2.6.1 -

Student Performance and Learning Outcomes

CONTENT

2.6.1 -

Programme Outcomes (POs) and Course Outcomes (COs) for all Programmes offered by the institution are stated and displayed on website

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Programme Outcomes (PO's) and Course Outcomes (CO's) for all Programmes offered by the institution are stated and displayed on website

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Programme Outcomes (PO's) and Course Outcomes (CO's) for all Programmes offered by the institution are stated and displayed on website

Outcome Based Education is an approach to education in which decisions about the curriculum, instruction, and assessment are driven by the exit learning outcomes that the students should demonstrate at the end of a program or a course. In outcome-based education, 'product defines processes. It is the opposite of input-based education where the emphasis is on the teaching and the system is happy to accept whatever is the result.

The Course Outcomes (CO's) are defined in accordance with the University curriculum. The CO's for each course from 1st to 8th semester for B. Pharmacy and 1 to 3 semesters for M. Pharmacy discipline are presented with a course coding system: eg., **103T.1 to T.4** is the third course (theory) in the first Semester of the program; and '.1' to '.4' are the outcomes of this course. The correlation between CO's and PO's is established through the process given below:

Step 1: CO's defined by the faculty is mapped with the PO's.

Step 2: For each course, the average value of PO's is obtained.

Step 3: Step 2 is carried out for all the courses in the B. Pharmacy and M. Pharmacy program eg.,

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BP103T.1	2	1	1	-	2	-	-	2	-	-	3

The mapping of all the courses with PO's in accordance with the procedure followed is summarized and presented, The *Correlation levels 1, 2 or 3, as defined below as 1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) '--' Indicates there is no correlation.*

For all the cognitive domains of the subjects, the content of the syllabus has been reorganized into relevant Course Objectives (COB's) and Course Outcomes (CO's) according to the Revised Bloom's taxonomy. The course outcomes statements are framed using the words

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with Bloom's taxonomy level expressing various categories like Knowledge, Comprehension, Application, Analysis, Synthesis, and Evaluation. The course outcomes for every subject are described in four points for theory and in three points for practical for all courses by the subject teachers. The Institute has defined the program outcomes (PO's) based on the following graduate attributes: pharmacy knowledge, planning abilities, problem analysis, modern tool usage, leadership skills, professional identity, pharmaceutical ethics, communication, pharmacist and society, environment and sustainability, and life-long learning. Course outcomes are prepared by the respective subject faculty and the department Head finally approves the same after discussion with the academic monitoring committee. All the CO's of the subjects are communicated to teachers and students in the following ways: (a) discussion in academic meetings (b) discussion during induction programs (d) discussion in the classroom at the beginning of the course. Along with this, the same is maintained in the course file, and displayed at the prominent places of the colleges, student VMEdulife portal, laboratory manuals, and website.

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Pharmacy Program Outcomes (PO's)

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Program Outcomes (PO's)/ Program Specific Outcome (PSO's)

ID	Program Outcomes (PO's)/ Program Specific Outcome (PSO's) Statements
PO1	**Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.
PO2	**Planning Abilities:** Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.
PO3	**Problem analysis:** Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.
PO4	**Modern tool usage:** Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.
PO5	**Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.
PO6	**Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

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ID	Program Outcomes (PO's)/ Program Specific Outcome (PSO's) Statements
PO7	**Pharmaceutical Ethics:** Honor personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.
PO8	**Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.
PO9	**The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.
PO10	**Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO11	**Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-access and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.
PO7	**Pharmaceutical Ethics:** Honor personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

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Program Specific Outcomes (PSO's)

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PROGRAM SPECIFIC OUTCOMES (PSO's)

Pharmaceutics

M. Pharmacy graduates will be able to,

ID	Program Specific Outcome (PSO's) Statements
PSO1	Understand analytical techniques for the identification, characterization, and quantification of drugs.
PSO2	Know theoretical and practical skills of UV, IR, HPLC, and Perform structural elucidation of organic compounds using spectroscopic tools.
PSO3	Know The elements of pre-formulation studies, & acquire knowledge of novel as well as conventional drug delivery systems.
PSO4	To identify and resolve the research problems by utilizing the technical skill gained through training and experimentation.
PSO5	Know Industrial Management and GMP Considerations, Generic drug Product development & utilize skills as a part of team a professional endeavor.

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Pharmaceutical Quality Assurance

M. Pharmacy graduates will be able to,

ID	Program Specific Outcome (PSO's) Statements
PSO1	Understand analytical techniques for identification, characterization and quantification of drugs.
PSO2	Know theoretical and practical skills of UV, IR, and HPLC, and Perform Structural Elucidation of organic compounds using spectroscopic tools.
PSO3	To understand the applications & responsibilities of Quality assurance and Quality control throughout the product life cycleand appreciate the importance of documentation.
PSO4	To analyze the application-based importance of emerging quality-building concepts in product manufacturing.
PSO5	To understand and perform procedures of method validation, process validation, equipment/facilities/utilities qualifications & validation, documents, and records designing as per the regulatory standards leading to compliance of cGMP.
PSO6	To Understand the Regulatory Requirements of Pharmaceuticals.

