COURSE OUTCOME

PROGRAMME- B. PHARM

Sr. no.	Sem	Course code	Course Name	Course outcome with code
1.	Sem I	BP101TP	Human Anatomy and Physiology I	**C101TP.1**: Explain the gross morphology, structure and functions of various organs of human body. **C101TP.2:** Describe the various homeostatic mechanisms and their imbalance. **C101TP.3:** Identify the various tissue and organs of different system of human body. **C101TP.4:** To Investigate human body for evaluation of different parameters. **C101TP.5:** Perform the haematological tests and understanding organ system through charts and models
2.	Sem I	BP102TP	Pharmaceutical Analysis I	**C102TP.1**: Define different methods used in Pharmaceutical Analysis **C102TP.2**: Explain the Principle behind different Pharmaceutical Analysis methods/techniques **C102TP.3:** Solve problems based upon different Pharmaceutical Analysis methods/techniques **C102TP.4:** Apply different Pharmaceutical Analysis methods/techniques for Analysis of Pharmaceuticals **C102TP.5:** To prepare and standardize various compounds in normal and molar concentration by electro analytical titration and perform assay of the compounds by volumetric analytical techniques.
3.	Sem I	BP103TP	Pharmaceutics I	**C103TP.1:** To study history of pharmacy profession, different dosage forms, prescription **C103TP.2:** To Understand the basics of different dosage forms, pharmaceutical incompatibilities and pharmaceutical calculations **C103TP.3**: To prepare different conventional

				dosage forms **C103TP.4:** To study various evaluation as dosage form & pharmaceutical compatibility **C103TP.5:** Formulate various solid, liquid, semisolid dosage form .Can Understand the basics of Posology and calculation regarding to it
4.	**Sem I**	**BP104TP**	**Pharmaceutical Inorganic Chemistry**	**C104TP.1**: To know about pharmacopoeia, impurities, methodology to determine pharmaceutical inorganic substance. **C104TP.2:** To understand the medicinal and pharmaceutical importance of inorganic compound. **C104TP.3**: To apply knowledge of various classes of inorganic compound with its medicinal uses in pharmacy **C104TP.4**: Familiar with different classes of inorganic pharmaceuticals and their analysis. **C104TP.5**: To understand and perform the preparation, identification test, limit test and test for purity of inorganic compounds.
5.	**Sem I**	**BP105TP**	**Communication Skills**	**C105TP.1:** To remember communication skill, barrier, perception, styles, basic listening and interaction techniques. **C105TP.2:** To understand the Communication skills, barrier, perspective, elements, listening, writing and group discussion. **C105TP.3:** To apply various communication , listening, writing and interview skills for overall development of individual **C105TP.4 :** To evaluate communication skills by group discussion, presentation and interview **C105TP.5:** To make understand of basic communication skills and its commercialization application.

6.	**Sem I**	**BP106TP**	**Remedial Biology**	**C106TP.1:** To learn the classification and salient features of five kingdoms of life **C106TP.2:** To understand the component of living world, structure and functional system of plant and animal kingdom **C106TP.3**: To apply basic component of anatomy and physiology animal with special reference to human **C106TP.4:** To evaluate and analyse living organism for different parameter **C106TP.5:** To Study of cell, Stem, Root, Leaf, seed, fruit, flower and their modifications and Determination of blood group ,blood pressure ,tidal volume.
7.	**Sem I**	**BP107TT**	**Remedial Mathematics**	**C107TT.1:** To remember the theory of partial fractions, matrices, calculus and differential equation **C107TT.2:** To understand different types of problem by applying theory **C107TT.3:** To appreciate important application of mathematics in pharmacy **C107TT.4:** To analyse and evaluate mathematics in pharmacy
8.	**Sem II**	**BP201TP**	**Human Anatomy and Physiology II**	**C201TP .1**: Explain the gross morphology, structure and functions of various organs of human body. **C201TP .2:** To understand various homeostatic mechanism and imbalance of hormones. **C201TP .3:** Appreciate co-ordinated working pattern of different organ of each system. **C201TP .4:** Investigate and interlinked mechanism in the maintenance of normal functioning of human body. **C201TP .5:** To understand various sensory organ system and different system using charts and models.

9.	**Sem II**	**BP202TP**	**Pharmaceutical Organic Chemistry I**	**C202TP.1:** To learn basic concept of classification, structure, nomenclature of organic compound. **C202TP.2:** To understand the mechanism, reaction, stability and reactivity of organic compound. **C202TP.3:** To apply knowledge and uses of organic compound in pharmacy involving multiple functional groups. **C202TP.4:** Preparation of organic compound and study qualitative test involved in various functional groups. **C202TP.5** To identify, construct & derivatize the organic compound.
10.	**Sem II**	**BP203TP**	**Pharmaceutical Engineering**	**C203TP.1:**To know various unit operations in pharmacy **C203TP.2:** To understand different material processing technique in pharmaceutical industry **C203TP.3:**To study application and uses of various pharmaceutical process **C203TP.4:**To understand different advantages disadvantages and problem in pharmaceutical process and material **C203TP.5** To conduct various unit operations used in pharmaceutical industries.
11.	**Sem II**	**BP204TP**	**Computer Applications in Pharmacy**	**C204TP.1:** To learn various types of number system, information system and web technologies used in pharmacy **C204TP. 2:** To understand the concept of number system, web technologies and various information and data base management system in pharmacy **C204TP.3:**To study the various application of computer and database in pharmacy **C204TP.4:** To analyse the impact of various technologies and their use in pharmacy **C204TP.5:** Provide application based knowledge

				which can be helpful in professional life.:
12.	**Sem II**	**BP205TT**	**Environmental Science**	**C205TT.1:** To learn about the environmental system and the status of its inherent or induce changes regarding environment **C205TT.2:** To understand the concept of the multidisciplinary nature of environmental studies, ecosystem and environmental pollution **C205TT.3:** Impart basic knowledge about environment, ecosystem and its allied problems **C205TT.4:**Acquitre skill and study different analysis method to prevent and control environmental problem
13.	**Sem III**	**BP301TP**	**Pharmaceutical Organic Chemistry II**	**C301TP.1:** To remember the structure & name of the organic compound **C301TP.2:**To understand the reactions and reactivity of some organic compounds **C301TP.3:** To acquire knowledge of synthesis, reactions, structure & medicinal uses of some organic compounds **C301TP.4:** Analyse the mechanisms of reactions of organic compounds **C301TP.5:** To determine oil values and prepare various organic compounds by involving laboratory techniques
14.	**Sem III**	**BP302TP**	**Physical Pharmaceutics I**	**C302TP.1:** To get the basic knowledge of various physicochemical properties of drug molecules and factors affecting in drug absorption. **C302TP.2:** To understand various Physicochemical Properties of drug molecules in designing dosage forms. **C302TP.3:** To study the application of Solubility, States of matter, Surface tension and Interfacial tension, complexion and Protein Binding, pH, Buffers and Isotonic Solution in development of dosage form. **C302TP.4:** Demonstrate use of physicochemical

				properties in the formulation development and evaluation of dosage form. **C302TP.5:** To understand applicability of physicochemical properties of drug in the formulation development and evaluation of dosage forms.
15.	**Sem III**	**BP303TP**	**Biochemistry**	**C303TP.1**: To study basics of Biomolecules and bioenergetics, Enzyme, carbohydrate, Lipid, Amino Acid, Protein, Nucleic Acid metabolism. **C303TP.2**: To understand Energy rich compound, the metabolism of nutrient molecules in physiological and pathological conditions, genetic organization of mammalian genome. **C303TP.3:** To study significance of energy rich compound, therapeutic and diagnostic application of enzyme, application of metabolic cycle in various disorder. **C303TP.4**: To analyse regulation of enzyme, nucleic acid metabolism, significance of carbohydrate, Lipid and amino acid metabolism. **C303TP.5:** To perform qualitative analysis various biomolecules in physiological and pathological conditions and understand the catalytic, therapeutic and diagnostic applications of enzymes.
16.	**Sem III**	**BP304TT**	**Pathophysiology**	**C304TT.1:** To remember and learn pathophysiology of selected disease. **C304TT.2:** To understand etiology, mechanism of pathogenesis, sign and symptoms and diagnosis of selected disease. **C304TT.3:** To express the sign and symptoms, etiology, pathogenesis and complications of selected disease. **C304TT.4:** To investigate and evaluate human body for diagnosis of selected disease.

