of stability of solutions, solids, and formulations against adverse conditions. **CO2-**The students should be able to suggest the measures to retain stability and storage conditions for retaining the efficacy of the products.

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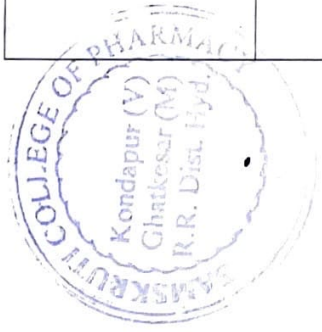
6412AV	ENTREPRENEURSHIP MANAGEMENT (Open Elective - II)	**CO1-** The Role of enterprise in national and global economy. And dynamics of motivation and concepts of entrepreneurship. **CO2-** Demands and challenges of Growth Strategies And Networking.
6412AW	NANO BASED DRUG DELIVERY SYSTEMS (Open Elective - II)	**CO1**-The students should be DELIVERY SYSTEMS (Open Elective - II) able to select the right kind of materials, able to develop nano- formulations with appropriate technologies, evaluate the product related test and for identified diseases.
6412AX	HERBAL AND COSMETICS ANALYSIS (Open Elective - II)	**CO1-**Determination of herbal remedies and regulations Analysis of natural products and monographs. **CO2-** Determination of Herbal drug-drug interaction. **CO3**- Principles of performance evaluation of cosmetic products.

M.Pharmacy 1st Year 1st Semester (Pharmaceutics): University Regulation R19

Subject code	Name of the subject	Course outcomes
	MODERN PHARMACEUTICS	CO1:-The students will. Be explain the preformulation parameters, apply ICH Guidelines and evaluate drug, drug excipients compatibility. CO2: -The students will. Be able to explain about formulation and development, use of excipients in tablets, powders, capsules, micro encapsulation and coating techniques.
	APPLIED BIOPHARMACEUTICS AND PHARMACOKINETICS	CO1-students will be able to express factors affecting the bioavailability and stability of

		dosage form. CO2- They also learn the bioequivalence studies and protocols for bioequivalent studies. CO3- They also evaluate the parameters for the disposition, absorption and Michaelis-Menton constants for nonlinear kinetics.
6403AA	**ADVANCED PHYSICAL PHARMACEUTICS (Core course - I)**	CO1-The students will learn particle size analysis method, solid dispersion, physics of tablets, polymer classification and its applications. CO2- student will also practice the stability calculations, shelf-life calculations and accelerated stability studies. CO3-They also understand the rheology, absorption related to liquids and semisolid dosage forms with advances. CO4-They also know the factors affecting the dissolution and solubility in related to In-vitro/In-vivo correlations.
6403AG	**DRUG REGULATORY AFFAIRS (Open Elective – I)**	CO1- Students will come to know the different competent regulatory authorities globally. and be aware of technical aspects pertaining to the marketing authorization application. CO2 - The regulatory guidelines and directions framed by the regulatory authorities will be helpful to place the drug

		products in market for marketing approvals.
	TOTAL QUALITY MANAGEMENT	C01: - Students will be able to learn the established regulatory guidelines in GMP, GCP,GLP,USFDA,WHO,ISO.. CO2: - Students will be able to acquire knowledge regarding the quality control aspects of different regulatory bodies as per their requirements throughout the world.
	PHARMACEUTICAL VALIDATION (Core Elective – I)	Upon completion of the subject student shall be able to **CO1-**Explain the aspect of validation. **CO2-** Carryout validation of manufacturing processes. **CO3-** Apply the knowledge of validation to instruments and equipment's. **CO4-**Validate the manufacturing facilities.
	STABILITY OF DRUGS AND DOSAGE FORMS (Open Elective - II)	**CO1-** The students should describe the evaluation of stability of solutions, solids, and formulations against adverse conditions. **CO2-**The students should be able to suggest the measures to retain stability and storage conditions for retaining the efficacy of the products.
	RESEARCH METHODLOGY AND IPR	CO1: - Upon completion of the subject student shall be able to Understand the research problem. CO2: - Upon completion of the subject student shall be able to know the literature studies, Plagiarism and ethics.



		CO3: - Upon completion of the subject student shall be able to get the knowledge about technical writing. CO4: - Upon completion of the subject student shall be able to know the Patient rights.
	MODERN PHARMACEUTICS – I (Core course - II)	CO1-Students shall explain the preformulation parameters, apply ICH guidelines and evaluate drug, drug excipients compatibility. CO2- Students also explain about formulation and development, use of excipients in tablets, powders, capsules, micro encapsules and coating techniques. CO3- They also learn and apply the statistical design in different formulations
	ADVANCED DRUG DELIVERY SYSTEMS	CO1: - Students will be able to design CDDS design of the formulation, fabrication of systems of drug delivery systems.
	INDUSTRIAL PHARMACY	CO1: -Students should be able to explain the machinery involved in milling, mixing, filtration, drying and packing material constructions used in the production of pharmaceutical materials. CO2 :- Students should be able salient features of GMP, TQM applicable in industry . CO3:- Students should be able to understand effluent treatments and prevent

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		pollution. CO4 :-Student should be able to evaluate the validation of analytical methods and processs.
	HERBAL COSMETICS	**CO1** -Students will learn about the raw materials used in herbal cosmetics and get exposed to various preparations herbal cosmetics.
	NANO BASED DRUG DELIVERY SYSTEMS (Open Elective - II)	**CO1-**The students should be DELIVERY SYSTEMS (Open Elective - II) able to select the right kind of materials, able to develop nano- formulations with appropriate technologies, evaluate the product related test and for identified diseases.
	NUTRACEUTICALS	**CO1-**The students should be able to understand the importance of Nutraceuticals in various common problems with the concept of free radicals.
	CLINICAL RESEARCH AND PHARMACOVIGILANCE	**CO1:** - Students will be able to explain the regulatory requirements for conducting clinical trial. CO2: - Students will be able to demonstrate the types of clinical trial designs. CO3: - Students will be able to explain the responsibilities of key players involved in clinical trials. CO4:- Students will be able to explain the principles the Pharmacovigilance.
	BIOSTATISTICS	**CO1:** - Students will be able to known the Biostatistics arrangement, presentation and formation of tables and charts **CO2:** - Students will be able to known the correlation and regression and application of different methods, analysis of data.
	SCALE UP AND TECHNOLGY TRANSFER	**CO1:** - - Students will be able to Manage the scale up process in pharmaceutical industry. CO2: - Students will be able to Assist in technology transfer.

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		CO3: - To establish safety guidelines, which prevent industrial hazards.