JSPM-RSCP

Subjectwise Course Outcome - [B Pharmacy - 2020-21]

Semester I

BP101T Human Anatomy & Physiology-I [Theory | Regular]

CO ID.	Course Outcome
CO1	Define anatomy & physiology and explain basic terminologies used in anatomy and physiology, Homeostasis and the progression of structural levels.
CO2	Explain the structure and functions of cell, Cell division and General principles of cell communication and intracellular signal transduction, Structure, location and functions of various types of tissues.
CO3	Recognizes the anatomy and physiology of integumentary system, skeletal system and joints
CO4	Clarify concepts and knowledge of body fluid and blood, anatomy and physiology of lymphatic system
CO5	Describe anatomy and physiology of Peripheral nervous system and special senses
CO6	Explain the anatomy and physiology of cardiovascular system

BP102T Pharmaceutical Analysis-I [Theory | Regular]

CO ID.	Course Outcome
CO1	Illuminate relevance & significance of Analytical Chemistry to Pharmaceutical Sciences.
CO2	Explain principle, theory and applications of volumetric methods of analysis.
CO3	Illustrate the gravimetric analytical method and its application for estimation of drugs.
CO4	Outlinethe principle, theory and instrumentation of electrochemical methods of analysis.

BP103T Pharmaceutics-I [Theory | Regular]

CO ID.	Course Outcome
CO1	Students will be able To understand pharmacy profession & status of pharmaceutical industry in India.
CO2	Students will be able to describe various dosage form including solid, monophasic, Biphasic formulations
CO 3	Students will be able to identify the prescription and its parts
CO 4	calculate the dose and prepare various dosage forms.
CO 5	Students will be able to discuss various semisolid dosage form including suppositories
CO 6	Students will be able to understand and relate various pharmaceutical incompatibilities.

BP104T Pharmaceutical Inorganic Chemistry [Theory | Regular]

CO ID.	Course Outcome
CO1	The student will be able to differentiate various pharmacopoeias currently in use and explain the contents of officialmonographs in pharmacopoeias
CO2	The student will be able to recognise impure and pure chemical compound and explain official methods of control like limit tests
CO3	The student will be able to elaborate the concepts of Acid, bases and buffers in pharmaceutical systems and calculate tonicity of various solutions
CO4	The student will be able to describe important functions of extracellular and intracellular ions in the body
CO5	The student will be able to Illustarte importance of various inorganic medicinal agents like Dental products, Gastrointestinal agent, Expectorants, Emetics, Haematinics, Poisons and Antidotes, Astringents with their method of preparation, properties, storage, assay, uses and marketed formulations.
CO6	The student will be able to discuss about radiopharmaceuticals and explain storage conditions, precautions, pharmaceutical applications of radioactive substances

BP105T Communication & Soft Skill [Theory | Regular]

CO ID.	Course Outcome
CO 1	Understand process, barriers and perspectives of communication
CO 2	Understand elements, types & styles of communication
CO 3	Develop listening and effective writing skills
CO 4	Develop interview skills

BP106RMT/RBT Remedial Mathematics/Remedial Biology [Theory | Elective]

CO ID.	Course Outcome
CO1	Able to understand the theory and their application in Pharmacy.
CO 2	Explain the basic concept & solve the different types of problems by applying theory.
CO 3	Able to understand the important application of mathematics in Pharmacy.
CO 1 RBT	Able to understand classification and salient features of five kingdoms of life.
CO 2 RBT	Explain the basic components of anatomy & physiology of plant.
CO 3 RBT	Able to understand the basic components of anatomy & physiology animal with special reference to human.

BP107P Human Anatomy & Physiology-I [Practical | Regular]

CO ID.	Course Outcome
CO1	Outline types, uses, care and handling of microscope and identify histological characteristics of different types of tissues
CO2	Identify axial and appendicular bones of human skeleton
CO3	Enumerate WBC and RBC count in practical physiology using hemocytometry
CO4	Determine bleeding time, clotting time, estimation of haemoglobin and blood group in practical Physiology
CO5	Perform erythrocyte sedimentation rate, heart rate and pulse rate, blood pressure
CO6	Explore blood bank to get the knowledge of importance of blood donation and the blood banking techniques

BP108P Pharmaceutical Analysis-I [Practical | Regular]

CO ID.	Course Outcome
CO1	Describe preparation of standard volumetric solutions and evaluate their strength.
CO2	Evaluate quality of bulk drug and its formulation by using different volumetric titration methods such as aqueous, non-aqueous, precipitation, complexometric and redox titration methods.
CO3	Quantify strength of various acids using Potentiometer/ pH meter, conductometer.
CO4	Demonstrate laboratory skills to estimate the samples by using Abbe's Refractometer.