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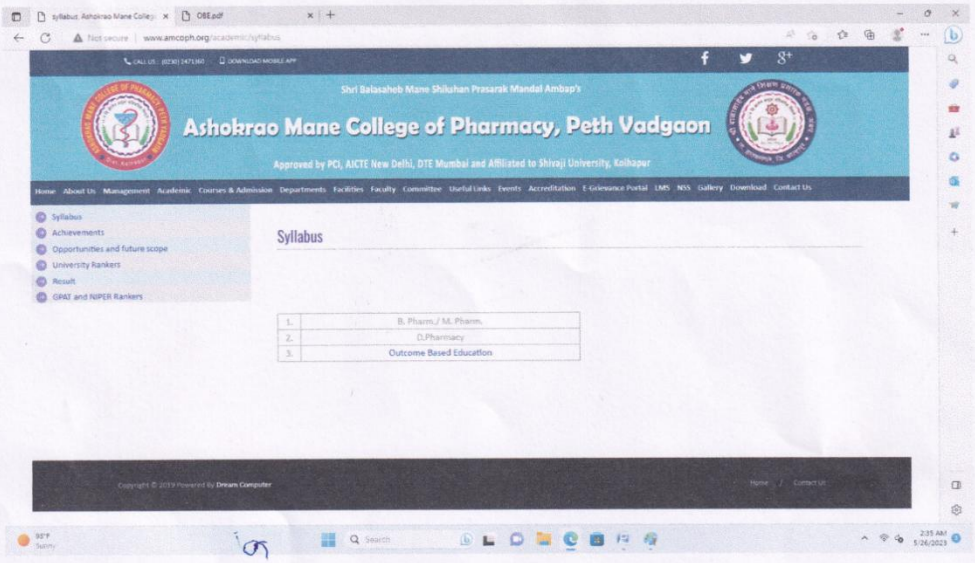

