St JAMES' COLLEGE OF PHARMACEUTICAL SCIENCES, ST JAMES' MEDICAL ACADEMY, RIVER BANK, CHALAKUDY, THRISSUR-680307

COURSE OUTCOME

Programme : B.Pharm

No	Name of the Course	Course Outcome
1.	BP101T Human Anatomy and Physiology-I	CO 1: Students would have attained knowledge of structure and functions of cell, skeletal, muscular, cardiovascular system of the human body. CO 2: Explain various homeostatic mechanisms and their imbalances. CO 3: Describe the coordinated working pattern of various systems. CO 4: Able to identify the various tissues, bones and organs of different systems of human body. CO 5: Acquired knowledge of anatomy and physiological role of various systems in human body
2.	BP102T Pharmaceutical Analysis I	CO1: Describe the principles of volumetric and electro chemical analysis CO2: Explain various means of expressing concentration. CO3: Can perform preparation and standardization of volumetric solution CO4: Carryout various volumetric and electrochemical titrations CO5: Describe the sources of errors in analysis and methods to minimize them
3.	BP103T Pharmaceutics I	CO1: Describe the history of pharmacy profession CO2: Aware of their professional role in the healthcare system CO3: Calculate the required quantities of ingredients, Prepare & dispense various dosage forms CO4: Can handle the prescription in a professional way CO5: Can identify incompatibilities in prescription
4.	BP104T Pharmaceutical Inorganic Chemistry	CO 1: Explain the Sources of impurities and methods to determine the impurities in inorganic drugs and pharmaceuticals CO 2: Prepare and Identify different inorganic drugs. CO 3: Knows the medicinal and pharmaceutical use of inorganic compounds. CO 4: Explain different theories of acids - bases CO 5: Describe the properties, storage condition and application

		of radiopharmaceuticals.
5.	BP105T Communication Skills	CO1: Understand the behavioral needs of Pharmacist to provide efficient Pharmaceutical service to patients and society CO2: Communicate effectively with heath care team members, patients and public CO3: Work in a team efficiently CO4: Can face interview with confidence CO5: Posses inclination to develop leadership qualities
6.	BP106RBT Remedial Biology	CO1: Classify and explain salient features of kingdoms of life CO2: Know the basic components of anatomy & physiology of plant CO3: Know the basic components of anatomy & physiology of animal with special reference to human CO5: Describe Various tissue organ systems in animals CO5: Describe various tissue system systems in plant
	BP106MT Remedial Mathematics	CO1: Apply mathematical concepts and principles to perform computations for Pharmaceutical Sciences. CO2: Solve different types of problems by applying theory. CO3: Communicate mathematical knowledge and understanding to help in the field of Clinical Pharmacy CO4: Perform abstract mathematical reasoning CO5: Appreciate the important application of mathematics in Pharmacy
7.	BP107P Human Anatomy and Physiology-I	CO 1: Can carry out hematological experiments. CO 2 : Can determination of blood pressure using sphygmomanometer. CO 3: Acquired practical knowledge of human gross and microscopic anatomy
8.	BP108P Pharmaceutical Analysis I	CO 1 : Can Carry out various volumetric and electrochemical titrations CO 2 : Can analyze experimental results and arrive at conclusion CO 3 :Can prepare and standardize volumetric solutions.
9.	BP109P Pharmaceutics I	CO 1: Able to prepare & dispense solid, liquid and semisolid dosage forms. CO 2: Acquired knowledge of choosing proper container for pharmaceutical products and labeling. CO3 : Able to prepare suppositories by using suppository mould.

10.	BP110T Pharmaceutical Inorganic Chemistry	CO1:Determine the impurities and prepare medicinally important inorganic compounds. CO2: Identify various inorganic compounds CO3: Perform test for purity as per Indian Pharmacopoeia
11.	BP111T Communication Skills	CO 1 : Got experience in Listening Comprehension / Direct and Indirect Speech. CO2 : Developed Effective verbal Communication and Writing Skills. CO 3 : Acquired E−Mail etiquette Presentation Skills.
12.	BP112RBT Remedial Biology	CO 1: Can determine blood group, blood pressure, Identify bones. CO 2: Can perform Section cutting techniques. CO 3: Can do Microscopic study and identification of plant tissues.
13.	BP201T Human anatomy and Physiology-II	CO 1: Describe structure and functions of various organs of different systems of human body. CO 2: Describe various homeostatic mechanisms and their imbalance. CO 3: Describe energy and metabolism. CO 4: Elaborate on interlinked mechanisms in the maintenance of normal functioning of human body. CO 5: Acquired basic knowledge on genetics
14.	BP202T Pharmaceutical Organic Chemistry I	CO 1: Can classify organic compounds with examples CO 2: Can write IUPAC name from structure of a compound and write structure from IUPAC name. CO 3: Explain reaction, mechanism, reactivity and orientation of elimination reaction, nucleophilic substitution reaction and addition reaction CO 4: Appreciate the importance of reaction intermediates CO 5: Describe preparation and reactions of various classes of aliphatic compounds.
15.	BP 203T Biochemistry	CO 1: Describe cell organales and bioenergetics. CO 2: Appreciate catalytic role of enzyme, importance of enzyme inhibitors in design of new drugs and therapeutic & diagnostic applications of enzymes. CO 3: Acquired knowledge on metabolism of biomolecules in physiological and pathological conditions. CO 4: Explain the genetic organization of mammalian genome and synthesis of DNA, RNA and proteins. CO 5: Acquired knowledge in qualitative and quantitative

		estimation of the biomolecules in body fluids.
16.	BP 204T Pathophysiology	CO 1: Describe the etiology and pathogenesis of selected disease states. CO 2: Differentiate the signs and symptoms for each disease. CO 3: Diagnosis disease from the given objective and subjective data of the patient. CO 4: Interpret the laboratory values and elucidate about the disease status. CO 5: Understand the complications of the diseases.
17.	BP205T Computer Applications in Pharmacy	CO1: Acquired Knowledge on mathematics and computing fundamentals as applicable to Pharmaceutical field CO2: Know the types and applications of databases in pharmacy. CO3: Integrate and apply efficiently the contemporary IT tools to all pharmaceutical related activities. CO4: Acquired Knowledge on the role of bioinformatics in drug discovery CO5: Can Analyze and interpret laboratory data and information data using software
18.	BP 206 T Environmental Sciences	CO1: Acquired basic knowledge of environment and its related problems. CO2: Developed concern for the environment. CO3: Ready to participate in environment protection and environment improvement activities. CO4: Acquired skills to identify and solve environment problems. CO5: Strive to attain harmony with Nature.
19.	BP207P Human anatomy and Physiology	CO 1: Can identify different organs, tissues and cells of various human physiological systems. CO 2: Acquired knowledge of functioning of different systems CO 3: Perform heamatological experiments.
20.	BP208P Pharmaceutical Organic Chemistry I	CO 1: Perform the qualitative analysis of unknown organic compounds with different functional groups. CO 2: Construct the molecular models of simple organic compounds. CO 3: Perform the synthesis and purification of organic compounds with one step reaction.

21.	BP209P Biochemistry	Student will be able to: CO 1: Perform the qualitative analysis of urine. CO 2: Perform the quantitative estimation of the biomolecules in body fluids. CO 3: Perform the preparation of buffer and the measurement of pH.
22.	BP210P Computer Applications in Pharmacy	CO 1: Create a HTML web page to save personal information. CO 2: Retrieve the information of a drug and its adverse effects using online tools. CO 3: Use the MS Office tools to store the patient informations.
23.	BP301T Pharmaceutical Organic Chemistry	CO1: Can explain the chemistry of aromatic hydrocarbons, alicyclic compounds, phenols and amines including structure, preparation and reactions including mechanism, reactivity and orientation of electrophilic aromatic substitution CO2: Have the knowledge of acidity, basicity of aromatic compounds. CO3: Account for reactivity/stability of aromatic hydrocarbons and cycloalkanes. CO4: Can design quality control of oils and fats based on physico-chemical properties CO5: Can describe the stereochemistry of cycloalkanes
24.	BP302T Physical Pharmaceutics I	CO1: Have knowledge of solubility, partition coefficient and their importance in formulation and drug action CO2: Can describe solid state, crystallinity, solvates and polymorphism and their influence on formulation CO3: Associate the concept of phase equilibrium and their role in pharmaceutical Unit Operation CO4: Have knowledge of buffers and appreciate the importance of pH and buffers in manufacturing dosage forms CO5: Acquired knowledge of complexation and protein binding with special reference to and their effect on drug action
25.	BP303 T Pharmaceutical Microbiology	CO1: Learnt methods of identification, cultivation and preservation of various microorganisms CO2: Have theoretical knowledge to perform microbial limit tests, preservative efficacy test & standardization processes CO3: Can describe sterilization, sterilization methods and sterility test for different samples. CO4: Understand the cell culture technology and its