BP109P Pharmaceutics-I [Practical | Regular]

CO ID.	Course Outcome
CO 1	Perform and Understand formulation and evaluation of monophasic liquid dosage forms
CO 2	Perform and Understand formulation and evaluation of Pharmaceutical biphasic liquid dosage
CO 3	Perform and Understand formulation and evaluation of pharmaceutical powders
CO 4	Perform and Understand formulation and evaluation of semisolid dosage form

BP110P Pharmaceutical Inorganic Chemistry [Practical | Regular]

CO ID.	Course Outcome
CO1	The student will be able to Identify impurities from pharmaceutical substances by performing limit tests

CO2	The student will be able to Identify acidic and basic radicals from given inorganic unknown sample
CO3	The student will be able to Analyse swelling power, acid neutralizing capacity of various Inorganic compounds
CO4	The student will be able to Synthesize pharmaceutical inorganic compounds and calculate their theoretical, practical and percentage yield

BP111P Communication & Soft Skill [Practical | Regular]

CO ID.	Course Outcome
CO 1	Communication skills techniques
CO 2	pronunciation skills with its application
CO 3	Develop advanced learning skills
CO 4	Develop presentation skills

BP112RBT REMEDIAL BIOLOGY ELECTIVE [Practical | Elective]

CO ID.	Course Outcome
CO 1	Able to understand classification and salient features of five kingdoms of life.
CO 2	Develop skills for sectioning of plant material, staining, mounting and focusing; choose staining reagents required for specific part of plant.
CO 3	Able to understand the basic components of anatomy & physiology animal with special reference to human.

Semester 3

BP301T Pharmaceutical Organic Chemistry-II [Theory | Regular]

CO ID.	Course Outcome
CO1	The student shall be able to Write the structure, name and the type of isomerism of the organic compound
CO2	the student shall be able to Write the reaction, name the reaction and orientation of reactions
CO3	the student shall be able to Account for reactivity/stability of compounds
CO4	the student shall be able to synthesize small organic compounds

BP302T Physical Pharmaceutics-I [Theory | Regular]

CO ID.	Course Outcome
CO1	Understand the importance of solubility, distribution phenomenon with utilization of the concepts in studying the absorption of the drugs and application of phase rule for formulation of stable aerosols and emulsions.
CO2	Understand crystal habit, methods of crystal analysis, polymorphism and different physicochemical properties of drug in the formulation development and evaluation of dosage forms
CO3	Select suitable surfactant for designing a stable pharmaceutical formulation
CO4	Use the principles of complexation/ protein binding, for calculation of drug release and stability constant
CO5	Apply the laws,equations related to pH,buffers and understand the importance of pH,buffers and isotonic solutions in the formulation of stable and efficient formulations.

BP303T Pharmaceutical Microbiology [Theory | Regular]

CO ID.	Course Outcome
CO1	Analyze the importance & applications of Pharmaceutical microbiology.
CO2	Summarize the knowledge of different microorganism like bacteria. Elaborate concept of sterilization with their methods and application in pharmaceutical industry.
CO3	Elaborate classification, reproduction and applications of fungus and virus with different examples. Differentiate concept of antiseptic, disinfectants. Also describe their mechanism of actions, evaluation tests and sterility tests of pharmaceutical products.
CO4	Elaborate designing of aseptic area, sources of contamination, principles and methods of microbial assay and importance of environmental cleanliness.

CO5	Recognize types and factors affecting the microbial spoilage, methods of preservation of pharmaceutical products, evaluation of microbial stability of formulations. Explain animal cell culture techniques.

BP304T Pharmaceutical Engineering [Theory | Regular]

CO ID.	Course Outcome
CO1	To understand basic principal and methodology of distillation, drying and evaporation
CO2	To understand different material handling system such as size reduction and separation, mixing
CO3	Elucidate fundamentals and facts about flow of fluids.
CO4	To know the basic principle and equipment's used in heat transfer
CO5	To know different unit operations such as filtration and centrifugation
CO6	To choose the material of construction of various equipment and methods prevention of corrosion

BP305P Pharmaceutical Organic Chemistry-II [Practical | Regular]

CO ID.	Course Outcome
CO1	The students will be able to Explain and apply the concept of Steam distillation.
CO2	The students will be able to Understand technique for Separation of Binary mixtures.
CO3	The students will be able to Understand technique for determination of saponification value of oil samples
CO4	The students will be able to Understand the chemistry involved and synthesize, recrystallize some medicinally important organic Compounds.
CO5	The students will be able to Develop skill of performing synthesis of medicinal drugs.

BP306P Physical Pharmaceutics-I [Practical | Regular]

CO ID.	Course Outcome
CO1	. explain the key physical pharmacy concepts of solubility,distribution phenomenon and apply them in pharmaceutical practice to determine thermodynamic parameters
CO2	calculate critical solution temperature; evaluate the effect of addititon of electrolyte on CST of phenol-water system
CO3	Calculate the Suraface tension and HLB value of surfactant.select a suitable surfactant for designing a stable formulation
CO4	Calculate critical micelle concentration of surfactant and understand the role of surfactant in solubilization
CO5	calculate the pKa value and the Henderson Hasselbalch equation
CO6	Calculate Freundlich and Langmuir constantsUsing adsoption isotherm
CO7	Calculate stability constant and donor acceptor ratio using complexation method
CO8	Calculate the physicochemical properties of substance like refractive index

BP307P Pharmaceutical Microbiology [Practical | Regular]

CO ID.	Course Outcome
CO1	Demonstrate the principle, construction and working of various instruments and perform their operations. Also, handle microscope for observation of microbes.
CO2	Apply the skills required for maintaining strictly aseptic condition & inoculation of cultures. Also, learn how to prepare and sterilize nutrient broth, nutrient agar, slants, stabs and plates.
CO3	Demonstrate the morphology of bacteria by simple staining, gram staining and acid fast staining.
CO4	Demonstrate skills for isolation, identification & characterization of microorganisms and isolate microorganism by streak plate technique ,pour plate and spread plate technique.
CO5	Demonstrate the motility of bacteria by hanging drop technique.
CO6	Describe the applications of antibiotic assay, sterility testing Bacteriological analysis of water, Biochemical Tests .