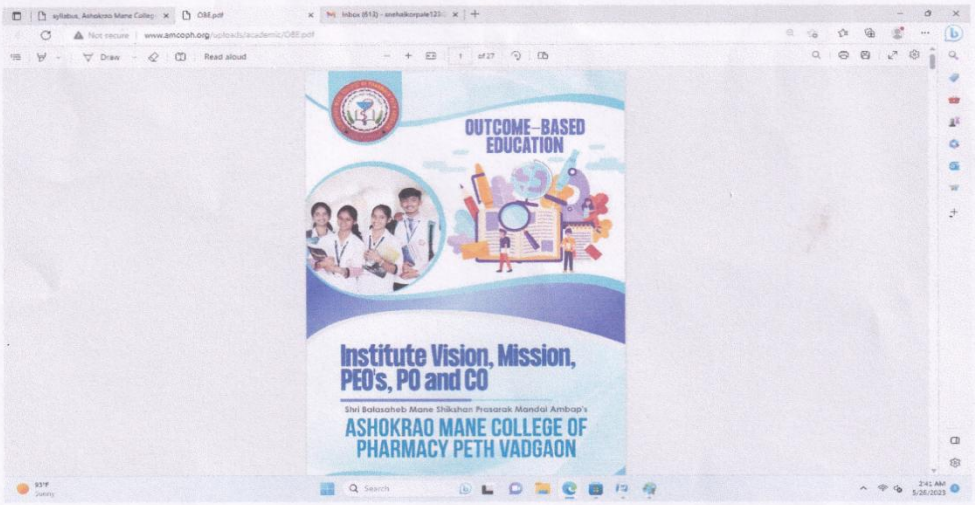

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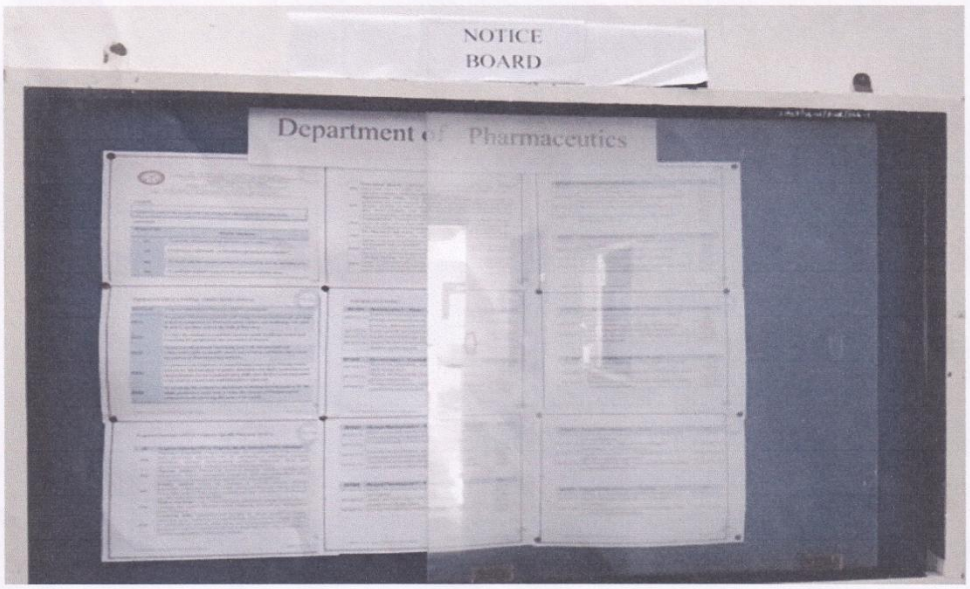

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STUDENT MENTORSHIP RECORD

VISION : Empowerment of the nation with knowledgeable pharmacist for healthy India.

MISSION :
- To provide pharmaceutical education par excellence.
- To promote community, institutional and industrial pharmacy.
- To foster and disseminate productive research in new & emerging area.
- To generate human resource in the profession of pharmacy.

PROGRAM OUTCOME :
1. Pharmacy Knowledge
2. Planning Ability
3. Problem Analysis
4. Modern Tool Usage
5. Leadership Skill
6. Professional Identity
7. Pharmaceutical Ethics
8. Communication
9. The Pharmacist & Society
10. Environment & Sustainability
11. Life-long Learning

Course : B. Pharmacy **Name of Mentor :** Dr. A. P. Gadad

I) Personal Details :

Name :	Yadav Shravani Amar	PRN :	2020080026
E-mail :	shravaniyadav1047@gmail.com	Mobile :	7058131047

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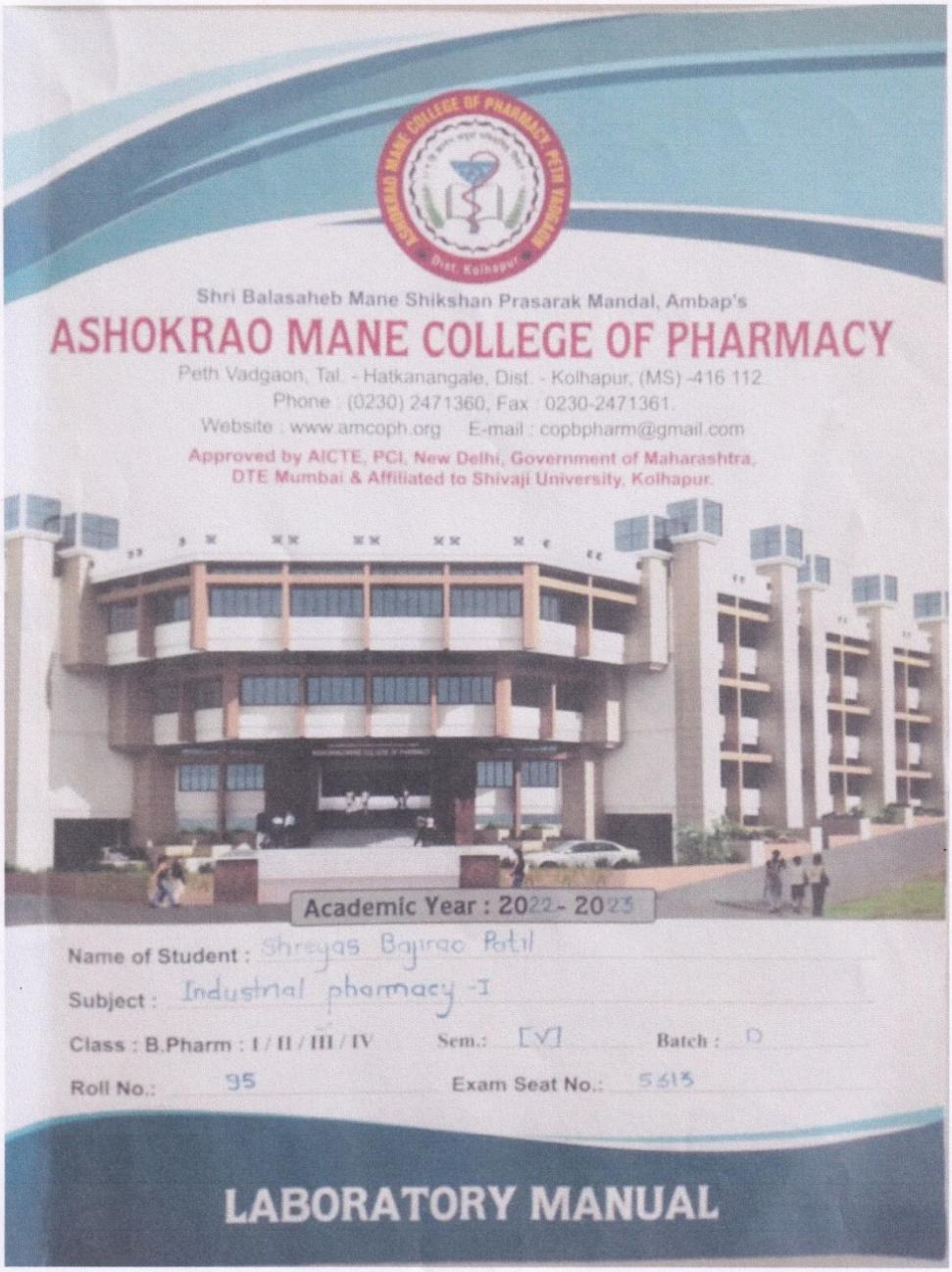