17.	**Sem III**	**BP305TP**	**Pharmacognosy and Photochemistry I**	**C305TP.1:** To learn pharmacognosy of drug obtained from various natural sources **C305TP.2:** to understand various system of medicine and techniques in the cultivation and production of crude drug and various crude drug obtained from marine sources **C305TP.3:** Application of crude drug, medicinal plant, plant tissue culture and various system of medicine **C305TP.4:** To explain evaluation techniques for herbal drug and to analyse the microscopic and morphological evaluation of carbohydrates, lipids, proteins and enzyme. **C305TP.5:** To perform various physical, microscopical, quantitative microscopical evaluation methods for various crude drugs and to perform the analysis of different crude drugs by chemical test.
18.	**Sem IV**	**BP401TT**	**Pharmaceutical Organic Chemistry III**	**C401TT.1:** To know the knowledge on stero-chemical aspects of organic compound, geometrical compound and heterocyclic compound. **C401TT.2:** To understand optical isomerism, geometric chemical reaction, synthesis of various heterocyclic organic compounds. **C401TT.3:** To know the medical use and other application of organic compound. **C401TT.4:** To known the reaction of synthetic importance, reaction of chiral molecule, stereoselective and stereospecific reaction and reaction of various heterocyclic compounds.
19.	**Sem IV**	**BP402TP**	**Medicinal Chemistry I**	**C402TP.1:** To know about history, development of medicinal chemistry & physiochemical properties of drugs. **C402TP.2:** To understand chemistry of drug & their metabolic pathway, adverse effect &

				therapeutic value of drugs. **C402TP.3:** To analyse & synthesize different classes of drugs based on SAR study. **C402TP.4:** To prepare & assay of different classes of drugs and physiochemical properties of some drugs. **C402TP.5:** To Synthesize and perform Assay of various medicinal drugs.
20.	**Sem IV**	**BP403TP**	**Physical Pharmaceutics II**	**C403TP.1:** To study the basic concepts of Colloidal and Coarse dispersion, rheology, micrometrics and drug stability involved in formulation, research and development. **C403TP.2:**To understand various physicochemical properties of drug molecules in the designing the dosage forms. **C403TP.3:** To know the application of Colloidal and Coarse dispersion, rheology, micromeritics and drug stability. **C403TP.4:** Demonstrate use of physicochemical properties in the formulation development and evaluation. **C403TP.5:** To understand applicability of physicochemical properties of drug in the formulation development and evaluation of dosage forms.
21.	**Sem IV**	**BP404TP**	**Pharmacology I**	**C404TP.1:** To learn basic concepts in pharmacology. **C404TP.2:** To understand the pharmacological action and mechanism of different categories of drug. **C404TP.3:** To apply basic pharmacological knowledge in prevention and treatment of various diseases. **C404TP.4:** To analyse and evaluate the effect of test item on selected test subject. **C404TP.5:** To understand the basic introduction

				of experimental pharmacology and study simulated experiments using software.
22.	**Sem IV**	**BP405TT**	**Pharmaceutical Jurisprudence**	**C405TT.1:** To understands the Pharmaceutical legislations and their implications in the development and marketing of pharmaceuticals. **C405TT.2:** To understand about drug and cosmetics act 1940 and its rules 1947. **C405TT.3:** To know about the regulatory authorities and agencies governing the manufacture and sale of pharmaceuticals. **C405TT.4:** To understand the code of ethics during the pharmaceutical practice, To know about the different acts in terms of objectives, provisions and offences and penalties**.**
23.	**Sem V**	**BP501TT**	**Medicinal Chemistry II**	**C501TT.1:** To learn mechanism pathways & SAR study of different classes of drugs. **C501TT.2:** To understand metabolic pathways, chemistry of drug, adverse effects & therapeutic value of drugs. **C501TT.3:** To apply knowledge & uses of different class of drugs based on mode of action. **C501TT.4:** To analyse & synthesize different classes of drugs based on SAR study.
24.	**Sem V**	**BP502TP**	**Pharmacology II**	**C502TP.1:** To learn pharmacology of drugs affecting various system of human body. **C502TP.2:** To understand the mechanism of drugs action and its relevance in the treatment of different disease. **C502TP.3:** To assess pharmacology of drug acting on various system of human body. **C502TP.4:** To evaluate and analyse co-relation of pharmacology of various drug with respect to medical science. **C502TP.5:** To emphasis basic concepts of bioassay and demonstrate isolation of different organs/ tissue from the laboratory animals by

				stimulated experiments.
25.	**Sem V**	**BP503TP**	**Pharmacognosy and Phytochemistry II**	**C503TP.1:** To learn the basic metabolic pathways, the general introduction to secondary metabolites, will learn and remember to identify various phytoconstituents, their presence in industrial world and also the basics of phytochemistry **C503TP.2:** Be able to understand the various steps in the formation of secondary metabolites, their composition and chemical classes, their isolation processes, industrial production and latest techniques used in isolation, purification of drugs **C503TP.3:** To know the application of various secondary metabolites in biogenetic studies, the commercial application of the herbs and, isolation and identification methods for phytoconstituents, their utilization, extraction using techniques like spectroscopy chromatography and electrophoresis. **C503TP.4:** To analyse the use of radioactive isotopes to study biogenetic pathways, a secondary metabolites and their therapeutic uses and bio sources, estimation methods to isolate, purify and identify the phytoconstituents. **C503TP.5:** To study the pharmacognostic profile along with extraction and analysis of different crude drugs by chemical test.
26.	**Sem V**	**BP504TP**	**Pharmaceutical Microbiology**	**C504TP.1:** To study basic concept of microorganisms, microbiology and factors essential for microbial activity. **C504TP.2:** To understand methods of identification of microbes, mechanism of various microbial process and instrument used in microbiology laboratory. **C504TP.3:** To know the application of

				microbiology, cellular culture, sterilization in pharma industry. **C504TP.4:** To Analyse antibiotics, disinfectant, calibration of instrument, assessment of microbial contamination **C504TP.5:** To study diff equipment used in microbiology, identify microbes, sterilization and sterility test.
27.	**Sem V**	**BP505TT**	**Pharmaceutical Biotechnology**	**C505TT.1:** Learning concept of bio-technologies, immunity and fermentation to revolunilize pharmaceutical industry **C505TT.2:** Understanding the importance of different technologies of biotechnologies in pharmaceutical industry **C505TT.3:** Application of biotechnology methods in relation to production of pharmaceutics **C505TT.4:** To impart technologies to develop pharmaceutics/biological revolution
28.	**Sem V**	**BP506TP**	**Contributor Personality Development Program**	**C506TP.1**: To learn the ideal of work, their self-esteem, taking challenges and career development model. **C506TP.2:** To understand different types of value, Engaging skills & Human centred thinking. **C506TP.3:** Application of contributor personality for wellbeing of individual **C506TP.4:** To evaluate their working activities, their vision towards success & career development approach, Value creation, deep engagement and trust conduct. **C505TP.5:** Develop professional communication practices in to the students.
29.	**Sem V**	**BP507TP**	**Integrated Personality Development Course**	**C507TP.1:** Improve the employability of students by giving them the right work ethic and thinking that employers are looking for. **C507TP.2:** Build student's confidence with which they can go into any job and contribute

				meaningfully and improve student's ability to engage better in the workplace and to be able to handle the challenges that come up there. **C507TP.3:** Build students career-worthiness and help them develop into future-ready contributors with ability to navigate a career in a volatile, changing world **C507TP.4:** Widen student's choices of career and success so that they are able to open up more opportunities for themselves and take up unconventional career pathways. **C507TP.5:** Develop professional communication practices in to the students.
30.	**Sem VI**	**BP601TP**	**Medicinal Chemistry III**	**C601TP.1:** To learn classification, nomenclature historical background & importance drug design & their technique. **C601TP.2:** To understand chemistry of drugs, metabolism, adverse effects & therapeutic value of drugs. **C601TP.3:** To apply knowledge & uses of different class of organic compound based on pharmacological action. **C601TP.4:** To analyse different classes of drugs based on SAR study. **C602TP.5:** To synthesize & assay of different classes of drugs & some compound by microwave irradiation technique & uses of chem draw tool for structure and reaction.
31.	**Sem VI**	**BP602TP**	**Pharmacology III**	**C602TP.1:** To learn the basic concept of pharmacology and toxicology with classification of selected pharmacological drug. **C602TP.2:** To understand mechanism of action of drug and its relevance in the treatment of different infectious disease. **C602TP.3:** To appreciate correlation of pharmacology with related to medical science

