BHARATI VIDYAPEETH (DEEMED TO BE UNIVERSITY)
POONA COLLEGE OF PHARMACY, PUNE
CO-PO mapping for M. Pharm. (CBCS-2019 Course PCI) (Program Code: 923)

DEPARTMENT OF PHARMACEUTICS (923-892)

Year Semester: M. Pharm. Semester I
Subject Name: Modern Pharmaceutical Analysis (Theory)
Course: PCI syllabus
Course Code: 20708

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
CO1: Comprehend the basic concepts of UV-Visible, IR and NMR spectroscopic techniques and Mass spectrometry,	3	3	1	2	3	1	3	2	3	3	1	1	2	3
CO: Explain instrumentation and their functions of UV-Visible, IR and NMR spectroscopy techniques and Mass spectrometry	3	3	1	2	3	1	3	2	3	3	1	1	2	3
CO3: Apply the chromatographic and electrophoresis separation for analysis of drugs.	3	3	1	3	3	3	2	2	3	3	1	1	2	3
CO4: Describe Immunological assays and X-ray crystallographic techniques	3	3	1	2	3	1	3	2	3	3	1	1	2	3
CO5: Interpret UV-Vis, IR, NMR and Mass spectra	3	3	1	3	3	3	3	2	3	3	1	1	2	3
CO6: Select and apply suitable instrumental analytical techniques to asses purity and safety of pharmaceuticals for the benefit of society	3	3	1	3	3	3	3	2	3	3	1	1	2	3
Average	**3**	**3**	**1**	**2.5**	**3**	**2**	**2.83**	**2**	**3**	**3**	**1**	**1**	**2**	**3**

Year Semester: M. Pharm. Semester I
Subject Name: Drug Delivery Systems (Theory)
Course: 2019 Syllabus
Course Code: 20717

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
CO1:Understand concept of sustained, controlled release formulations and 3D printing in pharmaceuticals	3	2	1	3	2	1	1	2	2	1	3	3	1	1
CO2: Identify different types of rate-controlled drug delivery systems.	2	3	1	2	2	1	1	1	2	2	2	1	1	2
CO3: Compare various Gastroretentive drug delivery systems.	3	3	2	1	2	1	1	1	3	1	1	3	1	1
CO4: Describe ocular drug delivery system, barrier of drug permeation and methods to overcome barriers.	2	3	2	1	2	1	2	1	2	1	2	1	2	2
CO5: Discuss formulation and evaluation aspects of transdermal drug delivery system.	3	2	2	1	3	2	1	2	3	2	2	1	1	2
CO6: Formulate and evaluate protein and peptide drug delivery system and understand concept of vaccine.	3	3	2	2	1	3	1	2	2	3	2	3	2	1
Average	**2.66**	**2.66**	**1.66**	**1.66**	**2**	**1.5**	**1.16**	**1.5**	**2.33**	**1.66**	**2**	**2**	**1.33**	**1.5**

Year Semester: M. Pharm. Semester I
Subject Name: Modern Pharmaceutics (Theory)
Course: 2019 Syllabus
Course Code: 20728

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
CO1: Understand concepts of pre-formulation studies of various dosage forms.	3	1	2	3	2	2	2	2	3	2	2	3	3	2
CO2: Identify the importance of API in the development of branded and generic products.	2	2	3	3	3	3	2	1	2	1	3	3	2	3
CO3: Compare the regulatory aspects associated with calibration and validation of processes and equipments.	1	3	2	1	1	1	1	2	2	2	3	2	2	2
CO4: Describe concept of cGMP and industrial management.	2	2	1	2	3	2	2	2	3	3	2	1	3	1
CO5: Know compression, compaction and consolidation parameters.	1	2	2	2	2	2	2	3	2	2	1	2	3	2
CO6: Understand optimization and pilot plant scale up techniques.	3	2	3	1	2	2	3	2	2	3	2	3	1	3
Average	**2**	**2**	**2.16**	**2**	**2.16**	**2**	**2**	**2**	**2.33**	**2.16**	**2.16**	**2.33**	**2.33**	**2.16**

Year Semester: M. Pharm. Semester I

Subject Name: Regulatory Affairs (Theory)
Course: 2019 Syllabus
Course Code: 20739

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
CO1: Illustrate the concepts of innovator and generic drugs.	3	2	1	2	3	2	2	2	2	2	3	2	1	2
CO2: Identify the regulatory guidance and guidelines for filing and approval of drug products.	2	3	2	2	3	1	1	2	3	1	2	1	2	3
CO3: Design Dossiers for submission to regulatory agencies in different countries.	2	2	3	2	2	2	2	1	2	3	2	3	3	1
CO4: Assess regulatory requirements for conducting clinical trials.	1	1	2	2	3	3	2	3	1	3	1	2	2	2
CO5: Plan pharmacovigilance activities.	2	3	2	3	2	2	2	1	2	1	3	1	3	3
CO6: Discuss post approval regulatory requirements for actives and drug products.	2	2	1	3	3	1	3	2	3	2	3	3	2	2
Average	**2**	**2.16**	**1.83**	**2.33**	**2.66**	**1.83**	**2**	**1.83**	**2.16**	**2**	**2.33**	**2**	**2.16**	**2.16**

Year Semester: M. Pharm. Semester I

Subject Name: Pharmaceutics Practical I
Course: 2019 Syllabus
Course Code: 20750

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
CO1: Understand dissolution of sustained and controlled release formulation.	3	2	2	1	3	2	1	2	2	1	2	1	3	1
CO2: Compare dissolution profile of prepared formulation with marketed formulation.	2	3	3	2	2	2	2	3	3	2	1	2	2	2
CO3: Estimate effect of particle size and binder concentration on dissolution of tablet.	3	2	1	2	1	2	1	2	2	3	3	3	1	2
CO4: Compute micromeritic properties of powders and granules.	2	3	3	3	2	2	2	3	2	2	2	2	2	2
CO5: Study formulation and development of transdermal patch.	3	2	2	2	2	3	2	2	3	3	2	3	1	3
CO6: Study Heckel, Higuchi and Peppas's plot.	1	1	2	2	3	1	2	3	2	2	3	2	2	2
Average	**2.33**	**2.14**	**2.16**	**2**	**2.16**	**2**	**1.66**	**2.5**	**2.33**	**2.16**	**2.16**	**2.16**	**1.83**	**2**

Year Semester: M. Pharm. Semester II
Subject Name: Molecular Pharmaceutics (Nano Tech and Targeted DDS) (Theory)
Course: 2019 Syllabus
Course Code: 20763

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
CO1: Apply the concept of drug targeting in the treatment of various diseases.	3	2	2	3	3	2	3	2	3	2	2	3	2	2
CO2: Understand formulation and evaluation of nanoparticles and liposomes.	3	1	1	3	2	2	2	3	2	3	3	2	2	3
CO3: Compare micro capsule and micro sphere-based systems.	1	2	2	1	2	3	1	2	2	1	3	3	3	3
CO4: Study formulation and evaluation of transdermal and pulmonary systems.	2	3	3	2	3	2	3	2	3	2	2	3	2	3
CO5: Apply nucleic acid based therapeutic delivery for management of hereditary disorders and cancer.	2	3	2	3	1	1	2	3	2	3	1	2	2	2
CO6: Compute the biopharmaceutics and pharmacokinetic parameters.	1	2	2	2	2	2	2	2	1	3	2	1	1	2
Average	**2**	**2.16**	**2**	**2.33**	**2.16**	**2**	**2.16**	**2.33**	**2.16**	**2.33**	**2.16**	**2.33**	**2**	**2.5**

Year Semester: M. Pharm. Semester II

Subject Name: Advance Pharmaceutics and Pharmacokinetics (Theory)
Course: 2019 Syllabus
Course Code: 20774

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
CO1: Understand basic concepts of biopharmaceutics and pharmacokinetics.	1	3	2	3	3	2	2	2	3	2	1	2	2	3
CO2: Identify raw materials to derive for various pharmacokinetic models and parameters for the effective ADME of drug molecule.	3	2	3	3	2	2	2	3	2	2	2	3	3	2
CO3: Compare biopharmaceutical studies including drug product equivalency.	3	2	2	2	3	2	2	2	3	2	2	3	2	3
CO4: Describe the evaluation of the dosage forms using biopharmaceutic and pharmacokinetic parameters.	2	3	3	2	3	3	1	2	3	2	1	3	3	2
CO5: Know potential clinical pharmacokinetic parameters.	2	2	2	3	3	3	2	2	2	2	2	2	2	3
CO6: Understand the basics of pharmacokinetic to solve the clinical pharmacokinetic problems.	1	2	1	1	1	2	1	2	3	1	2	1	1	1
Average	**2**	**2.28**	**2.16**	**2.33**	**2.5**	**2.33**	**1.66**	**2.16**	**2.66**	**1.83**	**1.66**	**2.33**	**2.16**	**2.33**

Year Semester: M. Pharm. Semester II
Subject Name: Computer Aided Drug Delivery System (Theory)
Course: 2019 Syllabus
Course Code: 20785

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
CO1: Understand concepts of computational modeling for the drug disposition.	2	2	2	2	3	2	1	2	2	3	2	3	2	2
CO2: Identify the importance of computers in the market analysis.	2	3	2	3	3	2	2	2	3	2	2	2	2	3
CO3:Know the computers in preclinical studies	3	3	3	2	2	3	3	1	2	1	1	3	3	2
CO4: Learn artificial intelligence and robotics in drug development.	3	2	3	3	3	3	1	3	3	2	1	2	2	3
CO5: Apply various pharmaceutical techniques in pharmaceutical formulation.	3	3	1	2	2	2	2	2	3	1	3	1	1	2
CO6: Understand computer aided biopharmaceutical characterization of formulation.	1	2	1	3	1	1	2	2	2	1	3	1	2	1
Average	**2.33**	**2.42**	**2**	**2.5**	**2.33**	**2.16**	**1.83**	**2**	**2.5**	**1.66**	**2**	**2**	**2**	**2.16**

Year Semester: M. Pharm. Semester II
Subject Name: Cosmetics and Cosmeceuticals (Theory)
Course: 2019 Syllabus
Course Code: 20796

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
CO1: Understand key ingredients used in cosmetics and cosmeceuticals.	2	2	3	2	2	3	2	3	2	2	2	2	2	2
CO2: Know key building blocks for various formulations.	2	3	2	3	3	2	2	3	2	2	3	2	2	2
CO3: Study regulatory and biological aspects for cosmeceuticals.	2	2	3	3	3	2	2	3	2	2	2	2	2	2
CO4: Identify different design of cosmeceutical products.	2	2	3	3	3	2	2	2	2	2	3	3	2	3
CO5: Understand the challenges in formulating herbal cosmetics.	2	3	2	2	2	2	2	1	2	2	2	2	2	2
CO6: Formulate and evaluate various cosmetics and cosmeceuticals.	2	3	2	2	3	2	2	2	2	2	2	2	2	2
Average	**2**	**2.42**	**2.5**	**2.5**	**2.66**	**2.16**	**2**	**2.33**	**2**	**2**	**2.33**	**2.14**	**2**	**2.16**