BP308P Pharmaceutical Engineering [Practical | Regular]

CO ID.	Course Outcome

CO1	To perform the experiment based on heat transfer including radiation
CO2	To study the drying curves, find out moisture content and humidity of air
CO3	To understand the factors affecting filtration, evaporation and crystallization
CO4	To verify laws of size reduction using ball mill and to evaluate size analysis by sieving
CO5	To be familiar with different equipment used in various pharmaceutical processes
CO6	To find out the efficiency of equipment based on mixing and distillation

Semester 5

BP501T Medicinal Chemistry-II [Theory | Regular]

CO ID.	Course Outcome
CO1	Describe the general aspects of the design & development of drugs including classification, nomenclature, structure activity relationship (SAR), mechanism of action and synthesis of Antihistaminic agents , Gastric proton pump inhibitors and leukotriene antagonist.
CO2	Memorize chemistry of prostaglandin and prostanoids.
CO3	Explain classification, nomenclature, structure activity relationship (SAR), mechanism of action, adverse effects, drug synthesis , therapeutic uses of various classes like anti-anginal , antiarrtymic ,antihypertensive, antihyperlipidemic and diuretics.
CO4	Elaborate the chemical structure and biological activity of various categories of steroidal drugs and antithyroidal agents
CO5	Discuss the general aspects of the design & development of drugs including classification, nomenclature, structure activity relationship (SAR), mechanism of action of and synthesis of oral hypoglycemic and local anaesthetics .

BP502T Industrial Pharmacy-I [Theory | Regular]

CO ID.	Course Outcome
CO1	Explain the concepts of dosage form design & formulation strategies
CO2	Explain tablets as a dosage formanufacture & evaluation, equipments, defects in tableting &remedies,coating, manufacture, evaluation and packaging of different liquid dosage forms.
CO3	Explain capsules, types, additives, size selection, manufacturing equipments, defects& evaluation, and also formulation requirements, pelletization process, equipments for manufacture of pellets.
CO4	Explain different types, preformulation, formulation , containers, evaluation of parenterals and ophthalmic preparationswith production facilities and controls and aseptic processing.
CO5	Explain formulation and preparation of different types ofcosmetic products. Materials ,factors influencing choice of containers, legal and official requirements, stability aspects and quality control tests of packaging materials

BP503T Pharmacology II [Theory | Regular]

CO ID.	Course Outcome
CO1	Discuss Pharmacotherapy of Cardiovascular disorders and Cardiovascular Shock.
CO2	Explain Diuretics and anti-diuretics
CO3	Explain Autacoids and related drugs
CO4	Describe Drugs acting on endocrine system
CO5	Explain and demonstrate Bioassay

BP504T Pharmacognosy and Phytochemistry II [Theory | Regular]

CO ID.	Course Outcome
CO1	Students are able to discuss the modern extraction techniques, characterization and identification of the herbal drugs and phytoconstituents.
CO2	Students are able to discuss the production of Phytoconstituents /herbal formulation.
CO3	Students are able to explain the metabolic pathways in formation of secondary metabolites and application of biogenetic studies.
CO4	Students are able to demonstrate isolation and identification of phytoconstituents.

BP505T Pharmaceutical Jurisprudence [Theory | Regular]

CO ID.	Course Outcome
CO1	To understand the significance and relevance of Pharmaceutical laws in India
CO2	To understand basic principles, purpose and dimensions of the laws
CO3	Students will able to be aware of some other enactment which are directly or indirectly related to manufacture, distribution and sale of drugs in India
CO4	To understand the regulatory system for safety and effectiveness of medicine and quality of product
CO5	To understand the enactment of code of ethics during the pharmaceutical practice

BP506P Industrial Pharmacy- I [Practical | Regular]

CO ID.	Course Outcome
CO1	Describe the correct use of various equipments in Pharmaceutics laboratory relevant to tablets, capsules, injections and ophthalmic preparations.
CO2	Explain and carry out formulation of granules, tablets, capsules and evaluation.
CO3	Explain and carry out formulation of injectable preparations.
CO4	Explain and carry out formulation of ophthalmic preparations and evaluation.
CO5	Explain and carry out formulation of cosmetic preparations and evaluation.
CO6	Describe evaluation of Glass containers

BP507P Pharmacology II [Practical | Regular]

CO ID.	Course Outcome
CO1	Discuss physiological salt solutions, drug solution and use of molar solution in various animal experiments.
CO2	Demonstrate effect of various drugs on heart rate, blood pressure in heart and on rabbit eye by using software.
CO3	Demonstrate bioassay of Matching, Graphical, Three point and four point method and DRC, PA2, PD2 Value using suitable isolated tissue preparations.
CO4	Demonstrate Anti-inflammatory activity of drugs using carrageenan induced paw-edema model
CO5	Demonstrate Analgesic activity using hotplate method
CO6	Demonstrate Anti allergic activity by mast cell stabilization assay
CO7	Demonstrate Clinical Case study and dose calculation
CO8	Demonstrate effect of spasmogens and spasmolytics using rabbit jejunum

BP508P Pharmacognosy and Phytochemistry II [Practical | Regular]

CO ID.	Course Outcome
CO1	Students are able to understand morphology, histology and powder characteristics & extraction & detection of crude drugs
CO2	Students are able to discuss the modern extraction techniques, characterization and identification of the herbal drugs and phytoconstituents.
CO3	Students are able to understand isolation & detection of active principles.
CO4	Students are able to demonstrate TLC in detail.
CO5	Students are able to demonstrate isolation and identification of phytoconstituents

Semester 7

4.7.1P Sterile Product [Practical | Regular]

CO ID.	Course Outcome
CO1	Explain the importance and process of validation of aseptic area & understand the gowning procedure.
CO2	Select and Evaluate packaging materials as per Pharmacopoeia.