				C602TP.4: To evaluate and analyse correlation of pharmacology of various drug with respect to side effect and adverse effect of drug. **C602TP.5:** To demonstrate different organ isolation experiment from the laboratory animals by stimulated experiment and understand the various OECD toxicity study guidelines.
32.	**Sem VI**	**BP603TP**	**Herbal Drug Technology**	**C603TP.1:** To learn the concept of herbal drug industry, quality of raw materials, guidelines for quality of herbal drugs, herbal cosmetics, natural sweeteners, neutraceuticals and patenting aspects. **C603TP.2:** To learn about herbs as raw material, Biodynamic agriculture, Indian system of medicine, neutraceuticals and herbs used in cosmetics. **C603TP.3:** Application of herbs in different aspects. **C603TP.4:** To analyse the different herbal formulation. **C603TP.5:** To perform preliminary phytochemical screening of crude drug, and to determine alcohol content of asavas and arista, standardize various formulations and to determine aldehyde, phenol and total alkaloids content.
33.	**Sem VI**	**BP604TT**	**Biopharmaceutics and Pharmacokinetics**	**C604TT.1:** Understand the basic concepts in biopharmaceutics and pharmacokinetics and their significance **C604TT.2:** To understand the methods f bioavailability and bioequivalence of drug products and their significance, different compartmental methods. **C604TT.3:** Understand various pharmacokinetic parameters, their significance & applications **C604TT.4:** Use of plasma drug concentration-time data to calculate the pharmacokinetic parameters to describe the kinetics of drug absorption,

				distribution, metabolism, excretion, elimination
34.	**Sem VI**	**BP605TP**	**Industrial Pharmacy I**	**C605TP.1:** To study Basic concept of pharmaceutical dosage form. And various preformulation parameter. **C605TP.2:** To understand the various pharmaceutical dosage forms. **C605TP.3:** To know manufacturing technique and various consideration in development of pharmaceutical dosage forms. **C605TP.4:** To evaluate various dosage form for their quality and application. **C605TP.5:** Preparation and evaluation of various pharmaceutical dosage forms.
35.	**Sem VII**	**BP701TP**	**Instrumental Methods of Analysis**	**C701TP.1:** To explain the principles and theory of the most used analytical equipment's in spectroscopy and chromatography **C701TP.2:** To understand the instrumentation and operation of the most used analytical equipment's in spectroscopy and chromatography **C701TP.3:** Learn applications and usage of various spectroscopic chromatographic techniques for organic, inorganic and natural products. **C701TP.4:** To interpret and communicate an analytical result and write technical reports. **C701TP.5:** To perform quantitative and qualitative analysis of drugs by using different analytical instruments and interpretation of result.
36.	**Sem VII**	**BP702TT**	**Industrial Pharmacy II**	**C702TT.1:** Basic learning and remember of pharmaceutical dosage form pilot plant and scale up techniques, Technology development and transfer, Regulatory requirements for drug approval, Quality management systems, Indian Regulatory Requirements for pharmaceutical dosage form. **C702TT.2:** Understand the fundamentals of pilot plant and scale-up techniques. Development and

				transfer of technologies Quality management systems, regulatory requirements for drug approval Indian Pharmaceutical Dosage Form Regulatory Requirements. **C702TT.3:** Explain the rationale and application of pilot plant and scale-up techniques, as well as technology development and transfer, regulatory requirements for drug approval, quality management systems, and Indian regulatory requirements for pharmaceutical dosage forms. **C702TT.4:** Investigate various regulations and take into account pilot plant and scale-up techniques, technology development and transfer, regulatory requirements for drug approval, quality management systems, and Indian regulatory requirements for pharmaceutical dosage form.
37.	**Sem VII**	**BP703TT**	**Pharmacy Practice**	**C703TT.1:** To learn about various set up for hospital and community pharmacy **C703TT.2:** To understand various approaches and aspect of hospital and community pharmacy. **C703TT.3:** To know various application of hospital and community pharmacy for different pharmaceutical care services. **C703TT.4:** To analyse the different criteria for pharmacy practice
38.	**Sem VII**	**BP704TT**	**Novel Drug Delivery System**	**C704TT.1:** To learn various concepts and approaches for different novel drug delivery system. **C704TT.2:** To understand various approaches and also selection criteria for drugs and polymer and excipients for development of different novel drug delivery system. **C704TT.3:** To study the various application and methods for different novel drug delivery system. **C704TT.4:** To analyse the criteria for formulation and evaluation for different novel drug delivery

				system.
39.	**Sem VII**	**BP705PP**	**Practice School**	**C705PP.1:** Hospital training (Hospital having minimum 10 bed facilities) and Training in Drug store/ CHC/ PHC **C705PP.2:** Training in a R & D organization/ CRO/ Manufacturing organization/ QA & QC Laboratory/ Public testing laboratory/ Drug regulatory body **C705PP.3:** To Successfully pass MOOCS course equivalent to 6 credits through SWAYAM Platform, also Detailed literature review on any technical topic. **C705PP.4:** To apply pharmacy knowledge in hospital, industries.
40.	**Sem VII**	**BP706TT**	**Quality Assurance**	**C706TT.1:** Acquire knowledge on various quality assurance systems, processes and current regulatory guidelines related to manufacturing and distribution. **C706TT**.2: Understand quality issues and provide solutions needed to attain Quality leadership in an environment of continual improvement . **C706TT.3:** Understand the importance of effective documentation. **C706TT.4:** To prepare competent individuals with Quality concept being engrained to achieve global quality standards in pharmaceutical industries.
41.	**Sem VIII**	**BP801TT**	**Biostatistics and Research Methodology**	**C801TT.1:** Teaches the fundamentals of numerous statistical approaches and how to memorise them in order to handle statistical issues in pharmaceutical research methodology. **C801TT.2:** Understanding the basic aspects of biostatics including descriptive statistics, graphics, correlation, regression, and logistic regression **C801TT.3:** Describe and apply biostatistics using descriptive statistics, graphics, correlation, regression, and logistic regression. Probability

				theory, Sampling technique, Parametric tests, Non-parametric tests, ANOVA, Introduction to Design of Experiments, Phases of Clinical Trials, Observational and Experimental studies, SPSS, R, and MINITAB statistical software in Pharmaceutical Research Methodology. **C801TT.4:** Analyse statistical data using statistics, graphics, correlation, regression, and logistic regression. Probability theory, Sampling technique, Parametric tests, Non-parametric tests, ANOVA, Introduction to Design of Experiments, Phases of Clinical Trials, Observational and Experimental studies, SPSS, R, and MINITAB statistical software in Pharmaceutical Research Methodology.
42.	**Sem VIII**	**BP802TT**	**Social and Preventive Pharmacy**	**C802TT.1:** To acquire high consciousness of current issue related to health and pharmaceutical problems within the country and worldwide. **C802TT.2:** Realization of health and pharmaceutical issues from which the world is dealing with and have a critical way of thinking based on current health care development. **C802TT.3:** Coming out with solutions to overcome the problematic issues related to health and pharmaceutical issues. **C802TT.4:** Evaluate alternative ways of solving problems related to health and pharmaceutical issues.
43.	**Sem VIII**	**BP803TT**	**Pharma Marketing Management**	**C803TT.1:** Demonstrate strong conceptual knowledge in the functional area of marketing management. **C803TT.2:** Demonstrate analytical skills in identification and resolution of problems pertaining to marketing management. **C803TT.3:** Demonstrate understanding of various marketing strategies, pricing and channel

				decisions. **C803TT.4:** Demonstrate understanding of integrated marketing communication and evaluation of market performance and recent trends in marketing.
44.	**Sem VIII**	**BP804TT**	**Pharmaceutical Regulatory science**	**C804TT.1:** Know about the process of drug discovery and development. **C804TT.2:** Know the regulatory authorities and agencies governing the manufacture and sale of pharmaceuticals. **C804TT.3:** Know the regulatory approval process and their registration in Indian and international markets. **C804TT.4:** To study Clinical trials and to study various Regulatory Concept.
45.	**Sem VIII**	**BP805TT**	**Pharmacovigilance**	**C805TT.1:** History and development of pharmacovigilance and Adverse drug reaction reporting systems and communication in pharmacovigilance. **C805TT.2:** ICH guidelines for ICSR, PSUR, expedited reporting, pharmacovigilance planning also International standards for classification of diseases and drugs **C805TT.3:.** National and international scenario of pharmacovigilance and Pharmacovigilance Program of India (PvPI) requirement for ADR reporting in India **C805TT.4:** Dictionaries, coding and terminologies used in pharmacovigilance and Drug safety evaluation in paediatrics, geriatrics, pregnancy and lactation
46.	**Sem VIII**	**BP806TT**	**Quality Control and standardization of Herbals**	**C806TT.1:** Know WHO guidelines for quality control of herbal drugs **C806TT.2:** Know Quality assurance in herbal drug industry