Year Semester: M.Pharm. Semester II
Subject Name: Pharmaceutics Practical II
Course: 2019 Syllabus
Course Code: 20807

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
CO1: Understand dissolution improvement approach of poorly soluble drug using solid dispersion technique.	3	2	3	3	3	1	1	1	2	2	1	2	3	2
CO2: Prepare and evaluate nanocarrier systems (niosomes& liposomes).	3	3	2	3	2	3	2	2	3	3	2	3	2	3
CO3: Study preparation methods of microcapsule.	2	2	3	2	3	2	2	2	2	2	3	2	3	2
CO4: Demonstrate pharmacokinetic and IV-IVC data analysis by Winonlin software.	2	3	2	1	1	2	3	3	2	3	2	2	2	1
CO5: Describe importance of design of experiment and quality by design for pharmaceutical development.	3	2	2	2	2	3	2	3	3	1	3	3	1	2
CO6: Prepare and evaluate microspheres and spherules.	1	2	1	3	3	2	3	2	2	3	1	2	2	3
Average	**2.33**	**2.33**	**2.16**	**2.33**	**2.33**	**2.16**	**2.16**	**2.16**	**2.33**	**2.33**	**2**	**2.33**	**2.16**	**2.16**

DEPARTMENT OF PHARMACEUTICAL CHEMISTRY (923-891)

Year Semester: M. Pharm. Semester I
Subject Name: Advanced Organic Chemistry - I (Theory)
Course: 2019 Syllabus
Course Code: 20716

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
CO1:Describe and apply retrosynthesis	2	3	3	3	2	1	1	3	2	3	2	2	1	3
CO2: Mechanize and apply various named reactions	3	3	2	2	2	2	2	3	2	2	2	2	1	2
CO3: Conceptualize the disconnection approach and develop new synthetic routes for small molecules	3	3	2	2	2	2	2	3	2	2	1	1	2	1
CO4:Employ various catalyst in organic reaction	3	3	2	3	2	2	2	2	2	1	2	2	2	2
CO5: Synthesize heterocyclic compound	2	3	3	2	3	2	3	2	2	1	1	1	2	1
CO6:Carry the synthesis of compounds by blocking competing groups	3	3	3	3	3	2	2	3	2	2	1	2	2	2
Average	**2.66**	**3**	**2.5**	**2.5**	**2.33**	**1.83**	**2**	**2.66**	**2**	**1.83**	**1.5**	**1.66**	**1.66**	**1.833**

Year Semester: M. Pharm. Semester I

Subject Name: Advanced Medicinal Chemistry (Theory)
Course: 2019 Syllabus
Course Code: 20727

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
CO1: Explain different stages of drug discovery	3	3	3	2	2	3	3	3	1	1	3	3	3	2
CO2: Describe role of medicinal chemistry in drug research	3	3	3	2	2	3	3	3	1	1	3	3	3	2
CO3: Apply different techniques for drug discovery	3	3	3	2	2	3	3	3	3	1	3	3	3	2
CO4: Design and develop new drug like molecules for biological targets	3	3	3	3	3	3	3	3	3	1	3	3	3	2
CO5: Synthesize new peptidomimetic drugs	3	3	3	2	3	3	3	3	3	3	3	3	3	2
CO6: A detailed understanding of the processes involved in the design, development and discovery of medicinal compounds.	3	3	3	2	3	3	3	3	1	1	3	3	3	3
Average	**3**	**3**	**3**	**2.2**	**2.5**	**3**	**3**	**3**	**2**	**1.3**	**3**	**3**	**3**	**2.2**

Year Semester: M. Pharm. Semester I
Subject Name: Chemistry of Natural Product (Theory)
Course: 2019 syllabus
Course Code: 20738

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
CO1:Categorize different types of natural compounds on the basis of chemistry	3	3	3	2	2	1	1	2	1	2	1	1	1	2
CO2: Describe importance of natural compounds as lead molecules for new drug development	3	3	3	3	1	2	1	2	1	2	1	2	2	2
CO3: Conceptualize rDNA technology tool for new drug discovery	2	2	1	1	1	1	1	2	1	2	1	2	2	2
CO4: Elucidate the structure of natural compounds	3	3	2	3	3	2	2	2	1	3	1	2	2	3
CO5: Isolate, purify and characterize constituents from natural source	3	3	2	3	2	2	2	2	2	3	1	2	2	3
CO6: Explain the uses of different natural products in treating the diseases	3	3	1	2	2	1	1	1	2	2	1	1	1	2
Average	**2.83**	**2.83**	**2**	**2.33**	**1.83**	**1.5**	**1.33**	**1.83**	**1.33**	**2.33**	**1**	**1.67**	**1.67**	**2.33**

Year Semester: M. Pharm. Semester I

Subject Name: Pharmaceutical Chemistry Practical I
Course: 2019 Syllabus
Course Code: 20749

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
CO1:Analyze the samples by employing advanced instruments	3	2	2	3	2	2	2	2	2	2	1	1	2	2
CO2: Perform important named reactions	3	3	2	2	2	2	2	2	2	2	1	2	2	2
CO3:Characterize medicinally important compounds for their structures	3	2	1	2	2	2	2	3	2	2	1	1	2	2
CO4: Estimate the elements and groups present chemical compounds of any origin	3	2	1	2	2	2	2	2	2	1	1	2	2	2
CO5: Ascertain the physical properties of compounds	3	2	2	2	2	2	2	2	2	1	1	1	2	1
CO6: Determine the presence of degraded products	3	1	2	2	2	2	2	3	2	2	1	2	2	3
Average	**3**	**2**	**1.67**	**2.17**	**2**	**2**	**2**	**2.33**	**2**	**1.67**	**1**	**1.5**	**2**	**2**

Year Semester: M. Pharm**.** Semester II

Subject Name: Advanced Spectral Analysis (Theory)
Course: PCI Syllabus
Course Code: 20762

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
CO1: Calculate absorption max using woodward fieser rules	3	3	3	3	3	2	3	2	3	3	1	1	2	3
CO2: Describe concepts of hyphenated instruments techniques, Thermal analysis and radio immunoassay	3	3	3	2	3	2	3	2	3	3	1	1	2	3
CO3: Interpret IR, NMR and Mass spectra of organic compounds	3	3	3	3	3	2	3	2	3	3	1	1	2	3
CO4: Apply analytical techniques for characterization of drugs	3	3	3	3	3	2	3	2	3	3	1	1	2	3
CO5:Apply chromatographic techniques for analysis of Pharmaceuticals	3	3	3	3	3	2	3	2	3	3	1	1	2	3
CO6:Select suitable methods of analysis for analysis of Pharmaceuticals	3	3	3	3	3	2	3	2	3	3	1	1	2	3
Average	**3**	**3**	**3**	**2.83**	**3**	**2**	**3**	**2**	**3**	**3**	**1**	**1**	**2**	**3**

Year Semester: M. Pharm**.** Semester II
Subject Name: Advanced Organic Chemistry II (Theory)

Course: 2019 Syllabus
Course Code: 20773

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
CO1: Able to utilize the green synthesis approaches for drug synthesis	1	2	3	2	2	1	3	3	2	3	2	2	1	2
CO2: Understand the application peptide synthesis reaction for development of pharmaceuticals	3	2	2	2	2	2	3	2	2	3	3	3	1	3
CO3:Conceptualize the catalyst used for pharmaceutical medicinal synthesis	2	2	1	2	2	2	3	3	2	2	2	3	2	2
CO4:Should be able to understand utilization of varoius catalyst in organic reaction	1	3	2	2	2	2	3	2	2	3	2	1	2	3
CO5: Able to apply asymmetric and stereochemical synthetic approaches for drug development	2	2	2	2	2	3	3	1	1	2	3	2	2	2
CO6: Able to use the photochemical method for the synthesis of drugs	2	1	2	2	2	2	3	2	2	2	2	1	3	1
Average	**1.83**	**2**	**2**	**2**	**2**	**2**	**3**	**2.33**	**1.83**	**2.5**	**2.17**	**2**	**1.83**	**2.17**

Year Semester: M. Pharm. Semester II
Subject Name: Computer Aided Drug Design (Theory)
Course: 2019 Syllabus

Course Code: 20784

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
CO1: Explain the role of CADD in drug discovery	3	1	3	1	1	1	1	3	2	2	3	2	3	2
CO2: Apply different CADD techniques in drug design	3	2	3	3	2	3	2	3	3	3	3	2	2	2
CO3: Apply different CADD techniques in drug design	3	2	3	3	2	3	3	3	3	3	3	3	3	1
CO4: Work efficiently with molecular modeling softwares	3	2	3	3	2	3	2	3	3	3	3	2	3	2
CO5: Employ in silico virtual screening protocols	3	3	3	3	3	3	3	3	3	3	3	1	3	3
CO6: Calculate molecular properties and correlate with biological activities	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Average	**3**	**2.16**	**3**	**2.66**	**2.16**	**2.66**	**2.33**	**3**	**2.83**	**2.83**	**3**	**2.16**	**3**	**2.16**

Year Semester: M. Pharm. Semester II
Subject Name: Pharmaceutical Process Chemistry (Theory)
Course: 2019 Syllabus

Course Code: 20795

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
CO1: Understand various unit operations and various reactions in process chemistry.	3	1	2	2	1	1	1	3	1	1	3	1	1	3
CO2: Apply knowledge on the development and optimization of a scale up synthetic route/s.	3	3	3	3	1	2	1	3	2	2	3	2	2	3
CO3: The pilot plant procedure for the manufacture of Active Pharmaceutical Ingredients and new chemical entities for the drug development phase.	3	3	3	3	2	3	1	3	3	2	3	3	2	3
CO4: Develop synthetic routes that are safe, cost-effective, environmentally friendly & efficient.	3	3	3	3	3	3	3	3	3	3	3	2	3	3
CO5: Analyse the outcome of organic reactions using a basic understanding of the general reactivity of functional groups and mechanism.	3	3	3	3	3	3	3	3	3	3	3	3	3	2
CO6: Evaluate the principles and applications of modern chemical instrumentation, experimental design, and data analysis.	3	3	3	3	3	3	3	3	3	3	2	3	3	3
Average	**3**	**2.67**	**2.83**	**2.83**	**2.17**	**2.5**	**2**	**3**	**2.5**	**2.33**	**3**	**2.33**	**2.6**	**2.83**

Year Semester: M. Pharm. Semester II
Subject Name: Pharmaceutical Chemistry Practical II
Course: 2019 Syllabus