		applications in pharmaceutical industries. CO5: Know various culture media and their use.
26.	BP304T Pharmaceutical Engineering	CO1: Describe processes involved in pharmaceutical manufacturing and material handling techniques CO2: Acquired knowledge of various unit operations used in Pharmaceutical process. CO3: Acquired knowledge of various machineries used for unit operation CO4: Have knowledge of material selection for Pharmaceutical plant CO5: Knows preventive methods used for corrosion control in Pharmaceutical industries.
27.	BP305P Pharmaceutical organic chemistry II	CO 1: Can determine analytical constants of fats and oils, and its purity. CO 2: Can Synthesize organic compounds using specific name reactions of benzene. CO 3: Can purify crude synthetic organic compounds by recrystallization.
28.	BP306P Physical pharmaceutics I	CO 1: Able to perform solubility & partition coefficient of drugs CO 2: Able to determine derived properties of powder sample like bulk density, angle of repose and particle size CO 3: Able to determine the pH of sample solution
29.	BP307 P Pharmaceutical microbiology	CO 1: Conversant with operation and maintenance of compound microscope CO 2: Able to identify micro organism CO 3: students are able to perform microbial limit tests, preservative efficacy test & standardization processes
30.	BP308P Pharmaceutical Engineering	CO 1: Able to operate various size reducing equipment's (ball mill, hammer mill,) CO 2: Able to perform humidity determination by dew point and psychometric methods. CO 3: Able to perform selected unit operation
31.	BP 401T Pharmaceutical Organic Chemistry III	CO 1: Understand the method of preparation and properties of heterocyclic compounds. CO 2: Can explain the stereochemistry of organic compounds and their significance. CO 3: Can describe stereospecific and stereoselective reactions and their importance in drug synthesis CO 4: Know the medicinal uses and other applications of

		heterocyclic compounds. CO 5: Describe detailed mechanisms for specified name reactions.
32.	BP402T Medicinal Chemistry I	CO 1: Understand the chemistry of drugs with respect to their pharmacological activity. CO 2: Understand the drug metabolism, therapeutic uses and adverse effects of drugs. CO 3: Know the SAR and QSAR analysis of specified classes of drugs. CO 4: Describe the chemical synthesis, mechanism of action and uses of the selected drugs. CO 5: Have knowledge of preparations and assay of medicinally important drugs.
33.	BP403T Physical Pharmaceutics II	CO1: Understand various physicochemical properties of drug molecules in the designing the dosage forms CO2: Know the principles of chemical kinetics & use them for stability testing and determination of expiry date of formulations CO3: Demonstrate use of physicochemical properties in the formulation development and evaluation of dosage forms. CO4: Can describe the flow behavior of fluids and concept of complexation CO5: Developed knowledge of surface phenomenon, interfacial phenomenon and thermodynamics in relation to suspensions, emulsions and colloidal formulation
34.	BP404TPharmacology I	CO1:Acquired knowledge on Pharmacological actions of different categories of drugs CO2: Learnt the mechanism of drug action at organ system, sub cellular and macromolecular levels. CO3: Can 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: Can correlate pharmacology with other bio medical sciences.

35.	BP405T Pharmacognosy and Phytochemistry I	CO1: Have the knowledge of natural sources of drugs, classification of natural drugs and quality control of natural drugs CO2: Acquired knowledge of Cultivation, Collection, Processing and storage of drugs of natural origin CO3: Possess the basic knowledge on plant tissue culture as a source of drugs and tissue culture techniques CO4: Can elaborate definition, classification, properties, use and test for identification of primary and secondary metabolites of plants. CO5: Can describe the biological source, chemical nature and uses of natural fibres, Hallucinogens, Teratogens and Natural allergens
36.	BP406 P Medicinal Chemistry I	CO 1: Able to synthesize different medicinally important compounds and purify them. CO 2: Can predict physicochemical properties of different drugs using drug design software's. CO 3: Able to perform quality control tests for drugs as per pharmacopoeia.
37.	BP407P Physical Pharmaceutics Ii	CO 1: Able to do determine physic – chemical properties of solides, liquids and semisolids using simple as well as sophisticated instruments CO 2: Able to determine their rate constants of chemical reaction CO 3: Carry our accelerated stability studies and determine shelf life
38.	BP408 P. Pharmacology- I	CO1: Acquired basic skills in the use of instruments used in experimental Pharmacolgy, experimental animals and common Pharmacology laboratory techniques. CO 2: Able to calculate dose required for Pharmacological and toxicological investigation using animals CO 3: Able to carry out experiments using isolated organs like chick ileum
39.	BP409 P. Pharmacognosy And Phytochemistry I	CO 1: Able to carryout phytochemical investigations by chemical and microscopic methods CO 2:Able to carry out experiments based on quantitative microscopy CO 3: Can determine physic-chemical investigation of herbal drugs and interpret the results to decide the purity of the sample
40.	BP501T.	CO1: Have understood chemistry of selected categories of

	Medicinal Chemistry II	drugs with respect to their pharmacological activity. CO2: Acquired knowledge of metabolic pathways, therapeutic uses and adverse effects of selected categories of drugs. CO3: Know the SAR of specified classes of drugs. CO4: Possess knowledge of chemical synthesis, mechanism of action and uses of the selected drugs. CO5: Have knowledge of preparations and assay of medicinally important drugs.
41.	BP502T. Formulative Pharmacy	CO1: Appreciate the preformulation studies and their importance in formulation development CO2: Acquired knowledge of various pharmaceutical dosage forms and their manufacturing techniques. CO2: Learnt the concept, types, pharmacopeial specifications, techniques quality control used in different dosage forms. CO3: Able to discuss development, Pharmacopoeial evaluation and labeling of SVPs, LVPs, and ophthalmic formulation CO4: Have developed knowledge on concepts of controlled drug delivery system CO5: Acquired basic knowledge on cosmetics, aerosols and packaging with respect to formulation and manufacturing
42.	BP503T. Pharmacology II	CO1:Acquired broad knowledge on classification, and therapeutic effects for selected categories of drugs CO2: Capable of providing information on clinical uses, side effects and contraindications of selected categories of drugs. CO3: understood the mechanism of action of selected drug and its relevance in the treatment of different diseases CO4: Possess knowledge on pharmacokinetics of selected categories of drugs CO5:Acquired knowledge on the concept, type and techniques of bioassay
43.	BP504T. Pharmacognosy and Phytochemistry II	CO1: Acquired knowledge of metabolic pathways and ways to investigate them CO2. Possess the knowledge on the chemical and pharmacological aspects of selected secondary metabolites CO3: Acquired understanding on modern extraction techniques, characterization and identification of the herbal drugs and phytoconstituents CO4: Can elaborate isolation and identification techniques of phytoconstituents.

		CO5: Acquired knowledge on modern methods of isolation and characterization of phyto-constituents.
44.	Bp 505 T. Pharmaceutical Jurisprudence	CO1:Knows various acts and rules governing activities related to manufacture , stocking and sale of drugs in India CO2:Acquired knowledge related to legislations controlling pharmacy education and practice of pharmacy profession in India CO3:Appreciate the role of intellectual property rights on the drug development and use in India CO4:Sound knowledge of professional ethics to be adhered to, CO5:Aware of right to information and prevention of cruelty to animals
45.	BP506P.Formulative Pharmacy	CO 1: Able to prepare solid dosage forms and perform in process quality control test for them CO 2: Able to prepare the various types of cosmetics and carry out their performance evaluation CO 3: Can prepare SVPs, LVPs, and ophthalmic preparations. and carry out sterility test
46.	BP507P. Pharmacology II	CO 1: Able to Conduct experiments on isolated tissue preparation. CO 2. Can interpret the effect of spasmogens and spasmolytics on tissue CO 3. Able to demonstrate drug effects using experimental pharmacology software.
47.	BP508P Pharmacognosy and Phytochemistry III	CO 1: Able to isolate some plant constituents. CO 2: Able to perform crude drug evaluation by Morphological and microscopical evaluations. CO 3: The students can identify plant products by using chemical test.
48.	BP601T Medicinal Chemistry III	CO1: Appreciate importance of drug design & different techniques of drug design CO2: Able to describe the relation between chemistry of drugs and their biological activity. CO3: Know the metabolism, SAR, therapeutic uses and adverse effects of antibiotics and antimicrobial agents. CO4: Possess knowledge on preparation and assay of different medicinally important compounds. CO5: Can assess physicochemical properties of different drugs using drug design software
49.	BP602T Pharmacology III	CO1: Appreciate the correlation of pharmacology with related medical sciences.