				C806TT.3: know the regulatory approval process and their registration in Indian and international markets **C806TT.4:** Appreciate EU and ICH guidelines for quality control of herbal drugs and acquired knowledge of cGMP, GAP and GLP practiced in traditional medicines manufacturing.
47.	**Sem VIII**	**BP807TT**	**Computer Aided Drug Design**	**C807TT.1:** To understand Design and discovery of lead molecules **C807TT.2:** The role of drug design in drug discovery process **C807TT.3:** The concept of QSAR and docking Various strategies to develop new drug like molecules. **C807TT.4:** The design of new drug molecules using molecular modelling software and Possess good understanding of in silico virtual screening protocols and informatics method in drug design.
48.	**Sem VIII**	**BP808TT**	**Cell and Molecular Biology**	**C808TT.1:** knowledge of the history and chemical foundations of cell biology. **C808TT.2:** Able to summarize the cellular functioning and composition **C808TT.3:** : Possess understanding of protein structure and DNA properties **C808TT.4:** Able to describe the basic molecular genetic mechanism, Able to describe the cell cycle
49.	**Sem VIII**	**BP809TT**	**Cosmetic Science**	**C809TT.1:** To know and explain about cosmetics, and related sciences, cosmeceuticals (cosmetics with skin, hair and oral care benefits) and personal care and hygiene products **C809TT.2:** To demonstrate practical skills in the area of biology, formulation science and

				analytical techniques required to scientifically design and develop various cosmetic products. **C809TT.3:** To describe about basic cosmetic problems associated with skin, hair and oral care etc. **C809TT.4:** Basic Concepts of cosmeceuticals, difference between cosmetics and cosmeceuticals. **C809TT.5:** Formulation, manufacturing and evaluation of creams, powders, hair cosmetics.
50.	**Sem VIII**	**BP810TT**	**Experimental Pharmacology**	**C810TT.1:** To learn basic knowledge of preclinical studies in experimental animals including design, conduct and interpretation of result **C810TT.2:**To understand and appreciate various screening model and data analysis used in preclinical study **C810TT.3:** To appreciate the application of various commonly used test subject in pharmacological studies **C810TT.4:** To analyse and evaluate design and execution of research hypothesis independently
51.	**Sem VIII**	**BP811TT**	**Advanced Instrumentation Techniques**	**C811TT.1:** Have knowledge of the basic concept and instrumentation of NMR, MS, X-ray crystallography, Thermal methods, Radio immunoassays and extraction technique for identification, extraction and characterization of compounds. **C811TT.2**: Possess in-depth knowledge on principles and instrumentation of hyphenated techniques like LCM/MS, GC-MS/MS, HPTLC-MS .methods of extraction process. **C811TT.3:** Able to perform quantitative & qualitative analysis of drugs using the above-mentioned instruments **C811TT.4:** Able to perform the calibration and

				validation of UV, IR,HPLC as per ICH guidelines.
52.	**Sem VIII**	**BP812TT**	**Dietary Supplements and Nutraceuticals**	**C812TT.1:** Understand the need of supplements by the different group of people to maintain healthy life. **C812TT.2:** Understand the outcome of deficiencies in dietary supplements. **C812TT.3:** Appreciate the components in dietary supplements and the application. **C812TT.4:** Appreciate the regulatory and commercial aspects of dietary supplements including health claims and acquired knowledge about use of plant constituents in preventing the diseases and promoting the health.
53.	**Sem VIII**	**BP813PP**	**Project Work**	**C813PP.1:** Know the source of literature and literature survey **C813PP.2:** Able to design research protocol and carry out study as per design **C813PP.3:** Can analyse and interpret research data using appropriate statistical tools **C813PP.4:** Capable of writing scientific documents and Developed tendency to work in group.
54.	**Sem VIII**	**BP814TT**	**Pharmaceutical Product Development**	**C814TT.1:** To know about the basic concepts of product development for the conventional and novel formulation. **C814TT.2:** To explain about the product development and Quality by design, Optimization techniques and experimental design for the pharmaceutical product development. **C814TT.3:** Application of regulation, optimization technique and pharmaceutical excipient in pharmaceutical product development **C814TT.4:** To evaluate the quality control and packaging of pharmaceutical product and excipients according to the regulatory requirement

55.	**Sem VIII**	**BP815TT**	**Epidemiology**	**C815TT.1:** To have a clear understanding of the definition and uses of epidemiology and appreciate its role in public health. **C815TT.2:** To be able to identify the key sources of data and have the ability to draw appropriate inferences from them. **C815TT.3:** To understand the concept and practical application of various measures such as: measures of disease frequency , measures of effect and measures of public health impact **C815TT.4:** To know the various types of epidemiological study designs and, understand their basic principles and the main analytic methods used in each specific design and Ascertain causality between an exposure and an outcome.

(Old Syllabus)

Sr. no	Sem	Course code	Course name	Course outcome with code
1	III	2230001	**Dispensing Pharmacy& Drug store management**	**C2230001.1** To learn the basic concept of prescription, Compounding and dispensing procedures and Posology **C2230001.2** To understand labelling,calculation of doses,principles and procedures of dispensing **C2230001.3** To apply knowledge of organization of drugs store, pharmaceutical calculations **C2230001.4** To identify types of drug stores and design, Drugs store Management **C2230001.5** To prepare and dispense various solid,liquid,semisolid dosage forms
2	III	2230002	**Pharmaceutical Engineering**	**C2230002.1** To know various unit operations used in Pharmaceutical industries. **C2230002.2** To understand the material handling Techniques, stoichiometry, modes of heat transfer **C2230002.3** To perform various processes involved in pharmaceutical manufacturing process **C2230002.4** To identify the types of fluid flows, materials of pharmaceutical plant construction **C2230002.5** To perform practical related to topics in pharmaceutical engineering
3	III	2230003	**Pharmaceutical Chemistry III Biochemistry I**	**C2230003.1** To learn classification, chemical nature, biological role and metabolism of biomolecules **C2230003.2** To Understand the catalytic role of enzymes, importance of enzyme inhibitors in design of new drugs, therapeutic and diagnostic applications of enzymes. **C2230003.3** To study about metals and vitamins as co-enzymes and their significance in human body. **C2230003.4** To analyse carbohydrate, lipid, protein, the generation of ATP and isolate RNA and DNA from different sources **C2230003.5** To perform identification of carbohydrates