Course Code: 20806

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
CO1: Conducts experiments using oxidation, reduction and nitration reactions	3	3	3	2	2	3	3	3	1	1	3	3	3	2
CO2: Synthezize important active pharmaceutical ingredients comparatively	3	3	3	2	2	3	3	3	1	1	3	3	3	2
CO3: Anayse the structure & purity by using advanced instrumental data	3	3	3	2	2	3	3	3	3	1	3	3	3	2
CO4: Compute different physicochemical properties	3	3	3	3	3	3	3	3	3	1	3	3	3	2
CO5: Design new medicinally important molecules by computational tools	3	3	3	2	3	3	3	3	3	3	3	3	3	2
CO6: Employ advanced synthetic techniques including microwave and parallel synthesis	3	3	3	2	3	3	3	3	1	1	3	3	3	3
Average	**3**	**3**	**3**	**2.2**	**2.5**	**3**	**3**	**3**	**2**	**1.3**	**3**	**3**	**3**	**2.2**

Year Semester: M. Pharm. Semester I
Subject Name: Quality Management Systems (Theory)
Course: 2019 Syllabus
Course Code: 20721

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
CO1:To understand the importance of quality and ISO management systems	3	3	3	3	2	3	3	3	1	1	3	3	3	2
CO2: To understand the tools for quality improvement	3	2	3	2	2	3	1	3	1	1	3	3	3	3
CO3:To study Quality evaluation of pharmaceuticals	3	3	3	2	2	3	1	3	3	1	3	3	3	2
CO4: To understand Stability testing of drug and drug substances	3	2	3	3	3	3	1	3	3	1	3	3	3	2
CO5: To understand the Quality evaluation of pharmaceuticals	3	2	3	2	3	3	2	3	3	3	3	3	3	3
CO6: To study the Statistical approaches for quality	3	3	3	3	3	3	1	3	1	1	3	3	3	3
Average	**3**	**2.5**	**3.0**	**2.5**	**2.5**	**3.0**	**1.5**	**3.0**	**2.0**	**1.3**	**3.0**	**3.0**	**3.0**	**2.5**

Year Semester: M. Pharm. Semester I

Subject Name: Quality Control and Quality Assurance (Theory)
Course: 2019 Syllabus
Course Code: 20732

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
CO1: Understand the cGMP aspects in a pharmaceutical industry	3	3	3	3	2	3	2	3	1	1	3	3	2	2
CO2: To appreciate the importance of documentation	3	2	3	2	2	3	1	3	1	1	3	3	3	3
CO3: To understand the scope of quality certifications applicable to Pharmaceutical industries	3	3	3	2	2	3	1	3	3	1	3	3	2	2
CO4: To understand the responsibilities of QA & QC departments	3	2	3	3	3	3	1		3	1	3	3	3	2
CO5: To understand the in process quality control tests for different dosage forms	3	2	3	3	3	3	1	3	3	1	3	3	3	2
CO6: To understand manufacturing process and IPR	3	2	3	2	3	3	2	3	3	3	3	3	3	3
Average	**3**	**2.4**	**3**	**2.4**	**2.4**	**3**	**1.4**	**3**	**2.2**	**1.4**	**3**	**3**	**2.6**	**2.4**

Year Semester: M. Pharm. Semester I

Subject Name: Product Development and Technology Transfer (Theory)
Course: 2019 Syllabus
Course Code: 20743

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
CO1: To understand the new product development process	3	3	3	3	2	3	3	3	1	1	3	3	3	2
CO2: To understand the necessary information to transfer technology from R&D	3	2	3	2	2	3	1	3	1	1	3	3	3	3
CO3: To understand the Pharmaceutical dosage form and their packaging requirments	3	3	3	2	2	3	1	3	3	1	3	3	2	2
CO4:To study the different principles of Drug discovery and development	3	3	3	2	2	3	1	3	3	1	3	3	3	2
CO5: To study concept of pilot plant scale up	3	2	3	3	3	3	1	3	3	1	3	3	3	2
CO6: To understand the new product development process- SUPAC and BACPAC	3	2	3	2	3	3	2	3	3	3	3	3	3	3
Average	**3**	**2.4**	**3**	**2.4**	**2.4**	**3**	**1.6**	**3**	**2.2**	**1.4**	**3**	**3**	**3**	**2.4**

Year Semester: M. Pharm. Semester I

Subject Name: Pharmaceutical Quality Assurance Practical I
Course: 2019 Syllabus
Course Code: 20754

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
CO1: Understand the analysis of Pharmacopoeial compounds in bulk and in their formulations	3	2	3	3	2	2	2	3	2	1	3	3	2	3
CO2: To study case studies on Total Quality Management, Six sigma and CAPA	3	2	3	2	2	3	1	3	1	2	3	3	3	3
CO3: To perform preformulation studies for tablets and parenterals	3	3	3	2	2	3	2	3	3	1	3	2	2	2
CO4: To perform experiments based on HPLC, GC and other analytical instruments	3	2	3	3	3	3	1	3	3	1	3	3	3	2
CO5: To perform testing of related and foreign substances in drugs and raw materials	3	2	3	2	3	3	2	3	3	3	3	3	3	3
CO6: To perform IPQC testing of pharmaceuticals	3	3	3	2	2	3	2	3	3	1	3	2	2	2
Average	**3**	**2.3**	**3**	**2.3**	**2.3**	**2.8**	**1.6**	**3**	**2.5**	**1.5**	**3**	**2.6**	**2.5**	**2.5**

Year Semester: M. Pharm. Semester II
Subject Name: Hazards and Safety Management (Theory)
Course: 2019 Syllabus
Course Code: 20767

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
CO1: Understand various environmental hazards, including air, water, soil, and chemical risks.	1	1	1	1	1	1	1	1	1	3	3	3	1	1
CO2: Explain the sources and characteristics of air-based and chemical hazards.	2	2	2	2	2	2	2	2	2	1	1	3	1	1
CO3: Apply fire prevention and protection measures in pharmaceutical industry settings.	1	1	1	1	1	1	1	1	1	1	1	1	1	1
CO4: Analyze safety regulations and assess potential risks in diverse industrial processes.	2	2	2	2	2	2	2	2	2	1	1	1	1	1
CO5: Develop comprehensive safety management plans for pharmaceutical environments.	1	1	1	1	1	1	1	1	1	1	1	1	1	1
CO6: Evaluate the effectiveness of workplace self-protective measures and safety programs.	1	1	1	2	2	3	3	1	1	1	1	2	2	2
Average	**1.33**	**1.33**	**1.33**	**1.5**	**1.5**	**1.67**	**1.67**	**1.33**	**1.33**	**1.33**	**1.33**	**1.83**	**1.17**	**1.17**

Year Semester: M. Pharm. Semester II
Subject Name: Pharmaceutical Validation (Theory)
Course: 2019 Syllabus
Course Code: 20778

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
CO1: Define calibration, qualification, and validation concepts and their importance.	1	1	1	1	2	1	1	2	1	1	1	1	1	1
CO2: Apply qualification processes to various pharmaceutical equipment and instruments.	1	2	1	1	1	2	1	1	1	1	1	1	1	1
CO3: Understand the principles of process validation and documentation requirements.	1	1	1	1	1	2	2	2	2	1	2	1	1	1
CO4: Analyze and validate analytical methods in accordance with ICH guidelines and USP.	1	3	1	2	1	2	2	3	2	1	2	1	2	2
CO5: Develop strategies for cleaning validation and computerized system validation.	2	1	1	1	1	3	2	1	2	1	2	1	1	1
CO6: Evaluate the economic significance and ethical considerations of intellectual property in the pharmaceutical industry.	1	1	2	1	2	3	2	1	2	**3**	**2**	**2**	**1**	**1**
Average	**1.17**	**1.5**	**1.17**	**1.17**	**1.33**	**2.17**	**1.67**	**1.67**	**1.67**	**1.33**	**1.67**	**1.17**	**1.17**	**1.17**

Year Semester: M. Pharm. Semester II
Subject Name: Audits and Regulatory Compliance (Theory)
Course: 2019 Syllabus
Course Code: 20789

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
CO1: Understand the cGMP Regulations and their significance in quality assurance.	1	1	3	1	1	2	1	1	1	1	1	3	1	2
CO2: Conduct audits for vendors and production departments, such as bulk pharmaceutical chemicals and packaging material vendors.	1	1	3	1	1	2	1	1	1	1	1	3	1	2
CO3: Evaluate the auditing process for microbiological laboratories, focusing on manufacturing processes, product information, and critical areas.	1	1	2	1	1	2	1	1	1	1	1	3	1	2
CO4: Develop checklists for auditing critical systems in Quality Assurance and Engineering departments, such as HVAC, water systems, and ETP.	1	1	3	1	1	2	1	1	1	1	1	3	1	2
CO5: Assess the importance of auditing in pharmaceutical industries.	1	1	2	1	1	3	1	1	1	1	1	1	1	3
CO6: Prepare comprehensive auditing reports based on the outcomes of various audits.	1	1	2	1	1	3	1	1	1	1	1	1	1	3
Average	**1**	**1**	**2.5**	**1**	**1**	**2.33**	**1**	**1**	**1**	**1**	**1**	**2.33**	**1**	**2.33**

Year Semester: M. Pharm. Semester II
Subject Name: Pharmaceutical Manufacturing Technology (Theory)
Course: 2019 Syllabus
Course Code: 20800

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
CO1: Understand legal requirements and licenses for pharmaceutical manufacturing compliance.	3	1	3	2	2	2	1	1	1	1	1	3	1	1
CO2: Differentiate between aseptic and non-sterile manufacturing processes for effective production planning.	1	1	1	1	1	2	1	2	2	1	1	1	1	1
CO3: Apply principles of process planning and scheduling to develop production plans.	1	1	1	2	1	2	2	1	2	1	1	1	1	1
CO4: Analyze various packaging methods such as blister packs, bubble packs, and foil/plastic pouches in terms of their suitability for different pharmaceutical products.	1	1	1	2	1	2	2	2	2	1	1	1	1	1
CO5: Designing a pharmaceutical manufacturing facility layout involves creating a layout that adheres to Good Manufacturing Practices (GMP).	1	1	1	2	1	3	1	2	2	1	1	1	1	1
CO6: Assess the impact of Quality by design (QbD) and Process Analytical Technology (PAT) on quality improvement and cost reduction.	1	1	1	1	2	2	2	1	2	1	1	1	1	1
Average	**1.33**	**1**	**1.33**	**1.67**	**1.33**	**2.17**	**1.5**	**1.5**	**1.83**	**1**	**1**	**1.33**	**1**	**1**

Year Semester: M. Pharm. Semester II
Subject Name: Pharmaceutical Quality Assurance Practical II
Course: 2019 Syllabus
Course Code: 20811