CO3	Formulate, evaluate, justify use of ingredients and demonstrate expertise in sealing of small volume parenterals.
CO4	Formulate, evaluate and justify use of ingredients in Large volume parenteral and ophthalmic products.
CO5	Evaluate marketed preparations and explain the significance of Accelerated stability testing of marketed samples.
CO6	To examine labels of marketed surgical/blood products /injectable/implant devices.

4.7.1T Sterile Product [Theory | Regular]

CO ID.	Course Outcome
CO 1	Utilize the principles of preformulation for designing safe, stable and effective sterile products.
CO 2	Analyze and select appropriate packaging materials for parenterals as per pharmacopoeial procedures.
CO 3	Describe the design of parenteral production facility as per GMP guidelines.
CO 4	Explain the formulation, processing, evaluation and pilot plant scale up of small volume parenterals, large volume parenterals and Ophthalmic Products
CO 5	Understand the principle of Freeze drying and formulate freeze dried products.
CO 6	Classify, evaluate and maintain the stability of Blood and surgical products

4.7.2P Pharmaceutical Analysis- V [Practical | Regular]

CO ID.	Course Outcome
CO 1	Operate UV-VISIBLE spectrometer and Infra-red Spectrometer instruments
CO 2	Analyze test samples, Active Pharmaceutical Ingredients (APIs) and formulations using above instrument.
CO 3	Process & interpret the data obtained through experimentation and report the results as per regulatory requirements.
CO 4	Demonstrate working of gas chromatography

4.7.2T Pharmaceutical Analysis- V [Theory | Regular]

CO ID.	Course Outcome
CO 1	Apply the principles, instrumentation involved in Infra-red (FTIR, NIR) Raman, Atomic Emission spectroscopy, and their applications in Pharmaceutical industry and research.
CO 2	Apply the principle and instrumentation of Gas Chromatography, Flash Chromatography, Super critical fluid chromatography, and their applications in Pharmaceutical industry and research.
CO 3	Relate the principle and applications of the knowledge about electron microscopy.

4.7.3P Medicinal Chemistry III [Practical | Regular]

CO ID.	Course Outcome
CO1P	Synthesize, recrystallize and understand reaction mechanisms involved in synthesis of medicinally important organic compounds and monitoring reactions over TLC.
CO2P	Utilize the knowledge of Column chromatography for purification of synthesized compounds.
CO3P	Interpretation of IR spectra of synthesized compounds.
CO4P	Interpretationof NMR spectra of synthesized compounds

4.7.3T Medicinal Chemistry -III [Theory | Regular]

CO ID.	Course Outcome
CO1	Describe the general aspects of the design & development of drugs including classification, nomenclature, structure activity relationship (SAR), mechanism of action and synthesis of antibiotics.
CO2	Explain the history and general aspects of the design & development of drugs including classification, nomenclature, structure activity relationship (SAR), mechanism of action, adverse effects, therapeutic uses, recent developments, and drug synthesis of antineoplastic agents including recent drugs.
CO3	Memorize the chemistry of monoclonal antibodies and their analogues.

CO4	Elaborate the history and general aspects of the design & development of drugs including classification, nomenclature, structure activity relationship (SAR), mechanism of action, adverse effects, therapeutic uses, recent developments, and drug synthesis of various categoriesof anti-infective agents.

4.7.4 P Pharmacology- IV [Practical | Regular]

CO ID.	Course Outcome
CO1	To find out the concentration of given drugs using three point and four point bioassay method on suitable isolated tissue preparation
CO2	Discuss the drug antagonism using suitable isolated tissue preparation
CO3	Justify rationality and irrationality of fixed dose combinations using parameters such as pharmacodynamic, pharmacokinetic and side effects
CO4	Give proper patient counseling based on the rational use of drugs.
CO5	Explain antioxidant activity of standard drugs

4.7.4T Pharmacology- IV [Theory | Regular]

CO ID.	Course Outcome
CO1	Explain Classification, mechanism of action, antibacterial spectrum, resistance, therapeutic uses, adverse effects and contraindications of chemotherapy of infections.
CO2	Describe Pharmacology and pharmacotherapy of Antineoplastic agents and Immunomodulators
CO3	Recognize Pharmacology of Drugs acting on blood & blood forming organs
CO4	Describe Pharmacology of drug/s used for clinical management of Cardiovascular disorders and Kidney diseases
CO5	Explain Reactive oxygen intermediates, antioxidants and there therapeutic implications
CO6	Describe scope and study design of Safety Pharmacology