				,lipids and analysis of oils/fats
4	**III**	**2230004**	**Pharmaceutical Chemistry IV Organic Chemistry I**	**C2230004.1** To learn to write the structure, name and the type of isomerism of the organic compound **C2230004.2** To understand the reaction, name the reaction and orientation of reactions **C2230004.3** To study reactivity/stability of compounds **C2230004.4** To analyse the chemical bonding and Properties **C2230004.5** To perform systemic qualitative analysis of organic compounds and preparation of their derivatives
5	**III**	**2230005**	**Health Education & Community health**	**C2230005.1** To learn about the concept of health,disease,epidemiology and demoography **C2230005.2** To understand the definitions and dimensions of health,first aid **C2230005.3** To study about the communicable diseases : brief outline, their causative agents, modes of transmission, symptoms and prevention **C2230005.4** To get familiar with communicable and non-communicable disease
6	**III**	**2230006**	**Pharmacognosy I**	**C2230006.1** To learn properties, methods of extraction, pharmaceutical and industrial applications of carbohydrates, lipids and proteins and their derived products **C2230006.2** To understand morphology, microscopy and powder characteristics of crude drugs. **C2230006.3** To study how to conduct extraction and estimation of different phytoconstituents **C2230006.4** To analyse significance of Pharmacognostic parameters and pharmacognostic scheme of study of crude drugs. **C2230006.5** To perform microscopical studies of plant tissues,leaf,stems ,root
7	**IV**	**2240001**	**Unit Operation II**	**C2240001.1** To learn the theory and principles of filteration, distillation, centrifugation, drying **C2240001.2** To understand different laws and their

				limitations in unit operations in pharmacy **C2240001.3** Application of knowledge of various theories and mechanism involved in drying filteration, evaporation and hvac **C2240001.4** To evaluate the types of instruments in each unit operations **C2240001.5** To demonstrate the use of centrifuge, dryers, distillation apparatus
8	**IV**	**2240002**	**Dispensing Pharmacy I and Pharma Industry Management**	**C2240002.1** To learn the concept of management and pharmaceutical marketing **C2240002.2** To understand the principals involved in dispensing of Semisolid Products and Suppositories **C2240002.3** To study Physical, chemical and therapeutic incompatibilities observed in prescriptions of dispensed products **C2240002.4** To evaluate the principles of sale management and marketing **C2240002.5** To prepare and dispense paste, jellies, suppositories.
9	**IV**	**2240003**	**Biochemistry II**	**C2240003.1** To know the basic concept of biomolecules like protein, nucleic acid, enzyme and know the basic parameter of techniques used in biochemistry. **C2240003.2** Understand chemistry, metabolism, synthesis, regulation of Biomolecules of biomolecules **C2240003.3** To study the application of biochemical synthesis and process. **C2240003.4** To analyse biochemical reaction, pathway and various techniques used in biochemistry. **C2240003.5** To perform qualitative analysis various biomolecules in physiological and pathological conditions and understand the catalytic, therapeutic and diagnostic applications of enzymes.
10	**IV**	**2240004**	**Organic Chemistry II**	**C2240004.1** To remember the structure, nomenclature, name and the type of isomerism of organic compounds. **C2240004.2** To understand the reactions and reactivity

				of some organic compounds **C2240004.3** To acquire knowledge of synthesis, reactions, structure & medicinal uses of some organic compounds **C2240004.4** Analyse the mechanisms of reactions of Organic compounds **C2240004.5** To determine oil values and prepare various organic compounds by involving laboratory techniques
11	**IV**	**2240005**	**Basic Concepts of Pharmacology and Clinical Pharmacy Practice**	**C2240005.1** To remember the concept of pharmacokinetics, Pharmacodynamics, effects of drug, drug interaction, adverse drug reaction, patient concealing, essential medicine and rational drug. **C2240005.2** Understand the basic of pharmacology terms, pharmacokinetics, Pharmacodynamics, effects of drug, drug interaction, adverse drug reaction, patient concealing, essential medicine and rational drug. **C2240005.3** Learn the application of pharmacokinetics, Pharmacodynamics, effects of drug, drug interaction, adverse drug reaction, patient concealing, essential medicine and rational drug. **C2240005.4** Analyse how pharmacokinetics, Pharmacodynamics, effects of drug, drug interaction, adverse drug reaction, patient concealing, essential medicine and rational drug.
12	**IV**	**2240006**	**Pharmacognosy II**	**C2240006.1** To remember definition, classification of volatile oil, resins and tannins. **C2240006.2** To understand physicochemical properties, general method for isolation, source, cultivation and collection of volatile oil, resins and tannins. **C2240006.3** To apply the knowledge for the commercial varieties of volatile oil, resins and tannins. **C2240006.4** Analyse pharmacognostic study of volatile oil, resins and tannins containing drugs. **C2240006.5**

13	**V**	**2250001**	**Hospital and Community Pharmacy**	**C2250001.1** To know basic organization system, drug distribution in hospital, hospital formulary and DIC system. **C2250001.2** To understand different pharmacy procedure manual, CSUM, Formulary, radio activity and role of pharmacist in community healthcare. **C2250001.3** Apply knowledge of pharmacy in dispensing of drug, Patient counselling and DIC. **C2250001.4** To analyse budget, hospital formulary, radiation dose, records and reports use in hospital.
14	**V**	**2250002**	**Pharmaceutical Microbiology & Biotechnology – II**	**C2250002.1** To know the basic concepts of microbiology, history, identification, isolation, microbial controls and basics of biotechnology and enzymes **C2250002.2** Understand various methods of microscopy, staining techniques, taxonomy, disinfectants, immobolization of enzymes **C2250002.3** Apply techniques of isolation & identify bacterial application of enzyme immobilization sterilization **C2250002.4** To know about bacterial count, growth, dynamics, Evaluation of disinfectant, sterilize monitoring protein synthesis **C2250002.5** To identify, isolate and counting bacteria, perform microbial assay of antibiotics.
15	**V**	**2250003**	**Pharmaceutical Analysis III**	**C2250003.1** To gather adequate knowlwdge different types of spectroscopy methods. **C2250003.2** To understand theory and instrumentation of different spectroscopy method. **C2250003.3** To apply knowledge of all spectroscopy method to develop and analysis pharmaceutical method **C2250003.4** To analyse pharmaceutical products using different spectroscopy method. **C2250003.5** To understand the importance of analytical spectroscopic techniques in complete analysis of drug.

16	**V**	**2250004**	**Medicinal Chemistry – I**	**C2250004.1** To know the chemistry of drugs with respect to their pharmacological activity**.** **C2250004.2** To understand the drug metabolic pathway, adverse effects and therapeutic value of drugs and understand the mode of action of drugs of different class of drugs **C2250004.3** To know the chemical synthesis of some drugs. **C2250004.4** To know the structure activity relationship (SAR) of different class of drugs**.** **C2250004.5** To prepare and perform assay of drugs / intermediates and determine partition co-efficient
17	**V**	**2250005**	**Pharmacology and Pharmacotherapeutics–I**	**C2250005.1** To remember the concept of pharmacokinetics, pharmacodynamics, effects of drug, drug interaction, adverse drug reactions, patient concealing, essential medicine and rational drug. **C2250005.2** Understand the basic of pharmacology terms, pharmacokinetics, pharmacodynamics, effects of drug, drug interactions, adverse drug reactions, patient concealing, essential medicine and rational drug. **C2250005.3** Learn the application of pharmacokinetics, pharmacodynamics, effects of drug, drug interactions, adverse drug reactions, patient concealing, essential medicine and rational drug in pharmaceutical practice industry. **C2250005.4** Analyse how pharmacokinetics, pharmacodynamics, effects of drug, drug interactions, adverse drug reactions, patient concealing, essential medicine and rational drug implies in pharmaceutical industry and clinical practice.
18	**V**	**2250006**	**Pharmacognosy II**	**C2250006.1** To remember definitions, classification and interdiction of glycosides and plant tissue culture **C2250006.2** To understand physicochemical properties, general methods for isolation of glycosides and type of culture, nutritional requirements in plant tissue culture.