		CO2: Have basic knowledge about currently using drugs and its classification. CO3: Has in depth knowledge on the principles of toxicology, the toxicity profile of drugs and chronopharmacology. CO4: Technical and experimental methodologies required to conduct research in the field of animal study. CO5: Sound knowledge on principles & chemotherapy infectious disease.
50.	BP603T Herbal Drug Technology	CO1: Acquired knowledge of herbal drug industry and its functi quality of raw material, guidelinning CO2: Have knowledge on quality control of herbal drugs, herbal cosmetics, natural sweeteners and neutraceuticals. CO3: Can practice Good Manufacturing Practices (GMP), organic farming, processing and storage of herbal drugs. CO4: Can follow WHO and other regulatory guidelines for evaluation of herbal drugs. CO5: The students are able to know patenting aspects of herbal drugs.
51.	BP604T Biopharmaceutics and Pharmacokinetics	CO1: Acquired basic concepts in biopharmaceutics and pharmacokinetics. CO2: Can assess the effect of Pharmacokinetic (ADME) parameters on the biological effects of the drug. CO3: Can design and evaluate dosage regimens of the drugs using pharmacokinetic and biopharmaceutic parameters. CO4: Able to calculate various pharmacokinetic parameters from plasma and urinary excretion data applying compartment modeling and model independent methods. CO5: Capable of participating Bioavailability and Bioequivalence studies of new drugs or dosage forms.
52.	BP605T Pharmaceutical Biotechnology	CO1: Know the basic principles of genetic engineering and enzyme technology. CO2: Have knowledge of principles of biosensors and protein engineering in Pharmaceutical Industry CO3: Can explain the concepts of rDNA technology and its applications CO4: Can describe the concept of immunity and production of vaccine, hybridoma technology and understand hypersensitivity reaction CO5: Acquired knowledge on the principles of fermentation its design and production of pharmaceutical products

53.	BP606T Quality Assurance	CO1: Can follow the cGMP protocol in pharmaceutical industry set up CO2: Appreciate the importance of documentation, Stability testing of drug and drug substances, Statistical approaches for quality control CO3: Has the knowledge of quality certifications applicable to Pharmaceutical industries CO4: Can involve in QA & QC activities in Pharmaceutical Industry CO5: Have understood ISO management systems and Tools for quality improvement,
54.	BP607 P Medicinal Chemistry III	CO 1 : Able to synthesize different medicinally important compounds and purify them. CO 2: Can predict physicochemical properties of different drugs using drug design software's. CO 3 : Able to perform quality control tests for drugs as per pharmacopoeia.
55.	BP608P Pharmacology III	CO 1: Use Statistical methods for interpretation of experimental results. CO 2: Demonstrate effect of drug using computer models. CO 3: Can Estimate biochemical arameters in body fluids.
56.	BP609 P Herbal Drug Technology	CO1:Aable to prepare herbal formulation and evaluate their quality CO 2: The students can prepare herbal cosmetics and evaluate their quality CO 3: can perform monograph analysis of crude drugs.
57.	BP701T Instrumental Methods of Analysis	CO1: Have knowledge of various instrumental methods available for drug analysis and their use CO2: Can describe the interaction of matter with electromagnetic radiations and its applications in drug analysis. CO3: Appreciate the importance of separation science in the qualitative and quantitative analysis of drugs CO4: Acquired sound knowledge on working principle, instrumentation and application of different instrumental methods CO5: Capable of interpreting the data obtained from analytical instruments for qualitative and quantitative analysis
58.	BP702T Industrial Pharmacy	CO1: Acquired knowledge on pilot plant and scale up of different solid, liquid orals and semi solid pharmaceutical

		dosage forms CO2: Understood the process of technology transfer from laboratory scale to commercial batch CO3: Know the international regulatory concepts, in different developed countries, including manufacturing approval process CO4: Aware of various quality systems related to Pharmaceutical Industry and their certification process CO5: Acquired knowledge of approval process and regulatory requirements for drug products in India
59.	BP703T Pharmacy Practice	C O 1: Aware of various drug distribution methods, pharmacy stores management and inventory control in a hospital. C O 2: Can interpret selected laboratory results of specific disease states, monitor drug therapy of patient, identify drug related problems and detect and assess adverse drug reactions C O 3: Able to provide pharmaceutical care services C O 4: Can do patient counselling in community pharmacy; C O 5: appreciate the concept of Rational drug therapy
60.	BP704T Novel Drug Delivery System	CO1: Understood the difference between conventional drug delivery system and novel drug delivery system along with their merits and limitations CO2: Acquired knowledge about the principles and technology used in the design of various novel drug delivery system CO3: Learnt the criteria for selection of a drugs and polymers for the development of novel drug delivery systems. CO4: Can performance evaluation of Novel drug delivery systems CO5: Able to describe the various approaches for development of drug delivery systems.
61.	BP705 P Instrumental Methods of Analysis	CO1: Able to conduct the chromatographic separation and spectroscopical Analysis of drugs. CO2: Able to operate HPLC, IR, UV, Visible, Spectro fluorimetry, Paperchromatography, TLC, Columnchromatography, Electrophoresis. CO3: Can Assess sources of error in chemical and instrumental analysis.
62.	BP706 PS Practice School	CO1: Exposed to real life professional activities in industry / hospital / community pharmacy set up CO2: Observed various activities of industry / hospital / community pharmacy

		CO3: Obtained basic training in the day to day activities of industry / hospital / community pharmacy CO4: Got experience of documentation of observation and report writing CO5; Learnt work culture of industry / hospital / community pharmacy
63.	BP801T Biostatistics and Research Methodology	CO1: Have fundamental knowledge on selection of research topic. CO2: Acquired basic understanding of different types of research data and documentation of data. CO3: Have the preliminary knowledge on data collection in clinical research CO4: Can design sampling protocol for research CO5: Can use different statistical tool for the research data analysis using software
64.	BP802T Social and Preventive Pharmacy	CO 1: Acquired high consciousness /realization of current issues related to the prevention and control of communicable and non-communicable diseases. CO 2: Able to counsel general public about hygiene, nutrition health, balanced diet, deficiencies and its prevention CO 3: Fully aware of and actively participate in national health programs. CO 4: Acquired expertise to participate in Community services related to rural, urban and school health CO5: Evaluate alternative ways of solving problems related to health and pharmaceutical issues
65.	BP803ET Pharma Marketing Management	CO 1: Acquired basic knowledge on Definition, general concepts, and scope of marketing CO 2: Appreciate the role of product life cycle, product portfolio analysis, product positioning, Product branding, packaging and labeling decisions, CO 3: Acquired theoretical knowledge on strategies in sales promotion CO 4: Possess knowledge on pharmaceutical marketing channels and role of Medical Representatives . CO 5: Got an understanding of drug pricing policies in India.
66.	BP804ET Pharmaceutical Regulatory Science	CO 1: Aware of new drug discovery process with reference to regulatory perspective CO 2: Acquired fundamental knowledge required to work in

		International Regulatory Affairs dept of Pharmaceutical Industry CO 3: Possess in depth knowledge on regulatory approval process in India. CO 4: Capable of involving in clinical trial process CO 5: Can involve in documentation process of Pharmaceutical Induatry
67.	BP805ET Pharmacovigilence	CO 1: Aware of pharmacovigilance and Pharmacovigilance Program of India (PvPI). CO 2: Posses knowledge on different pharmacovigilance methods CO 3; Able to do detect, assess, and report of ADRs CO 4: Capable using various statistical methods for safety data interpretation during drug development. and Drug safety evaluation in special population CO 5: Possess the knowledge of CDSCO and ICH guidelines for pharmacovigilance and CIOMS requirements for ADR reporting.
68.	BP806ET Quality Control and Standardization of Herbals	CO 1: Able to carry out quality control of herbal drugs as per WHO guidelines CO 2: Acquired basic knowledge to work in do quality assurance department of herbal drug industry CO 3: Possess knowledge on the regulatory approval process and their registration in Indian and international markets CO 4: Aware of EU and ICH guidelines for quality control of herbal drug. CO 5: Acquired knowledge of cGMP, GAP and GLP practiced in traditional medicines manufacturing.
69.	BP807ET Computer Aided Drug Design	Can use molecular modeling software in the design of novel drug-like molecules. Have the understanding of strategies to design &develop new drug like molecules using CADD and QSAR methods. Developed awareness of pharmacophore and generation of 3D structure of proteins. Possess good understanding of *in silico* virtual screening protocols and informatics method in drug design
70.	BP808ET Cell and Molecular Biology	CO1: Aare of the history and chemical foundations of cell biology CO2: Able to summarize the cellular functioning and composition.