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Academic Year : 2022 - 2023

Name of Student : Shreyas Bajirao Patil

Subject : Industrial pharmacy -I

Class : B.Pharm : I / II / III / IV Sem.: [V] Batch : D

Roll No.: 95 Exam Seat No.: 5613

LABORATORY MANUAL

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Course Outcomes:

1) Illustrate the preformulation and evaluation of packaging materials.

2) Relate the formulation and evaluation of Tablets, Capsules and compare with marketed Products.

3) Relate the preparation of parentral and ophthalmic dosage forms and cosmetic creams.

PROGRAM OUTCOMES

1. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.
2. **Planning Abilities:** Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.
3. **Problem analysis:** Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluateand apply information systematically and shall make defensible decisions.
4. **Modern tool usage:** Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.
5. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professionaland societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.
6. **Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).
7. **Pharmaceutical Ethics:** Honor personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.
8. **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations anddocumentation, and give and receive clear instructions.
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Course Outcomes B. Pharmacy

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COURSE OUTCOMES

FIRST YEAR B. PHARMACY

BP101T	Human Anatomy and Physiology I– Theory	PO
BP101T.01	Describe the gross morphology, and functions of cell and tissue.	1,3,4,6,7,8,11
BP101T.02	Describe about the gross morphology, functions of cell and tissue.	1,3,4,5,6,7,8,11
BP101T.03	Explain structure and functions of skeletal, muscular, cardiovascular system, lymphatic PNS of the human body.	1,2,4,6,7,8,11
BP101T.04	Explain structure and functions skin and Special senses and their disorders.	1,2,3,4,5,7,8,11

BP102T	Pharmaceutical Analysis I – Theory	PO
BP102T.01	Explain the basic concepts of pharmaceutical analysis, impurity, their source and volumetric method used to standardize various inorganic compounds.	1,2,3,6,7,8,9,11
BP102T.02	Describe the principle of various volumetric titrations.	1,2,3,6,7,8,9,11
BP102T.03	Explain principle involved in gravimetric analysis.	1,2,3,4,6,7,8,9,11
BP102T.04	Discuss the principle and techniques of electrochemical method of analysis & their applications.	1,2,3,4,6,7,8,9,11

BP103T	Pharmaceutics I – Theory	PO
BP103T.01	Explain the historical development of Pharmacy profession, pharmacopoeial specifications, introduction to dosage forms, posology, pharmaceutical calculations and prescription.	1,2,3,6,7,8,9,11
BP103T.02	Explain powder and liquid dosage forms	1,2,3,6,7,8,9,11
BP103T.03	Explain semisolid dosage forms and suppositories.	1,2,3,6,7,8,9,11
BP103T.04	Explain the pharmaceutical incompatibilities like physical, chemical and therapeutic.	1,2,3,6,7,8,9,11

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BP104T	Pharmaceutical Inorganic Chemistry – Theory	PO
BP104T.01	Summarize the sources of impurities and methods to determine the impurities in inorganic drugs and pharmaceuticals.	1,2,4,6,7,8,9,11
BP104T.02	Explain acids, bases, buffers, electrolytes, dental products with their official monographs.	1,2,4,6,7,8,9,11
BP104T.03	Explain the medicinal and pharmaceutical importance of inorganic compounds.	1,2,3,6,7,8,9,11
BP104T.04	Describe and relate radiopharmaceuticals and radioisotopes with their pharmaceutical application.	1,2,3,4,6,7,8,9,11

BP105T	Communication skill	PO
BP105T.01	Understand the behavioral needs for a Pharmacist to function effectively in the areas of pharmaceutical operation.	2,5,8,11
BP105T.02	Communicate effectively Verbal and Non Verbal.	2,5,8,11
BP105T.03	Relate basic listening skill and effective written communication.	2,5,8,11
BP105T.04	Develop interview skills, Leadership qualities and essentials	2,5,8,11