				C2250006.3 To apply knowledge of plant tissue culture and the knowledge for commercial varieties of Glycosides. **C2250006.4** To analyse chemical constituent, substituent, adulterants, use diagnostic macroscopic and microscopic features and chemical test for glycoside and laboratory requirement in plant tissue culture.
19	**VI**	**2260001**	**Forensic Pharmacy**	**C2260001.1** To know different pharmaceutical acts, laws and rules **C2260001.2** To understand the pharmaceutical legislation and limitations in the development and marketing of pharmaceuticals and various guidelines **C2260001.3** To apply pharmaceutical ethics during pharmacy practice **C2260001.4** To analyse various acts and laws like Pharmacy act, patent act, AICTE act
20	**VI**	**2260002**	**Pharmaceutical Microbiology & Biotechnology – II**	**C2260002.1** To remember mutation, transformation, sterility testing, immunity, collection, processing and storage of wholesome blood. **C2260002.2** To understand different mutagenic agents, protoplast fusion, gene cloning, drug by biotechnology, microbial assay of analytical microbiology **C2260002.3** Application of genetic recombination ,Immunology, blood products and fermentation **C2260002.4** To analyse microbial assay, ELISA, AIDS, Blood product & Various isolation and recovery of fermentation products
21	**VI**	**2260003**	**Pharmaceutical Analysis IV**	**C2260003.1** To remember introduction of x-ray spectroscopy, scattering spectroscopy, Gas, HPLC & HPTLC chromatography and various other introduction such as GLC,IPR,ISO &AMV **C2260003.2** To understand X ray diffraction, scattering spectroscopy, basic issue of GLP, interpretation of ISO 9001:2000 and principles of these **C2260003.3** Application of x ray ,scattering spectroscopy, GC, HPTLC, radio nuclides, RIA, ELISA

				and quality management system **C2260003.4** To analyse Brag's law, GC MS ,HPTLC measurement of radioactivity ,calibration and testing
22	**VI**	**2260004**	**Medicinal Chemistry – II**	**C2260004.1** To learn the importance of drug design and different techniques of drug design **C2260004.2** To understand the chemistry of drugs with respect to their biological activity. **C2260004.3** To apply knowledge & uses of different class of organic compound based on pharmacological action. **C2260004.4** To analyse different classes of drug based on SAR study. **C2260004.5** To synthesize & assay of different classes of drug & some compound by microwave irradiation technique & uses of chem draw tool for structure and reaction
23	**VI**	**2260005**	**Pharmacology and Pharmacotherapeutics–II**	**C2260005.1** To learn the classification of various classes of drug. **C2260005.2** To understand the mechanism of action, pharmacokinetics, drug interactions of various classes of drugs **C2260005.3** To study the treatment and management. **C2260005.4** To analyse various pharmacology test or disease treatments.
24	**VI**	**2260006**	**Pharmacognosy-IV**	**C2260006.1** To learn classification, physicochemical properties of alkaloids containing drug. **C2260006.2** To understand general methods of isolation and identifications test of alkaloids and enzymes. **C2260006.3** To study the pharmaceutical aids, marine pharmacognosy and specific chemical tests. **C2260006.4** To analyse the chemical constituents, substituents, adulterants of alkaloid containing drugs. **C2260006.5** To perform microscopic and chromatographic tests of crude drugs.

25	**VII**	**2270001**	**Dosage form Design I**	**C2270001.1** To learn preformulation study of various dosage forms. **C2270001.2** To understand various pharmaceutical necessities **C2270001.3** To apply the knowledge of Biopharmaceutics in development of dosage form design. **C2270001.4** To analyse various biopharmaceutical parameters, AUC, Bioavailability study, BDDCS (Biopharmaceutical Drug Disposition Classification System). **C2270001.5** To study preformulation, Optimization, Solubility and Compatibility studies And Calculate various bioavailability parameters
26	**VII**	**2270002**	**Pharmaceutical Technology I**	**C2270002.1** To learn the definitions of sterile, liquid, semisolid dosage forms **C2270002.2** To understand the formulation ,manufacturing and packaging of sterile, liquid, semisolids, aerosols, cosmetic preparations **C2270002.3** To study the applications of various dosage forms **C2270002.4** To analyse the good manufacturing practices for pharmaceuticals **C2270002.5**
27	**VII**	**2270003**	**Medicinal Chemistry - III**	**C2270003.1** To study introduction, history, classification, nomenclature, mechanism of action, adverse effects, therapeutic uses of drugs. **C2270003.2** To understand structure activity relationship (SAR) and synthetic procedures of selected drugs and recent developments of drugs **C2270003.3** To understand the Design and Development of drugs by QSAR. **C2270003.4** To understand the Methods of Lead Discovery and De novo Drug Design and To understand Combinatorial Chemistry and Parallel Synthesis **C2270003.5** To peform synthesis, reaction monitoring

				and purification of organic compounds with characterization of synthesized product with UV and IR and understands QSAR studies of its various parameters and models.
28	**VII**	**2270004**	**Pharmacology and Pharmacotherapeutics – III**	**C2270004.1** To learn the definitions of various drugs **C2270004.2** To understand the epidemiology ,etiology,pathophysiology,signs and symptoms of various diseases **C2270004.3** To study the treatment and management of various diseases **C2270004.4** To analyse the drug interactions and failures of therapy of various drugs **C2270004.5**
29	**VII**	**2270005**	**Pharmacognosy-V**	**C2270005.1** To learn the concept of Ayurveda and its detailed study **C2270005.2** To understand the biogenesis of pharmaceutically important compounds C2270005.3 To study about natural allergens, herbal cosmetics, neutraceuticals, plant sweeteners **C2270005.4** To analyse the morphology, chemical nature, chief constituents, pharmacological categories of indigenous drugs **C2270005.5** To study morphology, microscopy TLC, preparation and evaluation of crude dugs, toxic plant and plant sweeteners and prepare herbal products
30	**VII**	**2270014**	**Instrumental and Process Validation**	**C2270014.1** To explain the principles and theory of the most used analytical equipment's in spectroscopy and chromatography.; **C2270014.2** To understand the instrumentation and operation of the most used analytical equipment in spectroscopy and chromatography **C2270014.3** Learn application and usage of various spectroscopic chromatographic techniques for organic and inorganic and natural products **C2270014.4**To interpret and communicate an analytical result and write technical reports

31	**VII**	**2270016**	**Innovations in Conventional Drug Delivery System**	**C2270016.1** To know basic concept of convention drug delivery system **C2270016.2** To understand manufacturing techniques of various dosage forms. **C2270016.3** To To study application of solid, semisolid and aerosols dosage form **C2270016.4** To evaluate conventional dosage form.
32	**VIII**	**2280001**	**Dosage form Design II**	**C2280001.1** To learn definitions of pharmacokinetics and clinical pharmacokinetics **C2280001.2** To understand design and development of oral and parentral controlled and sustained release dosage forms and novel drug delivery systems **C2280001.3** To study formulation and evaluation of various formulations **C2280001.4** To analyse dosage adjustment in patients, pharmacokinetic drug interactions and their significance
33	**VIII**	**2280002**	**Pharmaceutical Technology II**	**C2280002.1** To learn definitions, advantages and disadvantages of tablets, capsules, pharmaceutical packaging **C2280002.2** To understand the formulations of different types of tablets ,coating solutions, pellets, supercritical fluids **C2280002.3** To study the applications, processing problems and remedies in various dosage forms **C2280002.4** To analyse the evaluation and equipments used for manufacturing of tablets tablets, coating solutions, pellets, supercritical fluids **C2280002.5** To formulate and evaluate different types of tablets
34	**VIII**	**2280003**	**Medicinal Chemistry - III**	**C2280003.1** To study introduction, history, classification, nomenclature, mechanism of action, adverse effects, therapeutic uses of drugs. **C2280003.2** To understand structure activity relationship (SAR) and synthetic procedures of selected drugs and recent developments of drugs **C2280003.3** To apply the Design and Development of

				drugs by QSAR. **C2280003.4** To analyse the Methods of Lead Discovery and De novo Drug Design and Combinatorial Chemistry and Parallel Synthesis. **C2280003.5** To learn synthesis, reaction, monitoring, purification of organic compounds and characterization of synthetic compounds with the help of UV and IR.
35	**VIII**	**2280004**	**Pharmacology and Pharmacotherapeutics – IV**	**C2280004.1** To learn definitions of various classes of drugs and pharmacology of diseases **C2280004.2** To understand the epidemiology ,etiology, pathophysiology, signs and symptoms of various diseases **C2280004.3** To study the treatment and management of those diseases mentioned in the syllabus **C2280004.4** To analyse signs and symptoms , complications of the diseases or conditions **C2280004.5** To conduct bioassay of various drugs and to evaluate case studies
36	**VIII**	**2280005**	**Pharmacognosy-VI**	**C2280005.1** To learn the introduction of herbal extracts and scope of herbal drug industry **C2280005.2** To understand the isolation identification and analysis of phytoconstituents **C2280005.3** To study the recent developments of natural products for various diseases **C2280005.4** To analyse the preparation of standard plant extracts **C2280005.5** Isolation and estimation of crude drugs by TLC and column chromatography
37	**VIII**	**2280010**	**Hospital Management and Medical Tourism**	**C2280010.1** To learn the definitions and classifications of illness, service organizations, healthcare organization, hospital departments **C2280010.2** To understand the challenges and Compositions and current issues In healthcare services **C2280010.3** To study about IPR, Emergency medical services, infection control measures **C2280010.4** To analyse the role of hospital in

				healthcare, managers and their responsibilities, causes of illness, hospital waste management
38	**VIII**	**2280016**	**Current advances in Novel Drug Delivery Systems**	**C2280016.1** To learn the basics of vesicular, transdermal. Nano particulate, self-emulsifying, mucoadhesive drug delivery systems **C2280016.2** To understand the formulation of vesicular, transdermal. Nano particulate, self-emulsifying, mucoadhesive drug delivery systems **C2280016.3** To study the evaluations of vesicular, transdermal. Nano particulate, self-emulsifying, mucoadhesive drug delivery systems **C2280016.4** To analyse the innovations and polymers used in novel drug delivery systems