		CO 3: Possess understanding of protein structure and DNA properties CO 4: Able to describe the cell cycle CO 5: Able to describe the basic molecular genetic mechanism.
71.	BP809ET Cosmetic Science	CO 1: Can describe Cosmetics and Cosmeceuticals as per Indian and EU regulations CO 2: Aware of the role of cosmetic excipients and building blocks in the formulation of cosmetics CO 3: Acquired knowledge about the structure and function of the skin, hair, teeth and gums. CO 4: Can discuss the fundamentals of sun protection and the formulation of Sunscreens, antiperspirants and deodorants CO 5: Can formulate cosmetics for skin care and hair care as well as dental and oral care CO 6: Can design various cosmetics and cosmeceuticals
72.	BP810ET Experimental Pharmacology	CO 1: Can demonstrate various screening methods used in preclinical studies. CO 2: Appreciate the importance of biostatistics and research methodology in experimental pharmacology. CO 3: Can design and execute a research hypothesis independently in the field of pharmacological investigation using animals. CO 4: Know handling of various commonly used laboratory animals. CO 5: Aware about CPCSEA guidelines.
73.	BP811ET Advanced Instrumentation Techniques	CO1: Have good understanding of the basic concept and instrumentation of NMR, MS, X-ray crystallography, Thermal methods, Radio immunoassays and extraction technique for identification, and characterization of compounds. CO2: Possess indepth knowledge on principles and instrumentation of hyphenated techniques like LCM/MS, GC-MS/MS, HPTLC-MS CO3: Able to perform quantitative & qualitative analysis of drugs using the above-mentioned instruments CO4: Able to perform the calibration and validation of UV, IR,HPLC as per ICH guidelines CO5: Understand the principle of and able to perform the solid phase and liquid phase extractions.
74.	BP812ET	CO 1: Can describe the need of supplements by the different

	Dietary Supplements and Nutraceuticals	group of people to maintain healthy life. CO 2: Aware of the outcome of deficiencies in dietary supplements. CO 3: Appreciate the components in dietary supplements and their function. CO 4: Developed awareness about the regulatory and commercial aspects of dietary supplements including health claims. CO 5: Acquired knowledge about use of plant constituents in preventing the diseases and promoting the health.
75.	BP813PW Project Work	CO1: Know the source of literature and literature survey CO2: Able to design research protocol and carry out study as per design CO3: Can analyze and interpret research data using appropriate statistical tools CO4: Capable of writing scientific documents CO5: Developed tendency to work in group

St JAMES' COLLEGE OF PHARMACEUTICAL SCIENCES, ST JAMES' MEDICAL ACADEMY, RIVER BANK, CHALAKUDY, THRISSUR-680307

COURSE OUTCOME

PROGRAMME: PHARM. D.

No	Name of the Course	Course Outcome
1.	1.1 Human Anatomy and Physiology	CO1: Can describe the structure and functions of various organs of the human body. CO2: Able to describe the homeostatic mechanisms and their imbalances of various systems. CO3: Can identify tissues and organs of the different systems of the human body. CO4: Acquired knowledge of anatomy and physiological role of various systems in human body. CO5: Appreciate coordinated working pattern & interlinked mechanisms in the maintenance of normal functioning (homeostasis) of human body.
2.	1.1 Human Anatomy and Physiology (Practical)	CO1:Capable of carrying out haematological experiments. CO2:Can determine blood pressure using sphygmomanometer. CO3:Demonstrate practical knowledge of human gross and microscopic anatomy using prepared histological slides, organ models.
3.	1.2 Pharmaceutics	CO1: Have fundamental knowledge in preparing & dispensing various dosage forms. CO2: Know the history of profession of pharmacy. CO3: Know the professional way of handling the prescription. CO4: aware of their professional role in the healthcare system. CO5: Have the basics of pharmaceutical incompatibilities and calculations involved in prescribing dose.
4.	1.2 Pharmaceutics (Practical)	CO1:Able to prepare & dispense solid, liquid, semisolid dosage form. CO2:Able to differentiate labelling and container requirements for pharmaceutical products. CO3:Can analysis the incompatibility problems present in the prescription.
5.	1.3 Medicinal Biochemistry	CO 1: Know the basic concepts of cell and metabolic process in healthy and illness conditions CO 2: Can describe activity of enzymes, isoenzymes and

		importance of enzyme inhibitors. CO 3: Acquired knowledge of genetic organization of mammalian genome CO 4: Know the biochemichemistry of specific organ function tests. CO 5: Know the qualitative analysis and determination of biomolecules in the body fluids.
6.	1.3 Medicinal Biochemistry (Practical)	CO1: Able to perform qualitatively analyze normal and abnormal constituents of urine. CO2: Able to estimate various biomolecules, SGOT and SGPT in serum. CO3 Able to prepare different buffers and its pH measurement.
7.	1.4 Pharmaceutical Organic Chemistry	CO 1: Can give IUPAC names of simple hydrocarbons. CO 2: Acquired understanding of the physical properties of organic compounds. CO 3: Acquire the knowledge of preparation and reactions of various clauses of organis compound. CO 4: Can explain important name reactions with mechanisms and applications. CO 5: Know the methods of preparation, qualitative and quantitative analysis of medicinal organic compounds.
8.	1.4 Pharmaceutical Organic Chemistry (Practical)	CO1: Able to synthesize organic compounds by benzoylation, condensation, diazotization, nitration etc. CO2: Able to identify organic compounds through systematic analysis CO3 Able to make stereo models of simple organic compounds and evaluate stereochemical aspects.
9.	1.5 Pharmaceutical Inorganic Chemistry	CO1: Can explain the sources of impurities in inorganic pharmaceuticals. CO2: Acquired knowledge on theoretical aspects of volumetric analysis. CO3: Acquired knowledge of limit test CO4: Explain the methods of preparation, assay, properties, medicinal uses of medicinal gases inorganic pharmaceuticals, pharmaceutical aids and miscellaneous compounds. CO5: Describe the properties, storage condition and application of radiopharmaceuticals.

10.	1.5 Pharmaceutical Inorganic Chemistry (Practical)	CO1: Able to perform the identification tests and preparation of inorganic compounds. CO2: Able to perform the limit tests and purity test for inorganic pharmaceuticals in a QC lab. CO3 Able to perform estimations of inorganic compounds
11.	1.6 Remedial Mathematics	CO 1: Can apply mathematical concepts and principles to perform computations for Pharmaceutical Sciences. CO 2: Able to create, use and analyze mathematical representations by applying mathematical theory CO 3: Know trigonometry, analytical geometry, matrices, determinant, integration differential equation, Laplace transform & their applications. CO 4: Perform abstract mathematical reasoning CO 5: Obtained knowledge of mathematical relationships
	1.6 Remedial biology	CO 1: Acquired basic knowledge of nature of Plant cell and Animal cell CO 2: Able to Classify Plants & Animals CO 3: Know the basic components of anatomy & physiology of plant and animals CO 4: Obtained knowledge Various tissue and organ in plant and animals CO 5: Aware of various naturally occurring drugs & its history
12.	1.6: Remedial biology (Practical)	CO1: Able to identify different plants using their morphological characteristics. CO2: Can do evaluation of different plants using anatomical methods. CO3: Able to prepare permanent slides for different samples of seeds, stems, roots and barks.
13.	2.1 Pathophysiology	CO1: Acquired thorough knowledge of pathology of various conditions with reference to its pharmacological applications. CO2: Have understanding of basic Pathophysiological mechanisms. CO3: Able to describes the etiology and pathogenesis of the selected disease states CO4: Can describe the signs and symptoms of the diseases CO5: Aware of complications of the diseases.
14.	2.2 Pharmaceutical Microbiology	CO1: Able to explain the anatomy, identification, growth factors of microorganisms