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
CO1: Apply different techniques like Flame photometer, HPLC, TLC, colorimetric for analysis	3	2	1	2	2	1	1	2	2	1	1	2	1	2
CO2: Apply QbD and PAT principles to a real-life pharmaceutical case study.	3	2	1	3	2	2	1	3	2	3	1	1	1	1
CO3: Evaluate the effectiveness of a method for drug analysis during the validation process.	1	2	1	3	3	2	1	2	2	1	1	2	1	2
CO4: Compare the validation requirements for different types of pharmaceutical testing equipment, such as Dissolution Testing Apparatus, Friability Apparatus, and Disintegration Tester.	1	2	1	3	2	2	1	2	2	2	1	2	1	2
CO5: Apply principles of plant layout design to both sterile and non-sterile environments.	1	1	2	2	1	2	2	2	1	1	1	2	1	1
CO6: Analyze the checklist for Bulk Pharmaceutical Chemicals vendors, tableting production, sterile production area and water for injection to ensure quality control.	1	1	2	2	2	2	2	1	1	1	1	2	2	1
Average	**1.67**	**1.67**	**1.33**	**2.5**	**2**	**1.83**	**1.33**	**2**	**1.67**	**1.5**	**1**	**1.83**	**1.17**	**1.5**

DEPARTMENT OF REGULATORY AFFAIRS (923-897)

Year Semester: M. Pharm. Semester I
Subject Name: Good Regulatory Practices (Theory)
Course: 2019 Syllabus
Course Code: 20711

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
CO1: Discuss key regulatory and compliance elements with respect to good manufacturing practices	3	3	3	3	3	3	3	3	3	3	2	3	3	3
CO2: Describe key regulatory and compliance elements with respect to good laboratory practices	3	3	1	2	3	3	3	3	3	3	3	3	3	3
CO3: Recommend key regulatory and compliance elements with respect to good automated laboratory practices	3	1	3	3	3	1	3	3	3	2	3	1	3	3
CO4: Outline key regulatory and compliance elements with respect to good distribution practices	3	3	3	3	3	2	3	2	1	3	3	3	3	2
CO5: Plan and design appropriate quality management systems	3	3	3	3	3	3	3	3	3	3	3	2	3	3
CO 6: Outline good regulatory practices in the healthcare and related industries	3	3	3	3	3	3	3	3	3	3	3	2	3	3
Average	**3**	**2.67**	**2.67**	**2.83**	**3**	**2.5**	**3**	**2.83**	**2.67**	**2.83**	**2.83**	**2.33**	**3**	**2.83**

Year Semester: M. Pharm. Semester I

Subject Name: Documentation and Regulatory Writing (Theory)
Course: 2019 Syllabus
Course Code: 20722

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
CO1: Identify various documents required in pharmaceutical industry	3	2	3	3	3	3	3	3	3	3	3	3	3	3
CO2: Outline the basics of dossier compilation and submission	3	3	3	3	1	3	3	3	3	3	1	3	3	3
CO3:esign audits for the pharmaceutical industry	3	3	3	3	3	3	3	1	3	3	3	3	3	3
CO4: Plan and implement inspections in the pharmaceutical industry	3	3	3	3	3	2	3	3	3	3	3	1	3	3
CO5: Discuss aspects of product life cycle management	3	3	3	2	3	3	3	3	3	3	2	3	1	3
CO6: Plan the follow ups after regulatory submissions and post approval document requirements	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Average	**3**	**2.83**	**3**	**2.83**	**2.67**	**2.83**	**3**	**2.67**	**3**	**3**	**2.5**	**2.67**	**2.67**	**3**

Year Semester: M. Pharm. Semester I

Subject Name: Clinical Research Regulations (Theory)
Course: 2019 Syllabus
Course Code: 20733

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
CO1: Describe phases of clinical trials	3	1	1	1	2	1	1	1	3	1	3	1	3	3
CO2: Prioritize ethics in clinical trials	3	3	2	3	3	3	2	3	2	3	3	2	3	3
CO3: Identify regulations governing clinical trials	3	3	3	3	3	3	3	3	3	3	3	2	3	3
CO4: Outline ICH and other guidelines related clinical research	3	3	3	3	3	3	3	3	3	3	3	1	3	3
CO5: Explain USA & EU regulations related to clinical trials	3	3	3	3	3	3	3	3	3	3	3	1	3	3
CO6: Explain Indian regulations related to clinical trials	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Average	**3**	**2.67**	**2.5**	**2.67**	**2.83**	**2.67**	**2.5**	**2.67**	**2.83**	**2.67**	**3**	**1.67**	**3**	**3**

Year Semester: M. Pharm. Semester I
Subject Name: Regulations and Legislation for Drugs & Cosmetics, Medical Devices, Biologicals & Herbals, and Food & Nutraceuticals in India and Intellectual Property Rights
Course: 2019 Syllabus
Course Code: 20744

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
CO1: Describe Acts and Rules related to biological, herbals, food and neutraceuticals in India	3	3	3	2	1	3	3	3	3	3	3	3	3	3
CO2: Explain regulatory requirements and approval procedures for biological, herbals, food and neutraceuticals in India	3	3	3	3	1	3	3	3	3	3	3	3	3	3
CO3: List Indian Pharmacopoeial standards and other standards for various products	3	3	3	3	1	3	3	3	3	3	3	3	3	3
CO4: Discuss bioavailability and bioequivalence requirements	3	3	3	3	3	3	3	3	3	3	3	3	3	3
CO5: Outline different types of intellectual property rights	3	3	3	1	3	3	3	2	3	3	3	3	3	3
CO6: Design the regulatory requirements for approval process of herbals, biologicals, food and neutraceuticals in India	3	3	3	1	3	3	3	2	3	3	3	3	3	3
Average	**3**	**3**	**3**	**2.17**	**2**	**3**	**3**	**2.67**	**3**	**3**	**3**	**3**	**3**	**3**

Year Semester: M. Pharm. Semester I
Subject Name: Regulatory Affairs Practical I
Course: 2019 Syllabus
Course Code: 20755

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
CO1: Write SOPs, and analytical reports	3	3	3	3	3	3	1	3	3	2	3	3	3	3
CO2: Recommend documentation for in process and finished products	3	2	3	1	3	3	3	3	3	3	3	1	3	3
CO3: Plan and prepare for clinical trial applications	3	3	3	3	2	3	3	3	3	3	2	3	3	3
CO4: Prepare regulatory requirements checklist for conducting clinical trials	3	3	3	1	3	3	3	3	3	3	3	3	3	3
CO5: Describe the procedure for registering for different Intellectual Property Rights in India	3	3	3	3	1	1	3	3	3	1	3	3	3	3
CO6: Discuss the features and applications of SUGAM portal of CDSCO	3	3	2	3	3	3	1	2	3	3	3	1	3	3
Average	**3**	**2.83**	**2.83**	**2.33**	**2.5**	**2.67**	**2.33**	**2.83**	**3**	**2.5**	**2.83**	**2.33**	**3**	**3**

Year Semester: M. Pharm. Semester II
Subject Name: Regulatory Aspects of Drugs & Cosmetics (Theory)

Course: 2019 Syllabus
Course Code: 20768

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
CO1: Discuss cosmetics regulations in regulated and semi-regulated countries.	3	3	3	3	1	2	2	2	1	1	3	3	3	3
CO2: Identify various regulatory approval process and registration procedures for API and drug products in US, EU Market.	3	3	3	3	1	2	2	2	1	1	3	3	3	3
CO3: Assess regulatory considerations and legislation for import, manufacture, distribution, and sale of cosmetics in European Union & Australia.	3	3	3	3	2	3	2	2	2	1	3	3	3	3
CO4: Assess regulatory considerations for manufacturing, packaging, and labelling of pharmaceuticals in Japan	3	3	3	3	2	3	2	2	2	1	3	3	3	3
CO5: Understand regulatory submissions as per WHO and other committees across the globe	3	3	3	3	2	2	2	2	2	1	3	3	3	3
CO6: Study regulatory requirements for registration of drugs and post approval requirements for Asean countries and CIS (Commonwealth Independent States) countries.	3	3	3	3	2	2	2	3	2	2	3	3	3	3
Average	**3**	**3**	**3**	**3**	**1.67**	**2.33**	**2**	**2.17**	**1.67**	**1.17**	**3**	**3**	**3**	**3**

Year Semester: M. Pharm. Semester II
Subject Name: Regulatory Aspects of Herbal & Biological (Theory)
Course: 2019 Syllabus
Course Code: 20779

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
CO1: Understand the regulation requirements for newly developed biologics and biosimilars.	3	3	3	1	1	2	1	2	1	1	3	3	3	3
CO2: Know the pre-clinical and clinical development considerations of biologics.	3	3	3	1	1	2	1	2	1	1	3	3	3	3
CO3: Assess the regulations, guidelines, principles, and data requirements for the development of biologics in India.	3	3	3	2	2	3	2	2	2	1	3	3	3	3
CO4: Study laws, regulations and guidance on development and approval of biologics and biosimilars in US.	3	3	3	2	2	3	2	2	2	1	3	3	3	3
CO5: Evaluation, development, regulatory approval of biologics along with their stability, safety, advertising, labelling and packing in EU	3	3	3	2	2	2	2	2	2	1	3	3	3	3
CO6. Understand Quality, safety and legislation for herbal products in India, USA and European Union	3	3	3	2	2	2	2	3	2	2	3	3	3	3
Average	**3**	**3**	**3**	**1.71**	**1.71**	**2.29**	**1.71**	**2.29**	**1.71**	**1.29**	**3**	**3**	**3**	**3**

Year Semester: M. Pharm. Semester II
Subject Name: Regulatory Aspects of Medical Devices (Theory)
Course: 2019 Syllabus

Course Code: 20790

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
CO1: Understand classification, process of development, ethical, and quality considerations of medical devices.	3	3	3	3	1	2	2	2	3	3	3	3	3	3
CO2: Assess regulatory approval process for medical devices and IVDs in India, US,	3	3	3	3	1	2	2	2	3	3	3	3	3	3
Canada, EU, Japan and ASEAN countries.	3	3	3	3	2	2	2	2	3	3	3	3	3	3
CO3: Study Quality System Regulations of Medical Devices	3	3	3	3	2	2	2	2	3	3	3	3	3	3
CO4: Understand the in vitro diagnostics, classification and approval process for European Union	3	3	3	3	2	2	2	2	3	3	3	3	3	3
CO5: Discuss registration procedures, Quality System requirements and clinical	3	3	3	3	2	3	2	3	3	3	3	3	3	3
CO6. Study USFDA - Quality System Requirements 21 CFR Part 820, labeling requirements 21 CFR Part 801	3	3	3	3	2	2	2	2	3	3	3	3	3	3
Average	**3**	**3**	**3**	**3**	**1.67**	**2.17**	**2**	**2.17**	**3**	**3**	**3**	**3**	**3**	**3**

Year Semester: M. Pharm. Semester II
Subject Name: Regulatory Aspects of Food & Nutraceuticals (Theory)
Course: 2019 Syllabus
Course Code: 20801