BP107P	Human Anatomy and Physiology I– Practical	PO
BP107P.01	Describe different type's tissue and bones.	1,3,4,6,7,8,11
BP107P.02	Illustrate the Hematological experiments.	1,3,4,5,6,7,8,11
BP107P.03	Illustrate the Hematological experiments.	1,2,4,6,7,8,11

BP108P	Pharmaceutical Analysis I – Practical	PO
BP108P.01	Illustrate the chemical compounds for their purity using limit tests.	1,2,3,4,5,6, 7,8,9,11
BP108P.02	Identify percentage purity of given pharmaceutical drugs by titrimetric analysis along with preparation of standardization of secondary standard solutions.	1,2,3,4,5,6, 7,8,9,11
BP108P.03	Perform and carryout various electrochemical titrations.	1,2,3,4,5,6, 7,8,9,11

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BP109P	Pharmaceutics I – Practical	PO
BP109P .01	Illustrate the preparation, labeling aspects and evaluation of liquid dosage form.	1,2,3,4,6,7,8,9,11
BP109P .02	Illustrate the preparation, labeling aspects and evaluation of granules and powders.	1,2,3,4,6,7,8,9,11
BP109P .03	Illustrate the preparation, labeling aspects and evaluation of suppositories and semisolids.	1,2,3,4,6,7,8,9,11

BP110P	Pharmaceutical Inorganic Chemistry – Practical	PO
BP110P.01	Identify impurities and carry out limit test and various tests for purity for pharmaceuticals.	1,2,3,4,6,7,8,9,11
BP110P.02	Identify the inorganic compounds by undertaking various identification tests.	1,2,3,4,6,7,8,9,11
BP110P.03	Justify the preparation method for inorganic pharmaceuticals.	1,2,3,4,6,7,8,9,11

BP111P	Communication skills	PO
BP111P.01	Comprehend the concept of communication and describe the basic communication skills and ways to overcome barriers.	2,5,8,11
BP111P.02	Convert the conceptual understanding of communication into everyday practice for better business communication.	2,5,8,11
BP111P.03	Apply the concept of positive thinking to keep a good stead at the time of crisis.	2,5,8,11

BP201T	Human Anatomy and Physiology II – Theory	PO
BP201T.01	Explain anatomy and physiology of nervous system.	1,3,4,6,7,8,11
BP201T.02	Explain anatomy and physiology of Digestive & respiratory system.	1,3,4,5,6,7,8,11
BP201T.03	Explain anatomy and physiology of urinary system.	1,3,4,6,7,8,11
BP201T.04	Explain anatomy and physiology Endocrine, Reproductive and genetics.	1,2,3,4,5,7,8,11

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BP202T	Pharmaceutical Organic Chemistry I – Theory	PO
BP202T.01	Explain IUPAC systems, classification, nomenclature and isomerism of organic compounds.	1,2,6,7,8,11
BP202T.02	Explain the hybridization, elimination reactions of alkanes, alkenes and alkyl halides and stability of conjugated dienes.	1,2,6,7,8,11
BP202T.03	Describe the reaction mechanisms, qualitative tests, structure and uses of alcohols and carbonyl compounds.	1,2,6,7,8,11
BP202T.04	Describe the reaction mechanisms, qualitative tests, structure and uses of carboxylic acids and aliphatic amines.	1,2,6,7,8,11

BP203T	Biochemistry – Theory	PO
BP203T.01	Classify the biomolecules and explain their importance	1,2,4,6,7,8,9,11
BP203T.02	Relate the metabolism of nutrient molecules in physiological and pathological conditions.	1,2,4,6,7,8,9,11
BP203T.03	Explain the catalytic role of enzymes, importance of enzyme inhibitors in design of new drugs, therapeutic and diagnostic applications of enzymes.	1,2,4,6,7,8,9,11
BP203T.04	Illustrate the genetic organization of mammalian genome and functions of DNA in the synthesis of RNAs and proteins	1,2,4,6,7,8,9,11

BP204T	Pathophysiology – Theory	PO
BP204T.01	Describe the principles of cell injury, adaptation and mechanism involved in the inflammation and repair.	1,2,6,8,9,11
BP204T.02	Describe etiology and pathogenesis of various diseases and complications.	1,2,6,8,9,11
BP204T.03	Describe etiology and pathogenesis of liver, cancer, bone and joints.	1,2,6,8,9,11
BP204T.04	Describe etiology and pathogenesis of Infectious diseases and sexually transmitted diseases	1,2,6,8,9,11

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BP205 T	Computer applications in Pharmacy	PO
BP205T.01	Understand the various types of application of computers in pharmacy.	1,2,3,4,5,6,7,8,11
BP205T.02	Understand basic handling techniques of computers.	1,2,3,4,5,6,7,8,11
BP205T.03	Describe the various types of databases.	1,2,3,4,5,6,7,8,11
BP205T.04	Know the various applications of databases in pharmacy.	1,2,3,4,5,6,7,8,11