4.7.5 P Natural Drug Technology [Practical | Regular]

CO ID.	Course Outcome
CO3	Conduct preformulation parameters & understand underlying rationale
CO1	Prepare, label & evaluate herbal/TSM formulations
CO2	Evaluate marketed cosmetic & nutraceutical formulations
CO4	Conduct in vitro assays for correlation with biological efficacy

4.7.5 T Natural Drug Technology [Theory | Regular]

CO ID.	Course Outcome
CO1	Comprehend & explain various factors affect on level of secondary metabolites, how these can be minimized to ensure quality in raw material, effect of post harvesting changes during storage
CO4	Explain in vitro screening methods and its applications for biological evaluation of natural products
CO2	Understand & explain concept of health & pathogenesis, philosophical basis, diagnosis &treatment aspects of Ayurveda, Unani, Siddha &Homoepatic system of medicine
CO3	Understand and explain the applications of plant tissue culture for Secondary metabolite production.
CO5	Explain the approaches and potentials of herbal new drug delivery systems and various physical, chemical, spectroscopic means & methods used instructural elucidation of natural products

4.7.6T Biopharmaceutics and Pharmacokinetics [Theory | Regular]

CO ID.	Course Outcome
CO1	Understand the concept of biopharmaceuticsand relate different factors, types, mechanisms of absorption, distribution.
CO2	Understand different factors, types, mechanisms ofelimination.
CO3	Distinguish the clinical significance of bioavailability, bioequivalence.
CO4	Justify the importance of one compartment model in the study of pharmacokinetics.

CO5	Justify the importance of two compartment model in the study of pharmacokinetics
CO6	Interpret the non- linearity along with its significance and outline the applications of pharmacokinetics

4.7.7. T Pharmaceutical Jurisprudence [Theory | Regular]

CO ID.	Course Outcome
CO1	To understand the significance and relevance of Pharmaceutical laws in India
CO2	To understand basic principles, purpose and dimensions of the laws
CO3	Students will able to be aware of some other enactment which are directly or indirectly related to manufacture, distribution and sale of drugs in India
CO4	To understand the regulatory system for safety and effectiveness of medicine and quality of product

JSPM-RSCP

Subjectwise Course Outcome - [M Pharm (Pharmaceutical Quality Assurance) - 2020-21]

Semester1

106 Seminar/Assignment [Theory | Regular]

CO ID.	Course Outcome
CO 1	Critically analyze the literature
CO 2	Decide the criterion to select the journal of optimum potential
CO 3	Understand, analyze and evaluate the hypothesis
CO 4	Effectively communicate the concept of studied research articles

MPAT101T Modern Pharmaceutical Analytical Techniques [Theory | Regular]

CO ID.	Course Outcome
CO1	Demonstrate understanding on the working principle of different analytical techniques (spectroscopy, chromatography, electrophoresis, X ray Crystallography, Potentiometry and Thermal Techniques) and recognize their advantages and limitations.
CO2	Explain the instrumentation and working of the spectrophotometers, chromatographic instruments, Electrophoresis, X ray Crystallography and Thermal Techniques.
CO3	Interpret the UV-vis, IR, NMR and Mass spectra of various organic compounds and elucidate the structure of unknown organic compounds using combined spectroscopic data.
CO4	Analyze various drugs in single and combination dosage forms by spectrophotometric, chromatographic, potentiometric and electrophoresis techniques.
CO5	Analyze and integrate the data from X ray Crystallography and thermal techniques (DSC, DTA and TGA) for the characterization of API and formulations.

MQA 103T Quality Control and Quality Assurance [Theory | Regular]

CO ID.	Course Outcome
CO 1	Apply the GLP, cGMP aspects and ICH Guidelines in Pharmaceutical industry.
CO 2	Understand the responsibilities of QA & QC departments.
CO 3	Understand the scope and importance of quality control and IPQC test on various Pharmaceutical dosage form.
CO 4	Understand the Pharmaceutical manufacturing operations and control.
CO 5	Appreciate the importance of documentation.

MQA 105P Pharmaceutical Quality Assurance Practical I [Practical | Regular]

CO ID.	Course Outcome
CO 1	Operate different analytical instruments like UV Visible spectrophotometer, HPLC, flame photometer, Photofluorimeter, etc.
CO 2	Analyze Pharmacopoeial compounds in bulk and in their formulations (single & multi-component) by UV Visible spectrophotometer, HPLC, GC, flame photometer, Photo-fluorimeter, etc.
CO 3	Apply principles of TQM, Six Sigma, change Management/ Change control, Deviations, out of Specifications, Out of Trend, Corrective & Preventive Actions and deviations.
CO 4	Develop stability study protocol and estimateprocess capability.
CO 5	Perform in process and finished product quality control tests for dosage forms (tablets, capsules, parenterals and semisolid and primary and secondary packaging materials.

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CO 6 Carry out assay of raw materials as per official monographs and testing of related and foreign substances in drugs and raw materials.

CO 7 Perform pre formulation and accelerated stability studies study for tablets and parenterals.

MQA101T Quality Management System [Theory | Regular]

CO ID.	Course Outcome
CO1	Define the basic concepts, terminology of quality, quality control and quality management system.
CO2	Understand ISO management systems.
CO3	Apply tools for quality improvement
CO4	Analyze issues in quality
CO5	Evaluate quality of pharmaceuticals
CO6	Perform stability testing of drug and drug substances.
CO7	Demonstrate ability to use statistical approaches for quality.