SMT. B.N.B. SWAMINARYAN PHARMACY COLLEGE,
N.H. 48, SALVAV-VAPI 369 191 (Gujarat)

COURSE OUTCOME

PROGRAMME -M.PHARM.

Department: Pharmaceutics

Sr. no.	Sem	Course code	Course Name	Course outcome with code
1	I	**MAT101T**	**Modern Pharmaceutical Analytical Techniques**	**PH101T.1:** Aware of the availability of vide choice of analytical techniques for routine drug analysis **PH101T.2:** Able to select appropriate analytical technique for a given analytical problem **PH101T.3:** Possess sound knowledge on theory, principle, instrumentation and use of commonly used instrumental methods. **PH101T.4:** Acquired expertise in mathematical treatment of analytical data in quantitative analysis **PH101T.5:** Acquired expertise in interpretation of analytical data to characterise drugs in qualitative analysis.
2	I	**MPH102T**	**Drug Delivery System**	**PH102T.1:** Able to get knowledge of various approaches for development of novel drug delivery systems. **PH102T.2**: able to identify selection of drugs and polymers for the development of delivering system **PH102T.3:** able to get knowledge of formulation and evaluation of Novel drug delivery systems. **PH102T.4:** Able to describe the various approaches for development of drug novel delivery systems. PH102T.5: Describe the concepts of vaccine and its drug delivery system.
3	I	**MPH103T**	**Modern Pharmaceutics**	**PH103T. 1:** Able to get knowledge of elements of preformulation and its application**.** **PH103T. 2:** Able to provide detail concepts about The Active Pharmaceutical Ingredients and their development in suitable drug delivery system.

				PH103T.3: Able to impart knowledge of Industrial Management and GMP to students so it can help them in professional life. **PH103T. 4:** To deliver knowledge of Optimization and Pilot plant scale up techniques so it can help the students during their Research. **PH103T.5:** To provide knowledge of Stability testing, Sterilization Process and Packaging of Dosage form to the students.
4	I	**MPH104T**	**Regulatory Affairs**	**PH104T.1:** Able to understand the Concepts of innovator and generic drugs, drug development process. **PH104T.2**: Able to obtain the Regulatory guidance's and guidelines for filing and approval Process **PH104T.3**: Able to Prepare of Dossiers and their submission to regulatory agencies in different countries & to study post approval regulatory requirements for actives and drug products **PH104T.4:** Able to Submit of global documents in CTD/ eCTD formats & to study Clinical trials requirements for approvals for conducting clinical trials **PH104T.5:** Able to impart knowledge of Pharmacovigilence and process of monitoring in clinical trials.
5	I	**MPH105P**	**Pharmaceutics Practical I**	**PH105P.1:** Able to perform experiments using instruments like UV Spectrophotometer, HPLC, IR spectrophotometer, and Spectroflurimetry. **PH105P.2**: Able to gain knowledge of prepare and evaluate different novel drug delivery systems. **PH105P.3:** Able to perform preformulation investigation and micromeritics characterization and Understand improving dissolution and dissolution study with kinetics**.**
6	I	**MSA106P**	**Seminar/Assignment**	**PH106P.1:** Able to understand discipline-based subject matter.

				PH106P.2: Enables deep learning of subject content**.** **PH106P.3:** Understand reading and research inquiry and present it in most constructive way.
7	II	**MPH201T**	**Molecular Pharmaceutics(Nano Tech and Targeted DDS)**	**PH201T.1:** The various approaches for development of novel drug delivery systems. **PH201T.2:** The criteria for selection of drugs and polymers for the development of NTDS. **PH201T.3**: The formulation and evaluation of novel drug delivery system. PH201T.4: Can apply knowledge of antisense molecules and aptamers in the design of novel drug delivery systems. **PH201T.5:** Possess knowledge on gene therapy in the treatment of cancer and inherited diseases.
8	II	**MPH202T**	**Advanced Biopharmaceutics & Pharmacokinetics**	**PH202T. 1:** To deliver Knowledge of basic concepts of Bio pharmaceutics and Pharmacokinetics**.** **PH202T. 2:** To teach how to utilise raw data and derive pharmacokinetic model along with it to deliver concepts of process of ADME**.** **PH202T.3:** To provide knowledge of critical evaluation of Biopharmaceutical studies including Bioequivalence. **PH202T. 4:** To deliver knowledge about designing of dosage regimen and its evaluation with the help of Biopharmaceutical and Pharmacokinetic parameters. **PH202T. 5:** To provide knowledge of potential of Clinical Pharmacokinetics Problems and application of basics of Biopharmaceutics.
9	II	**MPH203T**	**Computer Aided Drug Delivery System**	**PH203T.1:** To impart knowledge and skills necessary for computers applications in pharmaceutical research and development**.** **PH203T.2:** To know the history of computers in pharmaceutical research and development**.** **PH203T.3:**To understand concept and computational modelling of drug disposition **PH203T.4:** To study the applications of computers in

				optimization techniques in pharmaceutical formulations, preclinical and clinical development as well as computers in market analysis. **PH203T.5:** To clarify the theoretical concept of Artificial intelligence and robotics as well as computational fluid dynamics in pharmaceutical field.
10	II	**MPH204T**	**Cosmetic and Cosmeceuticals**	**PH204T.1:** Able to study key ingredients used in cosmetics and cosmeceuticals. **PH204T.2:** Able to obtain knowledge of Key building blocks for various formulations. **PH204T.3:** To study Current technologies in the market. **PH204T.4:** Able to study various key ingredients and basic science to develop cosmetics and cosmeceuticals. **PH204T.5:** Able to get Scientific knowledge to develop cosmetics and cosmeceuticals with desired Safety, stability, and efficacy.
11	II	**MPH205P**	**Pharmaceutics Practical II**	**PH205P.1:** Acquired expertise in preparation and evaluation of various cosmetics **PH205P.2:** Can develop new formulation with optimal performance using chemometric, statistical tools **PH205P.3**: Capable carrying out investigations related to pharmacokinetic of drug candidates.
12	II	**MSA206P**	**Seminar/Assignment**	**PH206P.1:** Able to understand discipline-based subject matter. **PH206P.2:** Enables deep learning of subject content. **PH206P.3**: Understand reading and research inquiry and present it in most constructive way.
13	III	**MRM301T**	**Research Methodology and Biostatistics***	**PH301T.1:** Able to formulate research questions and develop sufficiently coherent research design **PH301T.2:** Acquired basic understanding of different types of research data and documentation of data. **PH301T.3**: Have the preliminary knowledge on data collection in clinical research

				PH301T.4: To develop independent thinking for critically analyzing research reports. **PH301T.5:** Can use different statistical tool for the research data analysis using software**.**
14	III	**MJC302P**	**Journal Club I**	**PH302P.1:** Able to collect relevant literature and critically evaluate them. **PH302P.2**: Able to make a PPT presentation scientifically and deliver the same. **PH302P.3:** Able to get knowledge and can involve effectively in post presentation discussion.
15	III	**MDP303P**	**Discussion/ Presentation (Proposal Presentation)**	**PH303P.1:** Able to Provide an in-depth exploration of a topic of special interest. **PH303P.2:** Able to explain and apply relevant theories, concept in the chosen area**.** **PH303P.3:** Able to apply various research techniques, find suitable sources of information, and acknowledge them in the research project**.**
16	III	**MRW304P**	**Research Work - Dissertation Phase I**	**PH304P.1:** Able to Identify problems in their research, provide strategy to analyse. **PH304P.2:** Able to Learn a research topic independently using the scientific literature with the science knowledge they obtained and the skills they developed in the program. **PH304P.3:** Able to document the research work in the form of thesis in an acceptable format**.**

COURSE OUTCOME

PROGRAMME -M.PHARM.