		CO2: Aware of different methods of sterilization process in pharmaceutical microbiology Lab CO3: Obtained knowledge on diagnostic tests for Identification of infectious diseases CO4: Possess the understanding of determining drug potency by microbiological assay method CO5: Have knowledge on concepts of and types of immunity and antigen -antibody reactions.
15.	2.2 Pharmaceutical Microbiology (Practical)	CO 1: Able to identify different types of microorganisms by using staining techniques and biochemical test CO 2: Able to prepare various culture medium for cultivation of microorganisms and to determine the drug potency by microbiological assay technique CO 3: Able to perform sterilization, maintain the aseptic condition and able to do the sterility test for different pharmaceutical dosage forms
16.	2.3 Pharmacognosy & Phytopharmaceuticals	CO1: Able to classify crude drugs obtained from natural origin by various approches. CO2: Obtained theoretical knowledge of cultivation, collection and processing techniques, factors affecting growth of plant drugs. CO3: Possess awareness about adulterants used in herbal products and methods to determine adulterants. CO4: Possess knowledge about different herbal remedies belonging to carbohydrates, lipids, proteins, volatile oil, alkaloids and glycosides. CO5: Obtained knowledge about herbal source for pesticides and surgical dressings.
17.	2.3 Pharmacognosy & Phytopharmaceuticals (Practical)	CO 1: Able to perform crude dug evaluation through morphological and microscopical methods. CO 2: Able to analyze of oils and fats available in the market and assess their quality. CO 3: Able to identify plant products through chemical test.
18.	2.4 Pharmacology I	CO 1: Possess broad knowledge on classification, Pharmacological aspects, adverse effects, Therapeutic uses of different drug categories. CO 2: Can apply the knowledge therapeutically in deciding dose, route of administration, precautions, and contraindications. CO 3: Understood the pharmacological aspects of drugs used to treat ailment of different organ systems of the

		body. CO 4: Konow the procedures to handle & carry out animal experiments. CO5: Appreciate the importance of pharmacology subject as a basis of therapeutics.
19.	2.5 Community Pharmacy	C O 1: Able to provide pharmaceutical care services C O 2: Know the business and professional practice management skills in community pharmacies C O 3: Learnt to show empathy and provide patient counseling and health screening services to the community C O 4: Able to manage to minor ailments and provide appropriate OTC medication C O 5: Able to provide rational drug therapy to the patient
20.	2.6 Pharmacotherapeutics I	CO1: Able to identify the abnormal physiology and pathogenesis of diseases. CO2: Able to interpret the data from diagnostic tools. CO3: Able to diagnose the disease by monitoring the clinical manifestations of the patient and suggest individualized therapy. CO4: Able to provide rational drug therapy to the patient CO5: Capable to suggest the treatment options for special populations like pediatric, geriatric, breast feeding & pregnant.
21.	2.6 Pharmaco-therapeutics I (Practical)	CO 1: Can use therapeutic approach for the management of diseases CO 2: Know the controversies in drug CO 3: Able to identify the needed interventions from the prescription.
22.	3.1 Pharmacology II	CO1: Possess in depth knowledge of pharmacological aspects of drugs. CO2: Possess knowledge on the procedure to carry out animal experiments. CO3: Able to correlate pharmacology and therapeutics to provide better pharmaceutical care. CO4: Posses in depth knowledge on cell, macromolecules, cell signaling, DNA replication and cell cycle. CO5: Appreciate the importance of gene and its structure, genome, gene expression, recombinant and DNA technology.

23.	3.1 Pharmacology II (Practical)	CO 1: Able to perform Pharmacological effect of drugs on tissue preparations. CO 2: Able to perform the dosage calculations of drug. CO 3: Able to perform animal experiments by using isolated organs.
24.	3.2 Pharmaceutical Analysis II	CO1: Aware of basic concepts of quality assurance CO2: Obtained basic knowledge on spectroscopic, chromatographic and , electrometric methods of analysis. CO3: Acquired knowledge on the basic concept, instrumentation and application of sensitive instrumental analysis CO4: Perform quantitative & qualitative analysis of drugs using various analytical instruments CO5: Can perform mathematical treatment of analytical data in quantitative analysis
25.	3.2 Pharmaceutical Analysis II (Practical)	CO 1: Able to perform quantitative & qualitative analysis of drugs using various analytical instruments. CO 2: Able to operate different analytical equipments. CO 3: Apply the concepts of quality assurance and evaluation of analytical standards.
26.	3.3 Pharmacotherapeutics II	CO1: Able to understand different causes of diseases. CO2: Able to identify the abnormal physiology of individual with specific disease states. CO3: Able to diagnose the disease by correlating clinical manifestations and laboratory indices. CO4: Able to prepare individualized therapeutic plans based on diagnosis. CO5: Able to suggest lifestyle modifications based on the disease states.
27.	3.3Pharmaco-therapeutics II (Practical)	CO 1: Able to perform patient counseling regarding specific disease states and drugs. CO 2: Can identify relevant patient specific parameters in initiating drug therapy and monitoring therapy CO 3: Can monitor controversies in drug therapy and suggest rationale for drug therapy of selected diseases.
28.	3.4 Pharmaceutical Jurisprudence	CO 1: Developed inclination to follow the Professional ethics CO 2: Aware of various concepts of the pharmaceutical legislation in India

		CO 3: Obtained in depth knowledge of various acts & rules governing pharmacy profession Know the various parameters in the Drug and Cosmetic Act and rules CO 4: Know the Drug policy, DPCO, Patent and design act and understand the labeling requirements and packaging guidelines for drugs and cosmetics CO 5: Obtained understanding of Pharmacy Act, Pharmacy Council of India and its functioning
29.	3.5 Medicinal Chemistry	CO 1: Obtained knowledge of the chemistry of drugs with respect to their biological activity. CO 2: Can explain metabolism, therapeutic uses and adverse effects of drugs. CO 3: Obtained basic knowledge on modern techniques of drug design. CO 4: Appreciate the role SAR and QSAR in drug discovery. CO 5: Possess knowledge of synthesis, and analysis of selected representative drugs.
30.	3.5 Medicinal Chemistry (Practical)	CO 1: Able to prepare different medicinally important compounds. CO 2: Able to determine partition coefficient and Hansch analysis of different drugs. CO 3: Able to perform standardization and assay of drugs.
31.	3.6 Pharmaceutical Formulations	CO1: Acquired knowledge about the various non parenteral pharmaceutical dosage forms and their manufacturing techniques. CO2: Learnt Pharmacopeial specifications, and quality control techniques used in different dosage forms. CO3: Acquired knowledge on manufacturing, labeling, sterilization & sterility testing of SVPs, LVPs, and ophthalmic preparations. CO4: Realized the concepts of controlled drug delivery system CO5: Obtained basic knowledge on cosmetics technology
32.	3.6 Pharmaceutical Formulations (Practical)	CO 1: Able to formulate different dosage forms and carry out their in process control tests CO 2: Able to formulate the cosmetic preparations and perform its evaluation tests. CO 3: Can perform the quality control tests and to operate the equipments required for the tests

33.	PD 4.1 Pharmacotherapeutics-III	CO1: Able to identify the abnormal physiology individuals with diseases. CO2: Able to interpret the data from diagnostic tools. CO3: Able to diagnose the disease by monitoring the clinical features of the patient and suggest the therapy. CO4: Able to differentiate types of pain and can suggest the management strategies for each. CO5: Capable to suggest the treatment options from the evidences.
34.	PD 4.1 Pharmaco-therapeutics-III (Practical)	CO1:Able to systematically analyse a case CO2:Able to diagnose as well as suggest the medicine CO3:Can perform the patient counseling effectively
35.	PD 4.2 Hospital Pharmacy	CO 1: Know various drug distribution methods. CO 2: Know the professional practice management in hospital pharmacies CO 3: Can provide unbiased drug information to the doctors. CO 4: Aware of the manufacturing practices of various formulations in hospital set up. CO 5: Appreciate importance of stores management and inventory control.
36.	PD 4.3 Clinical Pharmacy	CO1: have good understanding of elements of comprehensive pharmaceutical care CO2: Can Interpret laboratory results to aid the clinical diagnosis of various disorders CO3: Can provide integrated medicine information CO4: Can provide integrated poison information CO5: Able to promote in the efficient patient management along with other health care professionals.
37.	PD 4.3 Clinical Pharmacy (Practical)	CO1:Can analyse, interpret and formulate drug information CO2Able to detect monitoring parameters in therapeutics for determination of liver and kidney abnormalities. CO3:Can identify, detect, assess and monitor adverse drug reaction
38.	PD 4.4 Biostatistics & Research Methodology	CO1: Have fundamental knowledge on selection of research topic. CO2: Acquired basic understanding of different types of research data and documentation of data. CO3: Have the preliminary knowledge on data collection in

		clinical research CO4: Can design sampling protocol for research CO5: Can use different statistical tool for the research data analysis using software
39.	PD 4.5 Biopharmaceutics & Pharmacokinetics	CO1: Learnt the basic concepts in biopharmaceutics and pharmacokinetics. CO2: Possess knowledge on the effect of Pharmacokinetic parameters on biological effects of the drug. CO3: Capable of designing and evaluating dosage regimens of the drugs using pharmacokinetic and bio-pharmaceutic parameters. CO4: Can calculate various pharmacokinetic parameters from plasma and urinary excretion data applying compartment modeling and model independent methods. CO5: Can design Bioavailability and Bioequivalence studies of new drugs or dosage forms.
40.	PD 4.5 Biopharmaceutics & Pharmacokinetics (Practical)	CO1:Able to perform the Dissolution studies for different marketed products of the same drug . CO2Able to compute various pharmacokinetic parameters from plasma and urinary excretion data applying compartment modeling and model independent methods. CO3:Can perform Bioavailability and Bioequivalency studies of drugs on animal/human model .
41.	PD 4.6 Clinical Toxicology	CO1: Student can support the medical professional in identifying the antidote for specified poisons. CO2: Able to give poison information especially regarding clinical features and management of poisoning. CO3: Can identify the venomous snakebite poison substance. CO4: Able to differentiate different types of substance abuse and can suggest the clinical features and its management. CO5: Able to give suggestions on the management of poisoning.