MQA104T Product Development and Technology Transfer [Theory | Regular]

CO ID.	Course Outcome
CO1	To understand the new product development process
CO2	To understand preformulation studies, pilot plant scale up and Packaging requirements of various dosage forms and apply it to prepare stable formulations
CO3	To understand the necessary information to transfer technology from R&D to actual manufacturing by sorting out various information obtained during R&D
CO4	To elucidate necessary information to transfer technology of existing products between various manufacturing places.

Semester 3

302 Journal club [Theory | Regular]

CO ID.	Course Outcome
CO 1	Critically analyze the literature
CO 2	Decide the criterion to select the journal of optimum potential
CO 3	Understand, analyze and evaluate the hypothesis
CO 4	Effectively communicate the concept of studied research articles

MQA303 Discussion / Presentation (Proposal Presentation) [Theory | Regular]

CO ID.	Course Outcome
CO1	Critically collect and analyze the literature to design formulation, fabrication and evaluation of drug delivery systems
CO2	Understand, analyze and evaluate the principles of hypothesis testing.
CO3	Effectively present the concept of studied literature

MQA304 Research Work [Theory | Regular]

CO ID.	Course Outcome
CO1	Critically collect and analyze the literature to design formulation, fabrication and evaluation of drug delivery systems
CO2	Gather data related to research topic.
CO3	Explain key research concepts and issues to analyze and solve problem.

MQA395 Introduction to constitution [Theory | Regular]

CO ID.	Course Outcome
CO1	Understand and explain the significance of Indian Constitution as the fundamental law of the land.
CO2	Exercise his fundamental rights in proper sense at the same time identifies his responsibilities in national building.
CO3	Analyse the Indian political system, the powers and functions of the Union, State and Local Governments in detail.
CO4	Understand Electoral Process, Emergency provisions and Amendment procedure.

MRM301T Research Methodology and Biostatistics* [Theory | Regular]

CO ID.	Course Outcome
CO1	Understand the approach of doing research and parameters related to research
CO2	Apply knowledge of biostatistics to numerical data during research work
CO3	Perform animal study in accordance with CPCSEA guidelines

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Subjectwise Course Outcome - [M Pharm (Pharmaceutical Quality Assurance) - 2020-21]

Semester 2

206 Seminar/Assignment [Theory | Regular]

CO ID.	Course Outcome
CO 1	Critically analyze the literature
CO 2	Decide the criterion to select the journal of optimum potential
CO 3	Understand, analyze and evaluate the hypothesis
CO 4	Effectively communicate the concept of studied research articles

MQA 205P Pharmaceutical Quality Assurance Practical II [Practical | Regular]

CO ID.	Course Outcome
CO 1	Analyze environmental contaminants and residues.
CO 2	Calibrate, qualify and validate pharmaceutical equipments and analytical instruments.
CO 3	Validate different pharmaceutical processes and analytical methods.
CO 4	Prepare check list in auditing process.
CO 5	Apply principles of QbD and PAT in pharmaceutical manufacturing.

MQA201T Hazards and Safety Management [Theory | Regular]

CO ID.	Course Outcome
CO1	Understand about environmental problems among learners.
CO2	Impart basic knowledge about the environment and its allied problems.
CO3	Develop an attitude of concern for the industry environment.
CO4	Ensure safety standards in pharmaceutical industry
CO5	Provide comprehensive knowledge on the safety management
CO6	Empower an ideas to clear mechanism and management in different kinds of hazard management system
CO7	Teach the method of Hazard assessment, procedure, methodology for provide safe industrial atmosphere.

MQA202T Pharmaceutical Validation [Theory | Regular]

CO ID.	Course Outcome
CO1	Apply the concepts of calibration, qualification and validation.
CO2	Perform the qualification of various equipments and instruments.
CO3	Execute process validation of different dosage forms.
CO4	Validate analytical method for estimation of drugs.
CO5	Carry out cleaning validation of equipments employed in the manufacture of pharmaceuticals.
CO6	Analyze IP and file the patents.

MQA202T Audits andRegulatory Compliance [Theory | Regular]

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CO ID.	Course Outcome
CO 1	To comprehend the importance of auditing.
CO 2	To assimilate the methodology of auditing.
CO 3	To carry out the audit process (vendors, production department, Microbiological laboratory, Quality Assurance and engineering department in Pharmaceutical industry).
CO 4	To organize the auditing report.
CO 5	To prepare the check list for auditing.

MQA204T Pharmaceutical Manufacturing Technology [Theory | Regular]

CO ID.	Course Outcome
CO 1	Plan the layout of manufacturing unit.
CO 2	Explain the manufacturing conditions of sterile product and no sterile product manufacturing
CO 3	Analyze and select the various packaging material used in sterile and non-sterile formulations
CO 4	Explain the concept of QbD and PAT and plan the experiments based on QbD

Semester 4

401 Journal club [Theory | Regular]

CO ID.	Course Outcome
CO 1	Critically analyze the literature
CO 2	Decide the criterion to select the journal of optimum potential
CO 3	Understand, analyze and evaluate the hypothesis
CO 4	Effectively communicate the concept of studied research articles

MQA 403 Discussion/Final Presentation [Theory | Regular]

CO ID.	Course Outcome
CO1	Critically collect and analyze the literature to design formulation, fabrication and evaluation of drug delivery systems.
CO2	Understand, analyze and evaluate the principles of hypothesis testing.
CO3	Effectively present the concept of studied literature

MQA402 Research Work [Theory | Regular]

CO ID.	Course Outcome
CO1	Critically collect and analyze the literature to design formulation, fabrication and evaluation of drug delivery systems.
CO2	Gather data related to research topic.
CO3	Explain key research concepts and issues to analyze and solve problem.