Department: Pharmaceutical Quality Assurance

Sr. no.	Sem	Course code	Course Name	Course outcome with code
1	I	**MAT101T**	**Modern Pharmaceutical Analytical Techniques**	**QA101T.1:** Aware of the availability of vide choice of analytical techniques for routine drug analysis. **QA101T.2:** Able to select appropriate analytical technique for a given analytical problem. **QA101T.3:** Possess sound knowledge on theory, principle, instrumentation and use of commonly used instrumental methods. **QA101T.4:** Acquired expertise in mathematical treatment of analytical data in quantitative analysis. **QA101T.5:** Acquired expertise in interpretation of analytical data to characterise drugs in qualitative analysis.
2	**I**	**MQA102T**	**Quality Management System**	**QA102T.1:** The student will understand the quality parameters and quality attribute in Pharmaceutical industry sectors. **QA102T.2:** By studying and practicing the guidelines ISO and other regulatory agencies student will predicts the current need of changes. **QA102T.3:** It provides the idea in the customers' expectations in the quality pharmaceutical product. **QA102T.4:** Student will know the importance of the quality of medicines in the public. **QA102T.5:**The subject will afford methodology in the regulatory body requirements for the import

				and export pharmaceutical products
3	I	**MQA103T**	**Quality Control and Quality Assurance**	**QA103T.1:** To know the importance of quality with ISO management systems. **QA103T.2:** To understand tools for quality improvement and analysis of issues in quality. **QA104T.3:** Quality evaluation of pharmaceuticals. **QA103T.4:** To understand Statistical approaches for quality. **QA103T.5:** To understand stability testing of drug and drug substance.
4	I	**MQA104T**	**Product Development and Technology Transfer**	**QA104T.1:** To apply the knowledge to develop new procedures of their own design of Pilot layouts **QA104T.2:** To understand the Quality by design practices of sterile and non-sterile dosage forms. **QA104T.3:** To understand the practices of packaging technology. **QA104T.4:** Student shall understand the Regulatory requirements in drug development stages. **QA104T.5:** Students shall understand the phase of technology transfer.
5	I	**MQA105P**	**Pharmaceutical Quality Assurance Practical I**	**QA105P.1 :** Estimation of process capability drug in pharmaceutical by using modern analytical techniques **QA105P.2:** In process and finished product quality control tests for tablets, capsules, parenteral and semisolid dosage forms **QA105P.3:** Development of Stability study protocol for pharmaceuticals and carry out pre formulation study for successful formulation of pharmaceutical.

6	I	**MSA106P**	**Seminar/Assignment**	**QA106P.1:** Able to understand discipline-based subject matter. **QA106P.2:** Enables deep learning of subject content. **QA106P.3:** Understand reading and research inquiry and present it in most constructive way**.**
7	II	**MQA201T**	**Hazards and Safety Management**	**QA201T.1:** To Understand about basic knowledge about the environment and its problems among learners. **QA201T.2:** To Know about an attitude of concern for the industry environment and ensure safety standards in pharmaceutical industry. **QA201T.3:** To understand about comprehensive knowledge on the safety management **QA201T.4:** To know about clear mechanism and management in different kinds of hazard managements system**.** **QA201T.5:** To know about method of Hazard assessment, procedure, methodology for provide safe industrial atmosphere.
8	II	**MQA202T**	**Pharmaceutical Validation**	**QA202T.1:** The concept of calibration, qualification and validation**.** **QA202T.2:** The qualification of various equipment and instruments**.** **QA202T.3:** Process validation of different dosage form. **QA202T.4:** Validation of analytical method for estimation of drug. **QA202T.5:** Cleaning validation of equipment used in manufacturing of Pharmaceuticals.
9	II	**MQA203T**	**Audits and Regulatory Compliance**	**QA203T.1:** To learn about audit objectives, deficiencies and their management and preparation of audit report. **QA203T.2:** Understand the role of quality systems and audits in pharmaceutical manufacturing environment and framing a

				checklist for auditing pharmaceutical industries. **QA203T.3:** Learn the requirements for auditing vendors supplying various materials and equipment. **QA203T.4:** Understand the audit of a microbiological laboratory. **QA203T.5:** Learn the auditing of quality assurance systems and engineering systems in a manufacturing plant.
10	II	**MQA204T**	**Pharmaceutical Manufacturing Technology**	**QA204T.1:** To impart professional knowledge and skills to develop an ability to perform by learning the basics of plant layout and production planning. **QA204T.2:** To learn the basics of aseptic process technology in pharmaceutical manufacturing **QA204T.3:** To learn process of sterile and non-sterile manufacturing technologies **QA204T.4:** To learn various techniques and procedures of packaging and storage of drugs with quality aspects of pharmaceutical containers and closures. **QA204T.5:** To impart knowledge on Quality by design (QbD) and process analytical technology**.**
11	II	**MQA205P**	**Pharmaceutical Quality Assurance Practical II**	**QA205P.1:** Able to Interpret NMR, Mass and IR spectra of various organic compounds. Acquire skills to design important documents like checklists. **QA205P.2:** Able to perform bioanalytical methods also Skill to qualify equipments. To get skills to perform analysis of actives and contaminants. Understand concepts of QbD, PAT. **QA205P.3:** Able to analyse adulterants used in herbalproducts, cosmetics and food products using modern analytical methods.

12	II	**MSA206P**	**Seminar/Assignment**	**QA206P.1:** able to understand discipline-based subject matter. **QA206P.2:** enables deep learning of subject content. **QA206P.3:** understand reading and research inquiry and present it in most constructive way.
13	III	**MRM301T**	**Research Methodology and Biostatistics**	**QA301T.1:** Able to formulate research questions and develop a sufficiently coherent research design **QA301T.2:** Acquired basic understanding of different types of research data and documentation of data. **QA301T.3**: Have the preliminary knowledge on data collection in clinical research **QA301T.4:** To develop independent thinking for critically analyzing research reports. **QA301T.5:** Can use different statistical tool for the research data analysis using software**.**
14	**III**	**MJC302P**	**Journal Club I**	**QA302P.1:** Able to collect relevant literature in advanced quality assurance. **QA302P.2:** Learnt to make a PPT presentation scientifically. **QA302P.3:** Able to involve effectively in post presentation.
15	III	**MDP303P**	**Discussion/ Presentation (Proposal Presentation)**	**QA303P.1:** Able to select research topic through literature survey. **QA303P.2:** Able to design, planning of research methodology. **QA303P.3:** Able to Present the selected research proposal convincingly.
16	III	**MRW304P**	**Research Work - Dissertation Phase I**	**QA304P.1**: can be able to carry out research work scientifically following research ethics. **QA304P.2:** Able to collect date, interpret them using appropriate statistical tools and arrive at conclusion scientifically. **QA304P.3:** Able to document the research work

				in the form of thesis in an acceptable format.
17	**IV**	**MJC401P**	**Journal Club II**	**QA401P.1:** Able to approach the analysis of the various types of articles. **QA401P.2:** Able to understand the basis of hypothesis testing**.** **QA401P.3:** Able to understand how results of study can be used in pharmaceutical research and future aspect.
18	**IV**	**MDP402P**	**Discussion/ Presentation**	**QA402P.1:** Able to select research topic through literature survey. **QA402P.2:** Able to design research method and find out rationale with justify it. **QA402P.3:** Able to Present the selected research proposal convincingly**.**
19	**IV**	**MRW403P**	**Research Work - Dissertation Phase II**	**QA403P.1:** Able to select research topic and research work for presentation through literature survey. **QA403P.2:** Able to design research method and find out rationale with justify it. **QA403P.3:** Able to Present the selected research proposal convincingly.