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
CO1: Know the regulatory Requirements for nutraceuticals	3	3	3	2	1	2	1	2	1	1	3	3	3	3
CO2: Understand the regulation for registration and labeling of nutraceuticals and food supplements in USA and Europe	3	3	3	2	1	2	1	2	1	1	3	3	3	3
CO3: Assess global aspects, NSF Certification, NSF Standards for Food And Dietary Supplements	3	3	3	3	2	3	1	2	2	1	3	3	3	3
CO4: Understand Good Manufacturing Practices for Nutraceuticals	3	3	3	3	2	3	1	2	2	1	3	3	3	3
CO5. Understand Regulations for import, manufacture and sale of nutraceutical products in India	3	3	3	2	2	2	1	2	2	1	3	3	3	3
CO6. Compare Recommended Dietary Allowances (RDA) of Nutraceuticals in India in USA and Europe.	3	3	3	2	2	2	2	3	2	2	3	3	3	3
Average	3	3	3	2.25	1.75	2.25	1.25	2.25	1.75	1.25	3	3	3	3

Year Semester: M. Pharm. Semester II
Subject Name: Regulatory Affairs Practical II
Course: 2019 Syllabus

Course Code: 20812

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
CO1: Prepare submission to FDA, EMA and MHRA using eCTD software	3	3	3	1	1	2	2	2	1	1	3	3	3	3
CO2: Compare clinical trial application requirements of US, EU and India of Biologics	3	3	3	1	1	2	2	2	1	1	3	3	3	3
CO3: Understand registration requirement comparison study in 5 emerging markets (WHO, BRICS, China and South Korea, Asean countries)	3	3	3	2	2	2	2	2	1	1	3	3	3	3
CO4: Prepare checklists for 510k and PMA for US market	3	3	3	2	2	2	2	2	1	1	3	3	3	3
CO5: Develop STED Application for Class III Devices	3	3	3	2	2	2	2	2	1	1	3	3	3	3
CO6: Develop Clinical Investigation Plan for Medical Devices	3	3	3	2	2	3	2	3	2	2	3	3	3	3
Average	**3**	**3**	**3**	**1.67**	**1.67**	**2.17**	**2**	**2.17**	**1.17**	**1.17**	**3**	**3**	**3**	**3**

DEPARTMENT OF PHARMACEUTICAL BIOTECHNOLOGY (923-890)

Year Semester: M. Pharm. Semester I
Subject Name: Microbial and Cellular Biology (Theory)

Course: 2019 Syllabus
Course Code: 20715

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
CO1: Elaborate the importance of microorganisms in health and industry.	3	3	3	3	3	1	1	3	3	3	3	1	1	3
CO2: Summarize the principles of cemtral dogma of moleular biology	3	3	1	3	2	2	1	3	3	3	3	1	1	3
CO3: Undustrand the criticals of cell biology, cell structure and function	3	3	1	3	3	2	2	3	3	3	3	1	3	3
CO4: Elaborate cell cycle, regulation and its implications	3	3	1	3	3	3	3	3	3	3	3	3	3	3
CO5: Devise measures of microbial and cellular clutures growth and dynamics	3	3	1	3	3	3	3	3	3	3	3	3	3	3
CO6: Employ steps for prevention and management of infectious diseases.	3	3	1	3	3	3	3	3	3	3	3	3	3	3
Average	**3**	**3**	**1.33**	**3**	**2.83**	**2.33**	**2.16**	**3**	**3**	**3**	**3**	**2**	**2.33**	**3**

Year Semester: M. Pharm. Semester I
Subject Name: Bioprocess Engineering and Technology (Theory)
Course: 2019 Syllabus
Course Code: 20726

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
CO1: Understand basics and design of fermentation technology	3	3	1	3	3	1	3	3	3	3	1	1	1	3
CO2: Scale up and scale down processing of fermentation technology	3	3	1	3	2	3	3	3	3	3	3	1	1	3
CO3: Bioprocessing of the industrially important microbial metabolites	3	3	1	3	3	3	3	3	3	3	3	1	3	3
CO4: Regulation governing the manufacturing of biological products	3	3	1	3	3	3	3	3	3	3	3	1	3	3
CO5: Understand and conduct fermentation process kinetics.	3	3	1	3	3	3	3	3	3	3	3	1	3	3
CO6: Bioprocessing of the industrially important microbial metabolites in R & D organizations.	3	3	1	3	2	3	3	3	3	3	3	1	1	3
Average	**3**	**3**	**1**	**3**	**2.5**	**2.33**	**3**	**3**	**3**	**3**		**1**	**2**	**3**

Year Semester: M. Pharm. Semester I

Subject Name: Advanced Pharmaceutical Biotechnology (Theory)
Course: 2019 Syllabus
Course Code: 20737

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
CO1: Understand latest technology development in technique, tools	3	3	1	3	2	2	3	3	3	2	3	1	1	3
CO2: Identify appropriate sources of enzymes.	3	3	1	3	3	1	3	3	3	2	3	1	1	3
CO3: Understand and perform rDNA technology, gene manipulation	3	3	1	3	2	2	3	3	3	2	3	1	1	3
CO4: Understand the overview of pharmacogenomics	3	3	1	3	2	3	3	3	3	3	3	3	3	3
CO5: Learn the regulatory approval process for new drugs, biologics, devices,	3	3	1	3	3	3	3	3	3	3	3	3	3	3
CO6: Understanding the use of biotechnology tools and techniques on drug and vaccine development	3	3	1	3	3	3	3	3	3	3	3	3	3	3
Average	**3**	**3**	**1**	**3**	**2.5**	**2.33**	**3**	**3**	**3**	**2.5**	**3**	**2**	**2**	**3**

Year Semester: M. Pharm. Semester I
Subject Name: Pharmaceutical Biotechnology Practical I
Course: 2019 Syllabus

Course Code: 20748

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
CO1: Characterize DNA and RNA	3	1	3	3	1	3	1	3	2	2	3	2	2	2
CO2: Illustrate techniques involved in DNA manipulation	3	2	3	3	2	3	2	3	3	3	3	2	2	2
CO3: Sterility test for pharmaceutical preparations	3	2	3	3	2	3	3	3	3	3	3	3	3	3
CO4: Whole cell immobilization engineering	3	2	3	3	2	3	2	3	3	3	3	3	3	3
CO5: Replica plating	3	2	3	3	3	3	3	3	3	3	3	3	3	3
CO6: Design, observe, record, compute, analyse and interprete experimental data	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Average	**3**	**2**	**3**	**3**	**2.16**	**3**	**2.33**	**3**	**2.83**	**2.83**	**3**	**2.6**	**2.6**	**2.6**

Year Semester: M. Pharm. Semester II
Subject Name: Protein and Protein Formulation (Theory)
Course: 2019 Syllabus

Course Code: 20761

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
CO1: Elaborate the methods of purification of Proteins used in lab and industry.	3	3	3	3	3	1	1	3	3	3	3	1	1	3
CO2: Summarize the principles of Peptides in drug development	3	3	1	3	2	2	1	3	3	3	3	1	1	3
CO3: Understand the basics of protein identification and characterization	3	3	1	3	3	2	2	3	3	3	3	1	3	3
CO4: Elaborate on Protein based formulations	3	3	1	3	3	3	3	3	3	3	3	3	3	3
CO5: Applications of protein engineering in drugs development protein sequencing	3	3	1	3	3	3	3	3	3	3	3	3	3	3
CO6: Promote novel applications and critical thinking	3	3	1	3	3	3	3	3	3	3	3	3	3	3
Average	**3**	**3**	**1.33**	**3**	**2.83**	**2.33**	**2.16**	**3**	**3**	**3**	**3**	**2**	**2.33**	**3**

Year Semester: M. Pharm. Semester II
Subject Name: Immunotechnology (Theory)

Course: 2019 Syllabus
Course Code: 20772

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
CO1: Understand basics of thechniques like immunodiagnostic tests	3	3	1	3	3	1	3	3	3	3	1	1	1	3
CO2: Characterization of lymphocytes, purification of antigens and antibody proteins MABs	3	3	1	3	2	3	3	3	3	3	3	1	1	3
CO3: Understand the Health problems with immunological background, autoimmune diseases	3	3	1	3	3	3	3	3	3	3	3	1	3	3
CO4: Elaborate on approaches for the immune intervention of diseases	3	3	1	3	3	3	3	3	3	3	3	1	3	3
CO5: Undustrand the basics of protein identification and characterization	3	3	1	3	3	2	2	3	3	3	3	1	3	3
CO6: Understand Applications in diagonistics and Biosimillars	3	3	1	3	3	3	3	3	3	3	3	1	3	3
Average	**3**	**3**	**1**	**3**	**2.83**	**2.5**	**3**	**3**	**3**	**3**	**2.66**	**1**	**2.33**	**3**

Year Semester: M. Pharm. Semester II
Subject Name: Bioinformatics and Computer Technology (Theory)

Course: 2019 Syllabus
Course Code: 20783

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
CO1: Understand the general concept behind use of computers in developing a new drugs	3	3	1	3	2	2	3	3	3	2	3	1	1	3
CO2: Elaborate on Biological concepts for bioinformatics	3	3	1	3	3	1	3	3	3	2	3	1	1	3
CO3: Understand the diversity in protein and DNA sequences	3	3	1	3	2	2	3	3	3	2	3	1	1	3
CO4: Demonstrate on the Data mining and searching biological databases	3	3	1	3	2	3	3	3	3	3	3	3	3	3
CO5: Learn the biological target searching and evaluation	3	3	1	3	3	2	2	3	3	3	3	1	3	3
CO6: Learn various techniques of in sillico drug designing	3	3	1	3	3	3	3	3	3	3	3	3	3	3
Average	**3**	**3**	**1**	**3**	**2.5**	**2.33**	**3**	**3**	**3**	**2.5**	**3**	**1.66**	**2**	**3**

Year Semester: M. Pharm. Semester II
Subject Name: Biological Evaluation of Drug Therapy (Theory)

Course: 2019 Syllabus
Course Code: 20794

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
CO1: Understand about the general concept of standardization of biologicals	3	3	1	3	2	2	3	3	3	2	3	1	1	3
CO2: Elaborate on significance and application of transgenic and knockout animals	3	3	1	3	3	1	3	3	3	2	3	1	1	3
CO3: Understand biological medicines in development of various diseases	3	3	1	3	2	2	3	3	3	2	3	1	1	3
CO4: Understand the overview of Biological assys and high throughput screening	3	3	1	3	2	3	3	3	3	3	3	3	3	3
CO5: Learn the biological evaluation of drugs in vitro and in vivo	3	3	1	3	3	2	2	3	3	3	3	1	3	3
CO6: Bio-medicines for diseases, therapeutics and products catagory	3	3	1	3	3	3	3	3	3	3	3	3	3	3
Average	**3**	**3**	**1**	**3**	**2.5**	**2.33**	**3**	**3**	**3**	**2.5**	**3**	**1.66**	**2**	**3**