42.	PD (PB) 1.1Pharmacotherapeutics-I & II	CO1: Able to understand different causes of diseases. CO2: Able to identify the abnormal physiology of individual with specific disease states. CO3: Able to diagnose the disease by correlating clinical manifestations and laboratory indices. CO4: Able to prepare individualized therapeutic plans based on diagnosis. CO5: Able to suggest lifestyle modifications based on the disease states.
43.	PD (PB) 1.1Pharmacotherapeutics-I & II (Practical)	CO1:Able to systematically analyse a case CO2: Able to diagnose as well as to prescribe the medicine CO3:Can perform the patient counseling effectively
44.	5.1-Clinical Research	CO1: Able to take part in drug discovery and new drug development process at clinical trial stage CO2: Acquired knowledge to conduct clinical trial CO3: Capable of preparing various study documents used in clinical trials and able to carry out clinical trial start up activities CO4: Possess knowledge about the procurement, storage, filing of investigational product and to conduct monitoring visit, close out visit and safety reporting CO.5: Possess knowledge of data management and quality assurance in CDM.
45.	5.2 Pharmacoepidemiology and Pharmacoeconomics	CO1: Posses knowledge of pharmacoepidemiology and concept of risk in pharmacoepidemiology CO2: Capable of measuring outcomes pharmacoepidemiology using various pharmacoepidemiological methods CO3: Possess knowledge of Sources of data for pharmacoepidemiological studies and applications of pharmacoepidemiology CO4:. Aware of concepts of pharmacoeconomics and its significance CO5: Can perform pharmacoeconomic evaluation

46.	5.3 Clinical Pharmacokinetics and TDM	CO1: Able to design of dosage regimen CO2: Able to give drug dosing information about elderly, pediatrics and obese patients. CO3: Able to describe different types of conversion from IV to Oral therapy. CO4: Able to give TDM information especially regards cardiac, seizure and psychiatric conditions CO5: Can support the medical professional in dosage adjustment in Renal and Hepatic disease
47.	5.4 Clerkship	CO1: capable of delivering clinical pharmacy services efficiently, CO2:Able to plan and execute pharmaceutical care CO3: Possess sound knowledge of therapeutics s
48.	5.5 Project work	CO1: Able to identify, design and carry out research work scientifically following research ethics CO2: Able to collect date, interpret them using appropriate statistical tools and arrive at conclusion scientifically CO3: Able to document the research work in the form of thesis in an acceptable format
49.	Internship	CO1: Expert in providing patient care as well as manage and use resources efficiently as a member of healthcare team CO2: Capable of promoting health improvement, wellness, and disease prevention in cooperation with other related professionals and community CO3; Developed skills in monitoring of the National Health Programmes and schemes with effective communication skill

St JAMES' COLLEGE OF PHARMACEUTICAL SCIENCES, ST JAMES' MEDICAL ACADEMY, RIVER BANK, CHALAKUDY, THRISSUR-680307

COURSE OUTCOME

PROGRAMME: M.PHARM – PHARMACEUTICAL ANALYSIS

No	Name of the Course	Course Outcome
1.	MPA101T Modern Pharmaceutical analytical Techniques	CO1: Aware of the availability of vide choice of analytical techniques for routine drug analysis CO2: Able to select appropriate analytical technique for a given analytical problem CO3: Possess sound knowledge on theory, principle, instrumentation and use of commonly used instrumental methods. CO4: Acquired expertise in mathematical treatment of analytical data in quantitative analysis CO5: Acquired expertise in interpretation of analytical data to characterise drugs in qualitative analysis.
2.	MPA102T Advanced Pharmaceutical Analysis	CO1: Aware of regulatory perception of impurities and its implications in approval process CO2: Capable of categorizing impurities as per regulatory requirement. CO3: capable of impurity profiling for regulatory filing. CO4: Have sound theoretical knowledge on the intricacies of stability testing of Phytopharmaceuticals CO5: Able to design bioassays and interpret the results and RIA
3.	MPA103T Pharmaceutical validation	CO1: Acquired knowledge on the variety of validation and qualification studies carried out in pharmaceutical industry CO2: Capable of carrying out analytical instruments qualification and analytical method validation CO3: Capable of designing protocol for process validation and utility validations CO4: Aware of various intellectual properties and their significance in Pharmaceutical Industry CO 5: Acquired knowledge on process of filing different types of patent application.

4.	MPA104T: Food analysis	CO:1 Have sound knowledge on various food products, food additives, food constituents and common food adulterants CO:2 Possess knowledge on food regulations and legislations, BIS, Official Methods of Analysis of AOAC International and its applications on food products CO:3 Able to detect impurities in food stuffs CO:4 Can describe proximate analyses of foods, Evaluation of test methods CO5: Aware of various techniques for analysis of food constituents, additives, pesticides
5.	MPA105 P Pharmaceutical Analysis Practical I	CO1: Able to perform the calibration of various instruments like UV Spectrophotometer, HPLC, IR spectrophotometer, Spectroflurimetry. CO2: Able to Perform the analysis of food constituents, additives, pesticides of impurities in drugs and residual solvents. CO3: Able to perform experiments using instruments like UV Spectrophotometer, HPLC, IR spectrophotometer, Spectroflurimetry.
6.	MPA201T Advanced Instrumental Analysis	CO1: Acquired sound knowledge on state of art separation techniques and their use in drug development CO2: Possess sound knowledge of tandem mass spectrometry and their use to carry out utra sensitive qualitative analysis . CO3: Able to use 2D NMR data for structural elucidation CO4: Acquired sound knowledge of state of art analytical technique; CE, CE-MS and SFC CO5: Learnt latest developments in Biochromatography
7.	MPA202T Modern bioanalytical techniques	CO1: Able to perform sample treatment for using sophisticated techniques for analytical purpose. CO2: Can explain the process and steps involved in the bioanalytical method development and its validation. CO3: Appreciate the biopharmaceutical consideration in the bioanalytical method development and applications. CO4: Aware of the ADME aspects of drugs and the guidelines for BA/BE studies. CO5: Possess basic knowledge of cell culture techniques.
8.	MPA203T Quality control and Quality assurance	CO1: Acquired knowledge on cGMP aspects in a pharmaceutical industry

		CO2: Appreciate the importance of documentation CO3: Aware of the scope of quality certifications applicable to Pharmaceutical industries CO4: Able to work in a team to carry out QA & QC activities CO5: Capable of carrying out quality control tests as per protocol
9.	MPA204T Herbal and cosmetic analysis	CO1: Well aware of the regulatory requirements and AYUSH/ WHO guidelines for herbal drugs manufacturing & standardization. CO2: Possess good understanding on various adulterants used in herbal products and modern analytic methods used to determine adulterants in various herbal formulations. CO3: Possess knowledge of herbal drug-drug interactions and WHO / AYUSH guidelines for the safety monitoring of natural medicine. CO4: Acquired knowledge on various types of cosmetics and various types of materials used in cosmetics CO5: Acquired in depth knowledge on the quality control of various cosmetics.
10.	MPA205 P Pharmaceutical Analysis Practical - II	CO1:Able to Interpret NMR, Mass and IR spectra of various organic compounds and CO2: Able to perform bioanalytical methods CO3:Able to analyse adulterants used in herbal products, coemetics and food products using modern analytical methods
11.	MRM 301T Research Methodology and Biostatistics	CO1: Have fundamental knowledge on selection of research topic. CO2: Acquired basic understanding of different types of research data and documentation of data. CO3: Have the preliminary knowledge on data collection in clinical research CO4: Can design sampling protocol for research CO5: Can use different statistical tool for the research data analysis using software
12.	Journal Club	CO1: Able to collect relevant literature and critically evaluate them CO2: Learnt to make a PPT presentation scientifically and deliver the same CO3: Able to involve effectively in post presentation

		discussion
13.	Project Discussion / Presentation	CO1: Able to select research topic through literature review CO2: Able to design research methodology CO3: Able to Present the selected research proposal convincingly
14.	Research Work	CO1: Able to carry out research work scientifically following research ethics CO2: Able to collect date, interpret them using appropriate statistical tools and arrive at conclusion scientifically CO3: Able to document the research work in the form of thesis in an acceptable format
15.	Pre submission Discussion / Presentation	CO1:Able to organize the research work for presentation CO2: Able to make PPT presentation of the research work scientifically and deliver the same CO3: Learnt to defend the research work scientifically and convincingly