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Subjectwise Course Outcome - [M Pharm (Pharmaceutics) - 2020-21]

Semester 1

106 Seminar/Assignment [Theory | Regular]

CO ID.	Course Outcome
CO 1	Critically analyze the literature
CO 2	Decide the criterion to select the journal of optimum potential
CO 3	Understand, analyze and evaluate the hypothesis
CO 4	Effectively communicate the concept of studied research articles

MPAT101T Modern Pharmaceutical Analytical Techniques [Theory | Regular]

CO ID.	Course Outcome
CO1	Demonstrate understanding on the working principle of different analytical techniques (spectroscopy, chromatography, electrophoresis, X ray Crystallography, Potentiometry and Thermal Techniques) and recognize their advantages and limitations.
CO2	Explain the instrumentation and working of the spectrophotometers, chromatographic instruments, Electrophoresis, X ray Crystallography and Thermal Techniques.
CO3	Interpret the UV-vis, IR, NMR and Mass spectra of various organic compounds and elucidate the structure of unknown organic compounds using combined spectroscopic data.
CO4	Analyze various drugs in single and combination dosage forms by spectrophotometric, chromatographic, potentiometric and electrophoresis techniques.
CO5	Analyze and integrate the data from X ray Crystallography and thermal techniques (DSC, DTA and TGA) for the characterization of API and formulations.

MPH102T Drug Delivery System [Theory | Regular]

CO ID.	Course Outcome
CO1	Design formulation, fabrication and evaluation of sustained, controlled and rate controlled, gastro- retentive, buccal, ocular, transdermal and protein –peptide drug delivery and vaccine delivery systems.
CO2	Understand the criteria for selection of drug and polymers for development of delivering system.
CO3	Apply knowledge to recent developments such as 3D printing, personalized medicines, telepharmacy and customized drug delivery systems.

MPH103T Modern Pharmaceutics [Theory | Regular]

CO ID.	Course Outcome
CO 1	To integrate the elements of pre-formulation studies
CO 2	To infer the process of validation
CO 3	To have a better understanding of industrial management and GMP considerations
CO 4	To relate the process of compaction and compression and diffusion parameters
CO 5	To illustrate the basic of optimization techniques & pilot plant scale up techniques

MPH104T Regulatory Affair [Theory | Regular]

CO ID.	Course Outcome

CO 1	To integrate the concepts of innovator and generic drugs, drug development process
CO 2	To infer the regulatory guidance's and guidelines for filing and approval process
CO 3	To relate the preparation of dossiers and their submission to regulatory agencies in different countries
CO 4	To illustrate the submission of global documents in CTD/ eCTD formats
CO 5	To be well verse with the clinical trials requirements for approvals for conducting clinical trials, Pharmacovigilence and process of monitoring in clinical trials

MPH105P Pharmaceutics Practical I [Practical | Regular]

CO ID.	Course Outcome
CO1	Operate different analytical instruments like UV Visible spectrophotometer, HPLC, flame photometer, Photofluorimeter
CO2	Analyze Pharmacopoeial compounds in bulk and in their formulations (single & multi-component) by UV Visible spectrophotometer, HPLC, GC, flame photometer, Photo-fluorimeter
CO3	Use knowledge to perform dissolution of CR/SR formulations and study effect of particle size and binder on it
CO4	Analyze preformulation studies such as compression force, micromeritics and particle size to design tablet
CO5	Design sustained release matrix, osmotically controlled, floating, hydro dynamically balanced drug delivery systems and transdermal patches

Semester 3

302 Journal club [Theory | Regular]

CO ID.	Course Outcome
CO 1	Critically analyze the literature
CO 2	Decide the criterion to select the journal of optimum potential
CO 3	Understand, analyze and evaluate the hypothesis
CO 4	Effectively communicate the concept of studied research articles

303 Discussion / Presentation (Proposal Presentation) [Theory | Regular]

CO ID.	Course Outcome
CO1	Critically collect and analyze the literature to design formulation, fabrication and evaluation of drug delivery systems.
CO2	Understand, analyze and evaluate the principles of hypothesis testing.
CO3	Effectively present the concept of studied literature

304 Research Work [Theory | Regular]

CO ID.	Course Outcome
CO1	Critically collect and analyze the literature to design formulation, fabrication and evaluation of drug delivery systems.
CO2	Gather data related to research topic.
CO3	Explain key research concepts and issues to analyze and solve problem.

MPH395 Introduction to constitution [Theory | Regular]

CO ID.	Course Outcome
CO1	Understand and explain the significance of Indian Constitution as the fundamental law of the land.
CO2	Exercise his fundamental rights in proper sense at the same time identifies his responsibilities in national building.
CO3	Analyse the Indian political system, the powers and functions of the Union, State and Local Governments in detail.
CO4	Understand Electoral Process, Emergency provisions and Amendment procedure.