Year Semester: M. Pharm. Semester II

Subject Name: Pharmaceutical Biotechnology Practical II
Course: 2019 Syllabus
Course Code: 20805

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
CO1: Transformation of E. coli rDNA technology	3	2	3	3	1	3	1	3	2	2	3	3	2	3
CO2: Recombinant Protein expression and analysis	3	2	3	3	2	3	2	3	3	3	3	3	2	3
CO3: Database searching and data mining, data curation	3	2	3	3	2	3	3	3	3	3	3	3	2	3
CO4: Sequence analysis methods and tools	3	2	3	3	2	3	2	3	3	3	3	3	2	3
CO5: Gene anotation and phylogenetic analysis	3	2	3	3	3	3	3	3	3	3	3	3	2	3
CO6: RT-PCR – working, programming analysis and interpretation	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Average	**3**	**2**	**3**	**3**	**2.16**	**3**	**2.33**	**3**	**2.83**	**2.83**	**3**	**3**	**2**	**3**

Year Semester: M. Pharm. Semester I
Subject Name: Advanced Pharmacology I (Theory)
Course: 2019 Syllabus
Course Code: 20719

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
CO1: Elaborate the mechanism of drug actions at cellular and molecular level.	3	3	3	3	3	1	1	3	3	3	3	1	1	3
CO2: Summarize the pharmacological effects of drugs.	3	3	1	3	2	2	1	3	3	3	3	1	1	3
CO3: Aprraise pharmacotherapy correlating the pathophysiology of diseases.	3	3	1	3	3	2	2	3	3	3	3	1	3	3
CO4: Recommend drugs for the treatment of diseases based on safety and efficacy.	3	3	1	3	3	3	3	3	3	3	3	3	3	3
CO5: Devise measures for prevention of adverse effects and drug interactions.	3	3	1	3	3	3	3	3	3	3	3	3	3	3
CO6: Employ steps for prevention and management of lifestyle diseases.	3	3	1	3	3	3	3	3	3	3	3	3	3	3
Average	**3**	**3**	**1.33**	**3**	**2.83**	**2.33**	**2.16**	**3**	**3**	**3**	**3**	**2**	**2.33**	**3**

Year Semester: M. Pharm. Semester I
Subject Name: Pharmacological and Toxicological Screening Methods-I (Theory)
Course: 2019 Syllabus

Course Code: 20730

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
CO1: Appraise the regulations and ethical requirements for the use of experimental animals.	3	3	1	3	3	3	3	3	3	3	1	3	3	3
CO2: Describe the various animals used in the drug discovery process, good laboratory practices in maintenance and handling of experimental animals	3	3	1	3	3	2	3	3	3	3	2	3	3	3
CO3: Elaborate the screening methods involved in the drug discovery process.	3	3	1	3	3	3	3	3	3	2	3	3	3	3
CO4: Elucidate newer techniques like transgenic and alternatives to animal experimentation for preclinical studies.	3	3	1	3	3	3	3	3	3	2	3	3	3	3
CO5: Integrate and apply the learnings of preclinical screening to drug discovery process.	3	3	1	3	3	3	3	3	3	3	3	3	3	3
CO6: Appreciate and correlate the preclinical data to humans.	3	3	1	3	3	3	3	3	3	3	3	3	3	3
Average	**3**	**3**	**1**	**3**	**3**	**2.83**	**3**	**3**	**3**	**2.66**	**2.5**	**3**	**3**	**3**

Year Semester: M. Pharm. Semester I
Subject Name: Cellular and Molecular Pharmacology (Theory)
Course: 2019 Syllabus

Course Code: 20741

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
CO1: Understand the structure and functions of cells, cell cycles and gene therapy.	3	3	1	3	2	2	3	3	3	2	3	1	1	3
CO2: Elaborate the cell signalling in molecular mechanisms of drug action.	3	3	1	3	3	1	3	3	3	2	3	1	1	3
CO3: Demonstrate the applications of molecular biology techniques in pharmacology.	3	3	1	3	2	2	3	3	3	2	3	1	1	3
CO4: Apply pharmacogenomics and proteomics techniques in pharmacology.	3	3	1	3	2	3	3	3	3	3	3	3	3	3
CO5: Justify the use of immunotherapeutics in clinical practices	3	3	1	3	3	3	3	3	3	3	3	3	3	3
CO6: Appraise the use of cell culture techniques.	3	3	1	3	3	3	3	3	3	3	3	3	3	3
Average	**3**	**3**	**1**	**3**	**2.5**	**2.33**	**3**	**3**	**3**	**2.5**	**3**	**2**	**2**	**3**

Year Semester: M. Pharm. Semester I
Subject Name: Pharmacology Practical – I
Course: 2019 Syllabus

Course Code: 20752

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
CO1: Demonstrate effects of drugs on various systems using *in vivo* experiments.	3	3	3	3	3	3	3	3	3	3	1	3	3	3
CO2: Employ appropriate laboratory technique for preclinical studies.	3	3	3	3	3	3	3	3	3	3	1	3	3	3
CO3: Estimate drugs in formulations and biological fluids using analytical techniques.	3	3	3	3	3	3	3	3	3	3	1	3	3	3
CO4: Illustrate the molecular mechanism of action of drugs.	3	3	1	3	3	3	3	3	3	3	1	1	3	3
CO5: Relate *in vitro, ex vivo* and *in vivo* evaluation techniques in drug discovery process.	3	3	3	3	3	3	3	3	3	3	1	1	3	3
CO6: Analyze and interpret the preclinical data using software's.	3	3	3	3	3	3	3	3	3	3	1	1	3	3
Average	**3**	**3**	**2.66**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**1**	**2**	**3**	**3**

Year Semester: M. Pharm. Semester II
Subject Name: Advanced Pharmacology II (Theory)
Course: 2019 Syllabus

Course Code: 20765

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
CO1: Elaborate the mechanism of drug actions at cellular and molecular level.	3	3	1	3	3	1	3	3	3	3	1	1	1	3
CO2: Summarize the pharmacological effects of drugs.	3	3	1	3	2	3	3	3	3	3	3	1	1	3
CO3: Appraise pharmacotherapy correlating the pathophysiology of diseases.	3	3	1	3	3	3	3	3	3	3	3	1	3	3
CO4: Comprehend the recent advances in treatment of diseases.	3	3	1	3	3	3	3	3	3	3	3	1	3	3
CO5: Describe measures for prevention of adverse effects and drug interactions.	3	3	1	3	3	3	3	3	3	3	3	1	3	3
CO6: Recommend drugs for the treatment of diseases based on safety and efficacy.	3	3	1	3	3	3	3	3	3	3	3	1	3	3
Average	**3**	**3**	**1**	**3**	**2.5**	**2.33**	**3**	**3**	**3**	**3**	**2.66**	**1**	**2**	**3**

Year Semester: M. Pharm. Semester II
Subject Name: Pharmacological and Toxicological Screening Methods-II (Theory)
Course: 2019 Syllabus
Course Code: 20776

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
CO1: Explain the various types of toxicity studies.	3	3	3	3	3	3	3	3	3	3	1	2	3	3
CO2: Appreciate the ethical and regulatory requirements for toxicity testings.	3	3	3	3	3	3	3	3	3	3	1	1	3	3
CO3: Demonstrate the practical skills required to conduct the preclinical toxicity studies.	3	3	3	3	3	3	3	3	3	3	1	3	3	3
CO4: Illustrate the importance and applications of toxicokinetic studies.	3	3	3	3	3	3	3	3	3	3	1	1	3	3
CO5: Integrate and apply the regulatory toxicological studies for drug discovery process.	3	3	3	3	3	3	3	3	3	3	1	1	3	3
CO6: Relate the preclinical safety pharmacology to clinical trials.	3	3	3	3	3	3	3	3	3	3	1	1	3	3
Average	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**1**	**1.5**	**3**	**3**

Year Semester: M. Pharm. Semester II
Subject Name: Principles of Drug Discovery (Theory)
Course: 2019 Syllabus

Course Code: 20787

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
CO1: Explain the various stages of drug discovery	3	2	3	3	1	2	2	2	1	3	1	1	1	2
CO2: Appreciate the importance of the role of genomics, proteomics and bioinformatics in drug discovery	3	1	3	2	2	1	1	2	1	3	1	1	2	2
CO3: Explain various targets for drug discovery	3	3	2	3	3	1	1	3	1	3	1	2	2	3
CO4: Explain various lead seeking method and lead optimization	3	3	2	2	3	1	2	3	1	3	1	1	1	3
CO5: Appreciate the importance of SBDD and LBDD	3	3	1	2	3	2	3	2	2	2	1	3	1	3
CO6: Apply the concept of prodrug in drug discovery and design	3	3	1	3	3	1	2	3	2	2	1	1	1	2
Average	**3**	**2.5**	**2**	**2.5**	**2.5**	**1.33**	**1.83**	**2.5**	**1.33**	**2.67**	**1**	**1.5**	**1.33**	**2.5**

Year Semester: M. Pharm. Semester II
Subject Name: Clinical Research and Pharmacovigillance (Theory)
Course: 2019 Syllabus

Course Code: 20798

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
CO1:Explain the regulatory requirements for conducting clinical trial	3	3	3	3	3	3	3	2	2	2	2	3	3	3
CO2:Interpret the types of clinical trial designs	3	2	2	3	3	3	3	3	3	3	3	3	3	2
CO3:Categorize the responsibilities of key players involved in clinical trials	3	1	2	3	3	3	3	2	3	3	2	2	3	2
CO4:Formulate safety monitoring, reporting and close-out activities	3	1	1	3	3	3	3	3	3	3	3	3	3	3
CO5:Describe the principles of Pharmacovigilance	3	2	2	3	3	3	3	2	3	3	3	3	3	3
CO6:Assess the adverse drug reaction reporting systems in community and communication in Pharmacovigilance	3	2	3	3	3	3	3	3	3	3	3	3	3	3
Average	**3**	**1.83**	**2.16**	**3**	**3**	**3**	**3**	**2.5**	**2.8**	**2.8**	**2.66**	**2.8**	**3**	**2.66**

Year Semester: M. Pharm. Semester II
Subject Name: Pharmacology Practical - II
Course: 2019 Syllabus

Course Code: 20809

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
CO1: Evaluate the effects of agonists and antagonists on isolated tissue experiments	3	3	1	1	2	1	1	1	3	2	3	1	3	3
CO2: Understand the various phases of drug discovery	3	3	3	2	2	2	3	3	3	2	3	3	3	3
CO3: Analyze the effect of drugs on CVS.	3	3	3	3	3	3	3	3	3	2	3	3	3	3
CO4: Demonstrate the practical skills required to conduct the preclinical toxicity studies.	3	3	3	3	3	2	3	3	3	2	1	3	3	3
CO5: Sensibilise the society about ADR monitoring	3	3	3	3	3	3	3	3	3	3	3	3	3	3
CO6: Appreciate correlation of pharmacology with molecular docking studies	3	3	3	3	3	3	3	3	2	3	3	3	3	3
Average	**3**	**3**	**2.66**	**2.5**	**2.66**	**2.33**	**2.66**	**2.66**	**2.83**	**2.33**	**2.66**	**2.66**	**3**	**3**