St JAMES' COLLEGE OF PHARMACEUTICAL SCIENCES, ST JAMES' MEDICAL ACADEMY, RIVER BANK, CHALAKUDY, THRISSUR-680307

COURSE OUTCOME

PROGRAMME: M.PHARM. - PHARMACEUTICAL CHEMISTRY

No	Name of the Course	Course Outcome
1.	MPC 101T Modern Pharmaceutical Analytical Techniques	CO1: Aware of the availability of vide choice of analytical techniques for routine drug analysis CO2: Able to select appropriate analytical technique for a given analytical problem CO3: Possess sound knowledge on theory, principle, instrumentation and use of commonly used instrumental methods. CO4: Acquired expertise in mathematical treatment of analytical data in quantitative analysis CO5: Acquired expertise in interpretation of analytical data to characterise drugs in qualitative analysis..
2.	MPC 102T Advanced Organic Chemistry I	CO 1: Can design synthetic routes for organic compound using reterosynthesis concept. CO 2: Possess in depth knowledge of mechanism & application of various named reactions. CO 3: Aware of the concept of disconnection to develop synthetic routes for small target molecules. CO 4: Possess knowledge of various catalysts used in organic reactions CO 5: Acquired in depth knowledge of chemistry of heterocyclic compounds.
3.	MPC 103T Advanced Medicinal Chemistry	CO 1: Describe different stages of drug discovery. CO 2: Understood the role of medicinal chemistry in drug research and synthesis of medicinally important drugs. CO 3: Can carry out investigation of stereochemical analysis of drugs and correlate with their action CO 4: Able to design and develop new drug like molecules for biological targets using drug design approaches CO 5: Possess knowledge of drug resistance, pro-drug design and peptidomimetics.
4.	MPC 104T Chemistry of Natural Products	CO 1: Can carry out isolation, purification & characterization of chemical constituents of natural source. CO 2: Can carry out structural elucidation of medicinally active natural compounds.

		CO 3: Appreciate the importance of natural compounds as lead molecule for new drug discovery. CO 4: Acquired knowledge on different types of natural compounds, their chemistry and medicinal importance. CO 5: Possess knowledge on rDNA technology as a tool for new drug discovery
5.	MPC105 P Pharmaceutical Chemistry Practical I	CO1: Able to perform experiments using instruments like UV Spectrophotometer, HPLC, IR spectrophotometer, and Spectroflurimetry. CO2: Acquired expertise in laboratory techniques for synthesis and purification of organic compounds CO3: Possess expertise in isolation and characterization of compound obtained from plants
6.	MPC 201T Advanced Spectral Analysis	CO1: Capable of performing spectral analysis to establish identity and structre of compounds. CO2: Understand the basic concept and instrumentation of HPTLC, HPLC, GC for identification, and characterization of compounds. CO3: Understand the basic principles and instrumentation of fluorimeter, atomic absorption spectrometer and potentiometer. CO4: Understand the instrumentation and applications of X-ray crystallography and thermal mathods. CO5: Explain Instrumentation, separation and identification of compounds by electrophoresis technique.
7.	MPC 202T Advanced Organic Chemistry II	CO 1: Capable of utilizing green chemistry concepts for drug development process CO 2: Capable selecting suitable catalysts for organic reactions. CO 3: Capable of synthesizing peptidomimetics using peptide chemistry & its concepts. CO 4: Aware of influence of Stereo-chemical features on reaction dynamics, asymmetric synthesis and photochemical reactions CO 5: Acquired fundamental knowledge of sonochemistry.
8.	MPC 203T Computer Aided Drug Design	CO 1: Acquired expertise to utilize molecular modeling software in the design of novel drug-like molecules. CO 2: Can apply various strategies to design &develop new drug like molecules using CADD and QSAR methods. CO 3: Capable of carrying out molecular modeling and

		molecular docking studies. CO 4: Able to carry out study of pharmacophore and generation of 3D structure of proteins. CO 5: Possess knowledge of *in silico* virtual screening protocols.
9.	MPC204T Pharmaceutical Process Chemistry	CO 1: Can develop synthetic routes involving nitration, oxidation and reduction. CO 2: Can develop and optimize synthetic route/s and create & carry out work up and separation procedure. CO 3: Possess knowledge on the strategies of scale up process of API's & intermediates CO 4: Can operate various unit operations used in API manufacturing. CO 5: Acquired knowledge on the principles and applications of modern chemical instrumentation, experimental design and data analysis.
10.	MPC 205P Pharmaceutical Chemistry Practicals – II	CO1: Acquired expertise in using drug design software CO2:Experienced in interpretation of spectra to identify/elucidate structure CO3: Able to compare and evaluate merits and demerits of different synthetic routes of a drug
11.	MRM 301T Research Methodology and Biostatistics	CO1: Have fundamental knowledge on selection of research topic. CO2: Acquired basic understanding of different types of research data and documentation of data. CO3: Have the preliminary knowledge on data collection in clinical research CO4: Can design sampling protocol for research CO5: Can use different statistical tool for the research data analysis using software
12.	Journal Club	CO1: Able to collect relevant literature and critically evaluate them CO2: Learnt to make a PPT presentation scientifically and deliver the same CO3: Able to involve effectively in post presentation discussion
13.	Project Discussion / Presentation	CO1: Able to select research topic through literature review CO2: Able to design research methodology CO3: Able to Present the selected research proposal convincingly

14.	Research Work	CO1: Able to carry out research work scientifically following research ethics CO2: Able to collect date, interpret them using appropriate statistical tools and arrive at conclusion scientifically CO3: Able to document the research work in the form of thesis in an acceptable format
15.	Pre submission Discussion / Presentation	CO1:Able to organize the research work for presentation CO2: Able to make PPT presentation of the research work scientifically and deliver the same CO3: Learnt to defend the research work scientifically and convincingly

St JAMES' COLLEGE OF PHARMACEUTICAL SCIENCES, ST JAMES' MEDICAL ACADEMY, RIVER BANK, CHALAKUDY, THRISSUR-680307

COURSE OUTCOME

PROGRAMME: M.PHARM. - PHARMACEUTICS

No	Name of the Course	Course Outcome
1.	MPH101T Modern Pharmaceutical Analytical Techniques	CO1: Aware of the availability of vide choice of analytical techniques for routine drug analysis CO2: Able to select appropriate analytical technique for a given analytical problem CO3: Possess sound knowledge on theory, principle, instrumentation and use of commonly used instrumental methods. CO4: Acquired expertise in mathematical treatment of analytical data in quantitative analysis CO5: Acquired expertise in interpretation of analytical data to characterise drugs in qualitative analysis.
2.	MPH102T Drug Delivery System	CO1: Capable of designing sustained release and controlled release drug delivery systems CO2: Able to select suitable excipients for the development of drug delivery systems. CO3: Able to describe the various approaches for development of drug delivery systems. CO4: capable of developing new formulation and evaluation of Novel drug delivery systems CO5: Appreciate the concepts of vaccine and its drug delivery system.
3.	MPH103T Modern Pharmaceutics	CO1: can carry out of pre-formulation studies CO2: Have knowledge of optimization techniques and their applications in pharmaceutical industries. CO3: Know the scope and merits of validation and different types of validation CO4: Aware of the importance of industrial management principles and GMP Considerations. CO5: Possess knowledge of ICH and WHO guidelines for calibration and validation of equipment
4.	MPH104T Regulatory Affairs	CO1: Aware of the concept of innovator drug & generic drugs and drug development process. CO2: Possess knowledge of preparation of dossiers for

		submission to regulatory agencies in different countries. CO3: Aware of regulatory submission in CTD/eCTD format. CO4: Know the clinical trials requirements and process forgetting approvals for conducting clinical trials. CO5: Have knowledge on SOPs for various Good Regulatory Practices
5.	MPH105 P Pharmaceutics Practicals - I	CO1: Able to perform experiments using instruments like UV Spectrophotometer, HPLC, IR spectrophotometer, and Spectroflurimetry. CO2: Able to prepare and evaluate various novel drug delivery systems. CO3: Capable of performing preformulation investigation and micromeritics characterization.
6.	MPH 201T Molecular Pharmaceutics	CO1: Can Design drug delivery systems for targeting drugs to tumours and to the brain CO2: Can prepare and evaluate nanoparticles and liposomes as carriers for drug targeting CO3: Able to formulate aquasomes, niosomes, phytosomes and electrosomes for various applications in drug targeting CO4: Can apply knowledge of antisense molecules and aptamers in the design of novel drug delivery systems: CO5: Possess knowledge on gene therapy in the treatment of cancer and inherited diseases
7.	MPH 202T Advanced Biopharmaceutics and Pharmacokinetics	CO1: Aware of various biopharmaceutical factors affecting drug bioavailability. CO2: Can carry out various method of dissolution testing and perform *in vitro–in vivo* correlation study. CO3: Able to perform pharmacokinetic analysis using different models CO4: Can explain the design and evaluation of dosage regimens of the drugs using pharmacokinetic and `biopharmaceutic parameters. CO5: Can design Bioavailability- Bioequivalence studies of new drugs or dosage forms.
8.	MPH 203T Computer Aided Drug Delivery system	CO1: Capable of investigating drug disposition using computational modeling CO2: Possess expertise on the applications of computer in preclinical development CO3: Can design experiments based on optimization techniques in pharmaceutical formulation