BP206 T	Environmental Sciences	PO
BP206T.01	Impart basic knowledge about the environment and awareness about environmental problems its allied problems.	1,2,3,4,5,6,7,8,9,10,11
BP206T.02	Motivate learner to participate in environment protection and environment improvement.	1,2,3,4,5,6,7,8,9,10,11
BP206T.03	Acquire skills to help the concerned individuals in identifying and solving environmental problems.	1,2,3,4,5,6,7,8,9,10,11
BP206T.04	Strive to attain harmony with Nature.	1,2,3,4,5,6,7,8,9,10,11

BP207P	Human Anatomy and Physiology II –Practical	PO
BP207P.01	Describe and recognize different types of organ system and family planning devices and pregnancy diagnosis test. With models, charts and specimen.	1,3,4,6,7,8,11
BP207P.02	Identify and examination of the functions of cranial nerves.	1,3,4,5,6,7,8,11
BP207P.03	Interpret the recording of body temp and BMI total blood count.	1,2,4,6,7,8,11

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BP209P	Biochemistry – Practical	PO
BP209P.01	Interpret the biomolecules like proteins and carbohydrates	1,2,3,4,6,7,8,9,11
BP209P.02	Interpret the biochemical investigation of blood and urine	1,2,3,4,6,7,8,9,11
BP209P.03	Plan the effect of different factors on enzymatic activity & contrast the importance of buffer solution in pharmaceuticals.	1,2,3,4,6,7,8,9,11

BP208P	Pharmaceutical Organic Chemistry I– Practical	PO
BP208P.01	Identify unknown organic compounds by qualitative analysis.	1,2,3,4,5,6, 7,8,9,11
BP208 P.02	Plan the synthesis of solid derivatives from organic compounds.	1,2,3,4,5,6, 7,8,9,11
BP208 P.03	Illustrate the molecular models of compounds using atomic models sets.	1,2,3,5,6, 7,8,9,11

SECOND YEAR B. PHARMACY

BP301T	Pharmaceutical Organic Chemistry II – Theory	PO
BP301T.01	Explain IUPAC systems, classification, nomenclature and isomerism of organic compounds.	1,2,6,7,8,11
BP301T.02	Explain the hybridization, elimination reactions of alkanes, alkenes and alkyl halides and stability of conjugated dienes.	1,2,6,7,8,11
BP301T.03	Describe the reaction mechanisms, qualitative tests, structure and uses of alcohols and carbonyl compounds.	1,2,6,7,8,11
BP301T.04	Describe the reaction mechanisms, qualitative tests, structure and uses of carboxylic acids and aliphatic amines.	1,2,6,7,8,11

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BP302T	Physical Pharmaceutics I – Theory	PO
BP302T.01	Relate various physicochemical properties of drug molecules in the designing the dosage forms.	1,2,3,6,7,8,9,11
BP302T.02	Explain principles of states and properties of matter.	1,2,3,4,6,7,8,9,11
BP302T.03	Describe the classification, methods and application of complexation and protein binding.	1,2,3,4,6,7,8,9,11
BP302T.04	Describe the preparation and application of buffers and isotonic solutions in pharmaceutical and biological system.	1,2,3,4,6,7,8,9,11

BP303T	Pharmaceutical Microbiology – Theory	PO
BP303T.01	Explain various methods of identification, cultivation and preservation of microorganisms.	1,2,3,4,6,7, 8,9,10,11
BP303T.02	Discuss the importance and implementation of sterilization in pharmaceutical processing and industry.	1,2,3,4,6, 7,8,9,11
BP303T.03	Interpret sterility testing of pharmaceutical products.	1,2,3,4,6,7,8,9,11
BP303T.04	Explain the cell culture technology and its applications in pharmaceutical industries.	1,2,3,4,6, 7,8,9,11

BP304T	Pharmaceutical Engineering – Theory	PO
BP304T.01	Explain the principle, equipment and application for flow of fluids and heat transfer.	1,2,3,4,5,6, 7,8,9,11
BP304T.02	Explain the various unit operations used in pharmaceutical industries.	1,2,3,4,5,6, 7,8,9,11
BP304T.03	Explain the various processes involved in pharmaceutical manufacturing processes.	1,2,3,4,5,6, 7,8,9,11
BP304T .04	Describe the various preventive methods for corrosion and pollution control in pharmaceutical plant construction.	1,2,3,4,5,6, 7,8,9,10,11