DEPARTMENT OF PHARMACOGNOSY (923-893)

Year Semester: M. Pharm. Semester I

Subject Name: Advanced Pharmacognosy-1 (Theory)

Course: 2019 Syllabus
Course Code: 20718

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
CO1: Explain the advances in the cultivation and production of drugs.	3	2	3	3	3	3	3	2	2	2	2	3	3	3
CO2: Explain various phytopharmaceuticals and their source, their utilization, and medicinal values.	3	2	2	3	3	2	3	2	3	3	3	2	3	3
CO3: Comprehend various nutraceutical herbs and their benefits.	3	2	2	3	3	3	3	2	3	3	2	2	3	3
CO4: Outline drugs of marine origin.	3	2	2	3	3	3	3	2	3	3	3	3	3	3
CO5: Describe recent advances in research of marine drugs.	3	2	2	3	3	3	3	2	3	3	3	3	3	3
CO6: Understand the pharmacovigilance of drugs of natural origin.	3	2	3	3	3	3	3	2	3	3	3	3	3	3
Average	**3**	**2**	**2.33**	**3**	**3**	**2.83**	**3**	**2**	**2.83**	**2.83**	**2.67**	**2.67**	**3**	**3**

Year Semester: M. Pharm. Semester I
Subject Name: Phytochemistry (Theory)
Course: 2019 Syllabus
Course Code: 20729

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
CO1: Understand the separation of the active constituents obtained from natural sources by the different	3	3	3	3	3	3	3	2	2	2	2	3	3	3

methods of separation. (Chromatography).														
CO2: Identify and understand the different methods to evaluate these components and learn the concept to deal with the side effects of some components (if any).	3	2	3	3	3	2	3	3	3	3	3	2	3	3
CO3: Outline the Herbal Drug discovery and development.	3	2	3	3	3	3	3	2	3	3	3	3	3	3
CO4:Explain the Optimization of Lead compounds Demonstrate the complete management of extraction, Isolation, and Phytochemical analysis of Natural Products	3	2	2	3	3	3	3	3	3	3	3	3	3	3
CO5: Outline the Phytochemical documentation	3	2	2	3	3	3	3	3	3	3	3	3	3	3
CO6: Outline the Phytochemical documentation	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Average	**3**	**2.33**	**2.67**	**3**	**3**	**2.83**	**3**	**2.67**	**2.83**	**2.83**	**2.83**	**2.83**	**3**	**3**

Year Semester: M. Pharm. Semester I
Subject Name: Industrial Pharmacognostical Technology (Theory)
Course: 2019 Syllabus
Course Code: 20740

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
CO1: Understand the separation of the active constituents obtained from	3	3	3	3	3	3	3	2	2	2	2	3	3	3

natural sources by the different methods of separation. (Chromatography).														
CO2: Identify and understand the different methods to evaluate these components and learn the concept to deal with the side effects of some components (if any).	3	2	3	3	3	2	3	3	3	3	3	2	3	3
CO3: Outline the Herbal Drug discovery and development.	3	2	3	3	3	3	3	2	3	3	3	3	3	3
CO4: Explain the Optimization of Lead compounds	3	2	2	3	3	3	3	3	3	3	3	3	3	3
CO5: Demonstrate the complete management of extraction, Isolation, and Phytochemical analysis of Natural products	3	2	2	3	3	3	3	3	3	3	3	3	3	3
CO6: Outline the Phytochemical documentation	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Average	**3**	**2.33**	**2.67**	**3**	**3**	**2.83**	**3**	**2.67**	**2.83**	**2.83**	**2.83**	**2.83**	**3**	**3**

Year Semester: M. Pharm. Semester I
Subject Name: Pharmacognosy Practical- I
Course: 2019 Syllabus
Course Code: 20751

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
CO1: Understand the spectroscopical methods of analysis of pharmacopoeial	3	3	3	3	3	3	3	2	2	2	2	3	3	3

compounds of natural origin and their formulations.														
CO2: Understand and explain various chromatographic methods of analysis.	3	2	3	3	3	2	3	3	3	3	3	2	3	3
CO3: Demonstrate methods of extraction.	3	2	3	3	3	3	3	2	3	3	3	2	3	2
CO4: Interpret monograph analysis.	3	2	2	3	3	3	3	3	3	3	3	3	3	3
CO5: Formulate and standardize different dosage form.	3	2	2	3	3	3	3	3	3	3	3	3	3	3
CO6: Developing the fingerprint of selected medicinal plants extracts.	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Average	**3**	**2.33**	**2.67**	**3**	**3**	**2.83**	**3**	**2.67**	**2.83**	**2.83**	**2.83**	**2.67**	**3**	**2.83**

Year Semester: M. Pharm. Semester II
Subject Name: Medicinal Plant Biotechnology (Theory)
Course: 2019 Syllabus
Course Code: 20764

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
CO1: Understand the concept of plant genetic engineering and molecular biology.	3	3	3	3	3	3	3	2	2	2	2	3	3	3

CO2: Demonstrate the plant tissue culture techniques for the production ofGenetically modified plants.	3	2	3	3	3	2	3	3	3	3	3	2	3	3
CO3:Explain the hairy root culture for the production of different primary andsecondary metabolites	3	2	3	3	3	3	3	2	3	3	3	3	3	3
CO4: Elaborate Plant fermentation technology.	3	2	2	3	3	3	3	3	3	3	3	3	3	3
CO5:Differentiate methods of cloning andtheir applications	3	2	2	3	3	3	3	3	3	3	3	3	3	3
CO6: Apply the concept of PCR in plant genome analysis.	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Average	**3**	**2.33**	**2.67**	**3**	**3**	**2.83**	**3**	**2.67**	**2.83**	**2.83**	**2.83**	**2.83**	**3**	**3**

Year Semester: M. Pharm. Semester II
Subject Name: Advanced Pharmacognosy –II (Theory)
Course: 2019 Syllabus
Course Code: 20775

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
CO1:Validation of Herbal remedies	3	3	3	3	3	3	3	2	2	2	2	3	3	3

CO2: Illustrate the methods for the detection of adulterants.	3	2	3	3	3	2	3	3	3	3	3	2	3	3
CO3:outline the techniques available for evaluation of herbal drugs	3	2	3	3	3	3	3	2	3	3	3	3	3	3
CO4: Elaborate methods for biological screening of herbal drugs.	3	2	2	3	3	3	3	3	3	3	3	3	3	3
CO5: Understand the concept of ethnobotany and ethnopharmacology.	3	2	2	3	3	3	3	3	3	3	3	3	3	3
CO6:Create the analytical profile of some herbal drugs	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Average	**3**	**2.33**	**2.67**	**3**	**3**	**2.83**	**3**	**2.67**	**2.83**	**2.83**	**2.83**	**2.83**	**3**	**3**

Year Semester: M. Pharm. Semester II
Subject Name: Indian Systems of Medicine (Theory)
Course: 2019 Syllabus
Course Code: 20786

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14

CO1: Understand basic principle of various Indian system of medicine.	3	3	3	3	3	3	3	2	2	2	2	3	3	3
CO2: Explain the clinical research of traditional medicine	3	2	3	3	3	2	3	3	3	3	3	2	3	3
CO3: Illustrate c GMP of the traditional system of medicine.	3	2	3	3	3	3	3	2	3	3	3	3	3	3
CO4: Elaborate Formulation development and standardization of various traditional formulations.	3	2	2	3	3	3	3	3	3	3	3	3	3	3
CO5: Describe the Safety monitoring of herbal medicines and Quality control and quality assurance concepts involved in the traditional system of medicine.	3	2	2	3	3	3	3	3	3	3	3	3	3	3
CO6: Differentiate the concepts of AYUSH, ISM, CCRAS, CCRS, CCRH, and CCRU.	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Average	**3**	**2.33**	**2.67**	**3**	**3**	**2.83**	**3**	**2.67**	**2.83**	**2.83**	**2.83**	**2.83**	**3**	**3**

Year Semester: M. Pharm. Semester II
Subject Name: Herbal Cosmetics (Theory)
Course: 2019 Syllabus
Course Code: 20797

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14

CO1: Understand the basic principles of herbal cosmetics.	3	3	3	3	3	3	3	2	2	2	2	3	3	3
CO2: Explain Regulatory Provisions related to the manufacturing of cosmetics including and Import, Export policies of Herbal/natural cosmetics.	3	2	3	3	3	2	3	3	3	3	3	2	3	3
CO3: Describe Raw product analysis and Herbal cosmeceutical development and standardization.	3	2	3	3	3	3	3	2	3	3	3	3	3	3
CO4: Elaborate on Possible interactions between chemicals and Herbs.	3	2	2	3	3	3	3	3	3	3	3	3	3	3
CO5:Illustrate concepts of Quality control and quality assurance of herbal cosmetics	3	2	2	3	3	3	3	3	3	3	3	3	3	3
CO6: Classify Toxicological and allergen screening techniques.	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Average	**3**	**2.33**	**2.67**	**3**	**3**	**2.83**	**3**	**2.67**	**2.83**	**2.83**	**2.83**	**2.83**	**3**	**3**

Year Semester: M. Pharm. Semester II
Subject Name: Pharmacognosy Practical I
Course: 2019 Syllabus
Course Code: 20808

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14

CO1: Demonstrate isolation of nucleic acid, DNA and RNA.	3	3	3	3	3	3	3	2	2	2	2	3	3	3
CO2: Explain Immobilization techniques.	3	2	3	3	3	2	3	3	3	3	3	2	3	3
CO3: Illustrate and establish different types of culture.	3	2	3	3	3	3	3	2	3	3	3	3	3	3
CO4: Estimate phytoconstituent quantitatively.	3	2	2	3	3	3	3	3	3	3	3	3	3	3
CO5:Prepare and standardize different dosage form of Indian system of medicine	3	2	2	3	3	3	3	3	3	3	3	3	3	3
CO6: Formulate and evaluate various cosmetic preparation	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Average	**3**	**2.33**	**2.67**	**3**	**3**	**2.83**	**3**	**2.67**	**2.83**	**2.83**	**2.83**	**2.83**	**3**	**3**

DEPARTMENT OF INDUSTRIAL PHARMACY (923-888)

Year Semester: M. Pharm. Semester I
Subject Name: Pharmaceutical Formulation Development (Theory)
Course: 2019 Syllabus
Course Code: 20713