		CO4: Can perform the market analysis of pharmaceutical products and clinical data management using software CO5: Has basic understanding of robotics, computational fluid dynamics and pharmaceutical automation process
9.	MPH 204T Cosmetics and Cosmeceuticals	CO1: Aware of the regulatory provisions related to the import and manufacture of cosmetics CO2: can choose key ingredients suitable in the formulation of various cosmetics CO3: Acquired knowledge on the problems related to the skin and hair CO4: Can select herbal ingredients in the formulation of cosmetics for hair care, skin care and oral care. CO5: Able to describe the guidelines for the regulation of herbal cosmetics
10.	MPH 205P Pharmaceutics Practicals - II	CO1: Acquired expertise in preparation and evaluation of various cosmetics CO2: Can develop new formulation with optimal performance using chemometric tools CO3: Capable carrying out investigations related to pharmacokinetic of drug candidates
11.	MRM 301T Research Methodology and Biostatistics	CO1: Have fundamental knowledge on selection of research topic. CO2: Acquired basic understanding of different types of research data and documentation of data. CO3: Have the preliminary knowledge on data collection in clinical research CO4: Can design sampling protocol for research CO5: Can use different statistical tool for the research data analysis using software
12.	Journal Club	CO1: Able to collect relevant literature and critically evaluate them CO2: Learnt to make a PPT presentation scientifically and deliver the same CO3: Able to involve effectively in post presentation discussion
13.	Project Discussion / Presentation	CO1: Able to select research topic through literature review CO2: Able to design research methodology CO3: Able to Present the selected research proposal convincingly
14.	Research Work	CO1: Able to carry out research work scientifically

		following research ethics CO2: Able to collect date, interpret them using appropriate statistical tools and arrive at conclusion scientifically CO3: Able to document the research work in the form of thesis in an acceptable format
15.	Pre submission Discussion / Presentation	CO1:Able to organize the research work for presentation CO2: Able to make PPT presentation of the research work scientifically and deliver the same CO3: Learnt to defend the research work scientifically and convincingly

St JAMES' COLLEGE OF PHARMACEUTICAL SCIENCES, ST JAMES' MEDICAL ACADEMY, RIVER BANK, CHALAKUDY, THRISSUR-680307

COURSE OUTCOME

PROGRAMME: M.PHARM.-PHARMACY PRACTICE

No	Name of the Course	Course Outcome
1.	MPP101T Clinical Pharmacy Practice	CO1:Able to Understand the elements of comprehensive pharmaceutical care CO2:Can Interpret laboratory results to aid the clinical diagnosis of various disorders CO3: Can Provide integrated medicine information CO4: Can Provide integrated poison information CO5: Able to promote efficient patient management along with other health care professionals.
2.	MPP102T Pharmaco-therapeutics – I	CO1: Able to identify the abnormal physiology of each individual with diseases. CO2: Able to interpret the diagnostic tools. CO3: Able to diagnose the disease by monitoring the clinical features of the patient and suggest drug therapy. CO4: Able to provide rational drug therapy to the patient. CO5: Capable of giving individualized drug therapy based on the diagnosis
3.	MPP103T Hospital & Community Pharmacy	CO1: Aware of organizational structure & drug policies of hospital pharmacy. CO2: Acquired knowledge on drug distribution practices, Inventory, waste management, Formulary, Budget, Medication adherence problems & prescription related problems in hospital CO3: Aware of community pharmacy management & its value-added services. CO4: Able to carry out health promotion activities, Health screening services, National health programs, Home medicines review program. CO5: Able to manage minor ailments through, Rational use of OTC mediation & use of PIL.
4.	MPP104T Clinical Research	CO1: Able to take part in drug discovery and new drug development process at clinical trial stage CO2: Acquired knowledge to conduct clinical trial CO3: Capable of preparing various study documents used in clinical trials and able to carry out clinical trial

		start up activities CO4: Possess knowledge about the procurement, storage, filing of investigational product and to conduct monitoring visit, close out visit and safety reporting CO.5: Possess knowledge of data management and quality assurance in CDM.
5.	MPP 105P Pharmacy Practice Practical – I	CO1: Able to provide drug information and patient counseling service. CO2: Able to assess prescription related problems including adverse drug reaction CO3: Able to provide Inventory control and can clinical trial process.
6.	MPP201T Principles of Quality use of Medicines	CO 1: Able to practice the concepts of Evidence based medicine, Essential drugs & rational drug use. CO2: Have good understanding of the principles & regulatory aspects of quality use of medicines. CO3: Able to identify & resolve medication errors & ADR CO4: Capable of promoting quality use of medicines in various settings CO5: Able to suggest the treatment options for special populations like pediatric, geriatric, lactation, pregnancy, immunocompromised & organ failure patients.
7.	MPP202T Pharmaco-therapeutics II	CO 2: Able to provide rational drug therapy to the patient. CO 3: Aware of clinical controversies in drug therapy and evidence based medicine CO 4: Able to identify abnormal physiology of each individual with diseases will be able to interpret the diagnostic tools. CO 5: Able to prepare and execute individualized therapeutic plans based on diagnosis CO 6: Can identify the patient specific parameters relevant in initiating drug therapy especially in oncology
8.	MPP203T Clinical Pharmacokinetics and therapeutic Drug Monitoring	CO1: Able to design the drug dosage regimen for individual patients CO2: Can Interpret and correlate the plasma drug concentrations with patients' therapeutic outcomes CO3: Able to recommend dosage adjustment for patients with special population

		CO4: Able to recommend dosage adjustment for pediatrics and geriatrics CO5: Can Manage pharmacokinetic drug interactions in patients.
9.	MPP204T Pharmaco-epidemiology & Pharmacoeconomics	CO1: Students would get the knowledge to do the clinical outcome measurement through statistical methods and drug use measures and also able to explain the concept, types of risk, Odds ratio and pharmacoepidemiological applications. CO2:The student shall be able to evaluate the safety and effectiveness through qualitative and quantitative type of pharmaco epidemiological methods, drug effect study in population. CO3: They would get the idea to do cost categorization of pharmacy products &services, able to explain about various outcome and measurement of pharmacoeconomics CO.4: Students will get more information on how to conduct various Pharmacoeconomic evaluations through pharmacoeconomic models along with PharmacoeconomicalSoftwares to improve clinical decision making CO5:They shall be able to promote HRQOL and to explain about Decision analysis, sensitivity analysis, Markov modeling and to identify the fundamental principles, applications of Pharmacoeconomics, especially in health caresystem.
10.	MPP 205P Pharmacy Practice Practical –II	CO1: Able to resolve medication related problems and can perform causality assessment of ADR CO2| Able to analyze case and provide required interventions. CO3" Able to apply pharmacokinetic parameters in clinical settings and can do the pharmacoeconomical evaluations.
11.	MRM 301T Research Methodology and Biostatistics	CO1: Have fundamental knowledge on selection of research topic. CO2: Acquired basic understanding of different types of research data and documentation of data. CO3: Have the preliminary knowledge on data collection in clinical research CO4: Can design sampling protocol for research CO5: Can use different statistical tool for the research

		data analysis using software
12.	Journal Club	CO1: Able to collect relevant literature and critically evaluate them CO2: Learnt to make a PPT presentation scientifically and deliver the same CO3: Able to involve effectively in post presentation discussion
13.	Project Discussion / Presentation	CO1: Able to select research topic through literature review CO2: Able to design research methodology CO3: Able to Present the selected research proposal convincingly
14.	Research Work	CO1: Able to carry out research work scientifically following research ethics CO2: Able to collect date, interpret them using appropriate statistical tools and arrive at conclusion scientifically CO3: Able to document the research work in the form of thesis in an acceptable format
15.	Pre submission Discussion / Presentation	CO1:Able to organize the research work for presentation CO2: Able to make PPT presentation of the research work scientifically and deliver the same CO3: Learnt to defend the research work scientifically and convincingly