MRM301T Research Methodology and Biostatistics* [Theory | Regular]

CO ID.	Course Outcome
CO1	Understand the approach of doing research and parameters related to research
CO2	Apply knowledge of biostatistics to numerical data during research work
CO3	Perform animal study in accordance with CPCSEA guidelines

JSPM-RSCP

Subjectwise Course Outcome - [M Pharm (Pharmaceutics) - 2020-21]

Semester 2

206 Seminar/Assignment [Theory | Regular]

CO ID.	Course Outcome
CO 1	Critically analyze the literature
CO 2	Decide the criterion to select the journal of optimum potential
CO 3	Understand, analyze and evaluate the hypothesis
CO 4	Effectively communicate the concept of studied research articles

MIP201T Advanced Biopharmaceutics & Pharmacokinetics [Theory | Regular]

CO ID.	Course Outcome
CO1	Understand the concept of biopharmaceuticsand relate different factors, types, mechanisms of absorption, distribution.
CO2	Understand different factors, types, mechanisms ofelimination.
CO3	Distinguish the clinical significance of bioavailability, bioequivalence.
CO4	Justify the importance of one compartment model in the study of pharmacokinetics.
CO5	Justify the importance of two compartment model in the study of pharmacokinetics
CO6	Interpret the non- linearity along with its significance and outline the applications of pharmacokinetics

MPH201T Molecular Pharmaceutics (Nano Tech and Targeted DDS) [Theory | Regular]

CO ID.	Course Outcome
CO1	Use various approaches for development of novel drug delivery systems such as nanoparticles, liposomes, microspheres, pulmonary drug delivery systems, nucleic acid based therapeutic delivery system.
CO2	Select drugs and polymers for the development of NTDS
CO3	Understand recent developments on antisense molecules and aptamers

MPH203T Computer Aided Drug Development [Theory | Regular]

CO ID.	Course Outcome
CO1	Understand the history of computers and apply the different statistical techniques in the pharmaceutical research and development.
CO2	To apply the concept of QbD in pharmaceutical research and development
CO3	Predict the effect of transporters on the disposition of drugs which include parameters of drug absorption, distribution, and excretion.
CO4	Use design of experiments in the formulation and evaluate all the formulation parameters systematically and in timely manner to optimize the formulation and the manufacturing process.
CO5	Understand the ethical issues related to the use of computers in R& D and in market analysis.
CO6	Understand the parameters used for model construction and the sensitivity predicted pharmacokinetic responses to various input parameters. Virtual trials for in silico modeling of drug absorption and the influence of food on drug absorption, as well as correlation between the in vitro and in vivo results.
CO7	Apply the knowledge of different simulation model in selecting the compound, dose selection, study design, patient-population selection and product labeling.
CO8	Use computers as a clinical data management system in clinical research to manage the data generated in a clinical trial.

CO9	Apply the knowledge of artificial intelligence in pharmaceutical industry for product development, the knowledge of computational fluid dynamics as a tool for generating solutions for fluid flows and knowledge of robotics in pharmaceutical manufacturing

MPH204T Cosmetic & Cosmeceuticals [Theory | Regular]

CO ID.	Course Outcome
CO 1	To infer the key ingredients used in cosmetics and cosmeceuticals
CO 2	To relate the design and evaluation of external and topical cosmetics
CO 3	To integrate a better understanding of regulatory aspects of cosmetic and cosmeceuticals
CO 4	To illustrate the basic of herbal cosmetics
CO 5	To be well verse with the scientific knowledge to develop cosmetics and cosmeceuticals with desired safety, stability, and efficacy

MPH205P Pharmaceutics Practical II [Practical | Regular]

CO ID.	Course Outcome
CO1	Understand the effect of temperature change, non solvent addition, incompatible polymer addition in microcapsules preparation.
CO2	Design alginate beads, gelatin /albumin microspheres, liposomes/niosomes, spherules.
CO3	Improve dissolution characteristics of slightly soluble drug by solid dispersion technique as well as compare dissolution of two different marketed products /brands.
CO4	Understand a highly protein bound drug & poorly protein bound drug.
CO5	Understand bioavailability studies of paracetamol in animals, pharmacokinetic and IVIVC data analysis and in vitro cell studies for permeability and metabolism and clinical data collection manual.
CO6	Design formulation using Quality-by-design and DoE using Design Expert Software.
CO7	Apply simulations in pharmacokinetics and pharmacodynamics, computational modeling of drug disposition, sensitivity analysis, and population modeling.
CO8	Design creams, shampoo, toothpaste base as well as to address dry skin, acne, blemish, wrinkles, bleeding gums and dandruff

Semester 4

401 Journal club [Theory | Regular]

CO ID.	Course Outcome
CO 1	Critically analyze the literature
CO 2	Decide the criterion to select the journal of optimum potential
CO 3	Understand, analyze and evaluate the hypothesis
CO 4	Effectively communicate the concept of studied research articles

402 Research Work [Theory | Regular]

CO ID.	Course Outcome
CO1	Critically collect and analyze the literature to design formulation, fabrication and evaluation of drug delivery systems.
CO2	Gather data related to research topic.
CO3	Explain key research concepts and issues to analyze and solve problem.

403 Discussion/Final Presentation [Theory | Regular]

CO ID.	Course Outcome
CO1	Critically collect and analyze the literature to design formulation, fabrication and evaluation of drug delivery systems.
CO2	Understand, analyze and evaluate the principles of hypothesis testing.

CO3 Effectively present the concept of studied literature