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
CO1: Understand concepts of pre-formulation studies of various dosage forms.	3	2	2	3	1	2	3	2	3	3	2	3	1	3
CO2: Identify the role of pharmaceutical additives in formulation development.	2	2	3	2	2	3	3	3	2	2	3	3	3	2
CO3: Compare in vitro and in vivo correlation.	2	3	2	2	2	3	2	3	3	2	3	2	3	2
CO4: Describe concept of design of experiment in product development.	3	3	3	3	3	3	2	2	3	2	3	3	3	3
CO5: Know concept of solubility and methods to enhance solubility.	3	3	2	2	3	3	3	3	2	2	3	2	3	2
CO6: Understand stability protocols, report and ICH guidelines.	3	3	3	2	3	2	2	3	2	2	2	2	2	2
Average	**2.67**	**2.67**	**2.5**	**2.33**	**2.33**	**2.67**	**2.5**	**2.67**	**2.5**	**2.17**	**2.67**	**2.5**	**2.5**	**2.33**

Year Semester: M. Pharm. Semester I
Subject Name: Novel Drug Delivery System (Theory)
Course: 2019 Syllabus
Course Code: 20724

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
CO1: Understand concept of sustained and controlled release dosage forms.	2	3	3	2	2	3	2	2	3	3	2	3	3	3
CO2: Study different types of drug delivery systems.	3	2	2	3	3	2	2	2	3	2	3	2	2	3
CO3: Know formulation and characterization of transdermal drug delivery system.	3	3	3	3	2	2	2	3	2	3	2	3	3	2
CO4: Describe concept of drug targeting and specialized pharmaceuticals.	2	2	2	3	2	3	2	3	3	2	3	2	2	3
CO5: Understand the application of biotechnology in drug delivery system and new trends personalized medicines.	3	3	3	2	3	2	3	3	3	2	2	3	2	2
CO6: Formulate and evaluate protein and peptide drug delivery system and understand concept of vaccine.	3	3	2	3	3	2	2	2	2	3	2	3	3	2
Average	**2.67**	**2.67**	**2.5**	**2.67**	**2.5**	**2.33**	**2.17**	**2.5**	**2.67**	**2.5**	**2.33**	**2.67**	**2.5**	**2.5**

Year Semester: M. Pharm. Semester I
Subject Name: Intellectual Property Rights (Theory)
Course: 2019 Syllabus
Course Code: 20735

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14

CO1: Understand regulatory audit process.	3	3	2	3	3	2	1	3	3	2	2	2	2	2
CO2: Study regulatory guidelines of drug and drug product.	2	3	3	1	2	2	3	2	2	1	3	2	2	3
CO3: Compare different regulatory agencies.	1	3	2	2	2	2	3	2	2	3	3	3	3	2
CO4: Describe regulatory requirement for contract research organization.	1	3	3	2	1	1	2	3	3	3	2	3	2	2
CO5: Know trademark, patent, IPR and types of IPR.	3	3	3	3	2	3	3	2	3	3	2	3	3	3
CO6: Study regulations associated with biosimilars.	3	3	2	3	3	2	2	2	2	3	2	3	3	2
Average	**2.17**	**3**	**2.5**	**2.33**	**2.17**	**2**	**2.33**	**2.33**	**2.5**	**2.5**	**2.33**	**2.67**	**2.5**	**2.33**

Year Semester: M. Pharm. Semester I
Subject Name: Industrial Pharmacy Practical I
Course: 2019 Syllabus
Course Code: 20746

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
CO1: Demonstrate data analysis by UV and HPLC analysis.	2	3	3	3	2	2	3	2	3	3	2	2	2	3
CO2: Learn to quantify the drug from different spectroscopic methods.	3	3	3	2	3	2	3	2	3	2	3	2	2	3
CO3: Understand the different approaches to find out the solubility and stability of different dosage forms.	3	3	2	2	3	3	2	3	2	2	1	2	3	2
CO4: Study formulation and development of various dosage forms including tablets, capsules and liposomes, TDDS and semisolid dosage forms.	2	3	3	3	3	3	2	3	2	3	2	3	1	2
CO5: Understand dissolution improvement approach of poorly soluble drug using solid dispersion technique.	3	3	2	3	3	2	3	3	3	2	3	2	2	2
CO6: Learn to carry out electrophoresis of various peptide drug delivery system.	3	3	3	3	3	1	2	2	1	3	2	2	2	2
Average	**2.67**	**3**	**2.67**	**2.67**	**2.83**	**2.17**	**2.5**	**2.5**	**2.33**	**2.5**	**2.17**	**2.17**	**2**	**2.33**

Year Semester: M. Pharm. Semester II
Subject Name: Advanced Biopharmaceutics & Pharmacokinetics (Theory)
Course: 2019 Syllabus
Course Code: 20759

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
CO1: Understand the various mechanisms of absorption of drug.	3	2	2	3	3	2	3	3	2	3	3	3	3	2
CO2: Identify the physiological, physicochemical and dosage form-related factors affecting drug absorption from different dosage forms	3	2	2	3	3	2	1	3	2	3	3	3	3	3
CO3: Design a dosage form on the basis of biopharmaceutical considerations and to understand its effect on *In Vitro* Drug Product Performance	3	3	3	3	3	2	1	3	3	3	3	2	3	2
CO4: Study different various pharmacokinetic models and their significance in interpreting various pharmacokinetic parameters	3	2	3	3	3	3	1	3	3	3	3	3	3	2
CO5: Establish *in vitro-in vivo* correlation for different drug products and Design protocols for bioavailability and bioequivalence studies	3	2	3	3	3	2	2	3	3	2	3	3	3	3
CO6: Understand the pharmacokinetic basis of modified-release and targeted drug delivery.	3	2	2	3	3	2	1	2	2	2	3	2	1	1
Average	**3.00**	**2.17**	**2.50**	**3.00**	**3.00**	**2.17**	**1.50**	**2.83**	**2.50**	**2.67**	**3.00**	**2.67**	**2.67**	**2.17**

Year Semester: M. Pharm. Semester II
Subject Name: Scale Up and Technology Transfer (Theory)

Course: 2019 Syllabus
Course Code: 20770

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
CO1: Understand the basics of Pilot plant design and Analyze layout designing of various pharmaceutical manufacturing facility	3	3	3	3	2	2	2	3	1	2	3	3	2	2
CO2: Importance of Technology transfer from R & D to pilot plant to plant scale and process scale up for various dosage forms	3	2	3	2	2	2	1	3	1	2	3	3	3	3
CO3: Familiarize with the scope, importance, and types of validation	3	3	3	2	2	2	1	3	3	2	3	3	2	2
CO4: Impart theoretical knowledge and training to perform validation/qualification of pharmaceutical process, facility, and utilities.	3	2	3	3	3	2	1	3	3	2	3	3	3	2
CO5: Understand the various Process validation for pharmaceutical manufacturing	3	2	3	2	3	3	2	3	3	3	3	3	3	3
CO6: Familiarize with Industrial safety: Hazards	3	2	2	2	1	2	1	2	2	2	3	1	1	1
Average	**3.00**	**2.33**	**2.83**	**2.33**	**2.17**	**2.17**	**1.33**	**2.83**	**2.17**	**2.17**	**3.00**	**2.67**	**2.33**	**2.17**

Year Semester: M. Pharm. Semester II
Subject Name: Pharmaceutical Production Technology (Theory)

Course: 2019 Syllabus
Course Code: 20781

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
CO1: Understand the manufacturing technologies of tablet, Capsules, Parenteral and disperse systems	3	2	2	3	3	2	2	3	2	3	3	3	3	2
CO2: Understand and analyze the design and functioning of equipment's and processes employed in pharmaceutical manufacturing of tablet, Capsules, Parenteral and disperse systems	3	2	2	3	3	3	1	3	2	3	3	2	3	3
CO3: Understand the principles and applications of advanced technologies like Lyophilization, Spray drying, pelletization, spheronizers, marumerisers, etc.	3	3	3	3	3	2	1	3	3	3	3	2	3	3
CO4: Perform the troubleshooting / problems encountered during manufacture of pharmaceutical Products	3	2	3	3	3	3	2	3	3	3	3	3	2	2
CO5: Learn Packaging Technology with various packaging materials, machinery, labeling, package printing for different dosage forms	3	2	3	3	3	3	2	3	3	2	3	3	3	3
CO6: Study various air handling systems and water treatment process techniques and its maintenance required in pharmaceutical manufacturing.	3	2	2	3	3	2	2	2	2	2	3	2	1	1
Average	**3.00**	**2.17**	**2.50**	**3.00**	**3.00**	**2.50**	**1.67**	**2.83**	**2.50**	**2.67**	**3.00**	**2.50**	**2.50**	**2.33**

Year Semester: M. Pharm. Semester II
Subject Name: Entrepreneurship Management (Theory)

Course: 2019 Syllabus
Course Code: 20792

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
CO1: Understand the scope of entrepreneurship in pharmaceutical business and role of enterprise in national and global economy.	3	1	2	3	3	3	3	3	2	3	3	3	3	2
CO2: Study the concepts of entrepreneurial competency	3	2	2	3	3	2	2	3	3	3	3	3	3	3
CO3: Understand the concept of growth strategies and networking	3	2	3	3	3	3	3	3	3	3	3	3	3	2
CO4: Understand the concept of enterprise selection, market assessment, enterprise feasibility study, SWOT Analysis, etc	3	2	3	3	3	3	2	3	3	3	3	3	2	3
CO5: Know about the Joint venture, co-ordination and feasibility study	3	2	3	3	3	3	3	3	3	2	3	3	3	2
CO6: Focus on the new project proposal to find its feasibility as new enterprise project	3	3	2	3	3	3	2	3	3	2	3	2	2	2
Average	**3.00**	**2.00**	**2.50**	**3.00**	**3.00**	**2.83**	**2.50**	**3.00**	**2.83**	**2.67**	**3.00**	**2.83**	**2.67**	**2.33**

Year Semester: M. Pharm. Semester II
Subject Name: Industrial Pharmacy Practical II

Course: 2019 Syllabus
Course Code: 20803

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
CO1: Understand dissolution improvement approach of poorly soluble drug using solid dispersion technique.	3	2	3	3	2	2	2	3	2	1	3	3	2	3
CO2: Compare dissolution profile of prepared formulation with marketed formulation.	3	2	3	2	2	3	2	3	1	2	3	3	3	3
CO3: Demonstrate pharmacokinetic and IV-IVC data analysis by Winonlin software.	3	3	3	2	2	3	2	3	3	2	3	2	2	2
CO4: Study formulation and development of various dosage forms including tablets, capsules, suspensions, emulsions, injections, enteric coated tablets	3	2	3	3	3	3	2	3	3	1	3	3	3	2
CO5: Demonstrate freeze dryer and develop freeze dried formulation	3	2	3	2	3	3	2	3	3	3	3	3	3	3
CO6: Demonstrate Spray dryer and develop spray dried formulation	3	2	2	3	3	2	1	2	2	2	3	2	1	2
Average	**3.00**	**2.17**	**2.83**	**2.50**	**2.50**	**2.67**	**1.83**	**2.83**	**2.33**	**1.83**	**3.00**	**2.67**	**2.33**	**2.50**