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BP401T	Pharmaceutical Organic Chemistry III– Theory	PO
BP401T.01	To explain the stereo chemical aspects of organic compounds and stereo chemical reactions with respect to optical isomerism.	1,3,4,10,11
BP401T.02	To explain the stereo chemical aspects of organic compounds and stereo chemical reactions with respect to geometrical isomerism.	1,3,4,10,11
BP401T.03	To summarize the synthesis, chemical reactions, and medicinal uses of some heterocyclic compounds.	1,3,4,10,11
BP401T.04	To illustrate statement, mechanism, and applications of some named reactions.	1,3,4,10,11

BP402T	Medicinal Chemistry I – Theory	PO
BP402T.01	Explain the physicochemical properties and drug metabolism for various categories of drugs.	1,2,3,5,6, 7,8,9,11
BP402T.02	Explain the classification, mechanism of action and uses of different classes of drugs.	1,2,3,5,6, 7,8,9,11
BP402T.03	Relate the Structure activity relationship of different classes of drugs.	1,2,3,5,6, 7,8,9,11
BP402T.04	Plan the synthesis of different class of selective medicinal drugs.	1,2,3,4,5,6, 7,8,9,11

BP403T	Physical Pharmaceutics II – Theory	PO
BP403T.01	Explain the general characteristics and classification of colloidal dispersion.	1,2,6,7,8,9,11
BP403T.02	Describe principles involved in the rheological characteristics and coarse dispersion.	1,2,4,6,7,8,9,11
BP403T.03	Explain the micromeritic of the powder and their application in solid dosage forms.	1,2,4,6,7,8,9,11
BP403T.04	Describe the kinetics study and accelerated stability testing in pharmaceutical dosage forms.	1,2,4,6,7,8,9,11

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BP404T	Pharmacology I – Theory	PO
BP404T.01	Explain the general pharmacology of the drugs regarding pharmacokinetics & pharmacodynamics.	1,3,4,6,9,10, 11
BP404T.02	Relate the drug discovery & clinical trials for a new drug.	1,2,3,4,9,10,11
BP404T.03	Describe the Pharmacology of drugs acting on peripheral nervous system.	1,3,4,9,10,11
BP404T.04	Describe the pharmacology of drugs acting on central nervous system.	1,3,4,6,9,10,11

BP405T	Pharmacognosy and Phytochemistry I– Theory	PO
BP405T.01	Explain the Pharmacognostic scheme of the crude drug of natural origin.	1,2,3,4,6, 7,9,11
BP405 T.02	Explain the role of pharmacognosy in various systems of medicines and study the Pharmacognostic scheme of secondary metabolites.	1,2,3,4,6, 7,8,9,1
BP405 T.03	Describe the cultivation, collection, processing and storage of natural origin of medicinal drugs and development and application of tissue culture.	1,2,3,4,6, 7,8,9,11
BP405 T.04	Explain the Pharmacognostic scheme of drugs of natural origin containing plant products, primary metabolites and marine drugs.	1,2,3,4,6, 7,8,9,11

BP406P	Medicinal Chemistry I – Practical	PO
BP406P.01	Synthesize drugs and drug intermediates of selective medicinal compounds.	1,2,3,4,5,6, 7,8,9,11
BP406P.02	Assess the percentage purity of selective drugs.	1,2,3,4,5,6, 7,8,9,11
BP406P.03	Assess the partition coefficient of drugs.	1,2,3,4,5,6, 7,8,9,11

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BP407P	Physical Pharmaceutics II – Practical	PO
BP407P.01	Identify the micromeritic properties of the powders.	1,2,3,4,6,7,8,9,11
BP407P .02	Identify the physical properties in the formulation development.	1,2,3,4,6,7,8,9,11
BP407P.03	Relate the principle of chemical kinetics and apply them in stability testing of formulation.	1,2,3,4,6,7,8,9,11

BP408P	Pharmacology I – Practical	PO
BP408P.01	Summarize about the construction and working the about basic instruments, common laboratory animals and maintenance as per CPCSEA guidelines used in experimental pharmacology.	1,4,10,11
BP408P.02	Describe and demonstrate the common laboratory techniques like routes of drug administration, blood withdrawal and plasma separation, anesthetics and euthanasia used for animal studies.	1,3,4,10,11
BP408P.03	Interpret and observe the effect of different drugs on animals by simulated experiments.	1,3,4,9,10,11

BP409P	Pharmacognosy and Phytochemistry I – Practical	PO
BP 409P.1	Illustrate the analysis of crude drugs by chemical tests.	1,2,3,4,6,7,8,9,11
BP 409P.2	Determine the characteristics of crude drugs by physical method.	1,2,3,4,6,7,8,9,11
BP 409P.3	Describe the physical characteristics of crude drug by microscopy method.	1,2,3,4,6,7,8,9,11

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THIRD YEAR B. PHARMACY

BP501T	Medicinal Chemistry II – Theory	PO
BP501T.01	Explain the classification and uses of different classes of drugs.	1,2,3,5,6,7,8,9,11
BP501T.02	Relate the Mechanism of action of different classes of drugs.	1,2,3,5,6,7,8,9,11
BP501T.03	Relate the Structure activity relationship of different classes of drugs.	1,2,3,5,6,7,8,9,11
BP501T.04	Plan the synthesis of different class of selective medicinal drugs.	1,2,3,4,5,6,7,8,9,11

BP502T	Industrial Pharmacy I– Theory	PO
BP502T.01	Explain the preformulation studies and relate the packaging materials in the development of various dosage form.	1,2,3,4,5,6, 7,8, 9,11
BP502T.02	Describe the formulation and quality control test for solid and liquid dosage forms such as tablets, pellets, capsules and liquid orals.	1,2,3,4,5,6, 7,8,9,11
BP502T.03	Describe the production condition, formulation and quality control test of parentrals, ophthalmic products and aerosols.	1,2,3,4,5,6, 7,8,9,11
BP502T.04	Explain the formulation considerations for the various cosmetic preparations.	1,2,3,4,5,6, 7,8,9,11

BP503T	Pharmacology II – Theory	PO
BP503T.01	Explain the pharmacological action and its relevance of drugs acting on CVS and urinary system.	1,2,6,7, 8,9,11
BP503T.02	Explain the pharmacological action and its relevance of drugs acting on autacoids and drugs.	1,2,6,7, 8,9,11
BP503T.03	Explain the pharmacological action and its relevance of drugs acting on endocrine system.	1,2,6,7, 8,9,11
BP503T.04	Describe the principles, types and application of bioassay of drugs.	1,2,4,6,7, 8,9,11

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BP504T	Pharmacognosy and Phytochemistry II– Theory	PO
BP504T.01	Explain the basics of metabolic biosynthesis and biogenesis pathways and their determinations.	1,2,3,4,6,7,8,9,11
BP504T.02	Describe the various chemical categories of secondary metabolites and its Pharmacognostic studies.	1,2,3,4,6,7,8,9,11
BP504T.03	Illustrate the evaluation of Phytoconstituents by isolation, identification, estimation, production and utilization.	1,2,3,4,6,7,8,9,11
BP504T.04	Relate the basics in Phytochemistry, its extraction and application of various techniques of screening.	1,2,3,4,6,7,8,9,11

BP505T	Pharmaceutical Jurisprudence – Theory	PO
BP505T.01	Explain the import, manufacture, sale of drugs as per Drugs & cosmetics act 1940 and rules1945.	1,2,4,5,6,7, 8,9,10,11
BP505T.02	Summarize the administration of the Drug & Cosmetics act and rules.	1,2,3,5,6,7, 8,9,10,11
BP505T.03	Describe the various pharmaceutical acts & laws M & T P Act 1955,N D &P S Act 1985,D& M R Act, Prevention of Cruelty to animalsAct-1960, DPCO act, MTP Act, RTIACT, IPR.	1,2,3,5,6,7, 8,9,10,11
BP505T.04	Describe the development of pharmaceutical legislation of India &pharmacist in relation to ethics practice.	1,2,3,5,6,7, 8,9,10,11

BP506P	Industrial Pharmacy I – Practical	PO
BP 506P.01	Illustrate the preformulation and evaluation of packaging materials.	1,2,3,4,6,7,8,9,11
BP 506P.02	Relate the formulation and evaluation of tablets, capsules and compare with marketed products.	1,2,3,4,6,7,8,9,11
BP 506P.03	Relate the preparation of parentral and ophthalmic dosage forms and cosmetic creams.	1,2,3,4,6,7,8,9,11

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BP507P	Pharmacology II – Practical	PO
BP507P.01	Summarize the preparation of physiological salt solutions in the study of effect of drugs on various receptor & animal model.	1,3,4,6,9,10,11
BP507P.02	Compare the bioassay of drugs using animal models by various methods.	1,3,4,6,9,10,11
BP507P.03	Explain the analgesic & Anti-inflammatory activity of drugs by using various methods.	1,3,4,6,9,10,11

BP508P	Pharmacognosy and Phytochemistry II – Practical	PO
BP508P.01	Assess the morphology, histology, powder characteristics and extraction, isolation and detection of crude drugs.	1,2,3,4,5,6,7,8,9,11
BP508P.02	Plan the separation and detection of Phytoconstituents by different chromatographic methods.	1,2,3,4,5,6,7,8,9,11
BP508P.03	Assess the analysis of crude drugs by chemical test.	1,2,3,4,5,6,7,8,9,11

BP601T	Medicinal Chemistry III – Theory	PO
BP601T.01	Explain the classification and uses of different classes of drugs.	1,2,3,5,6,7,8,9,11
BP601T.02	Relate the Mechanism of action and Structure activity relationship of different classes of drugs.	1,2,3,5,6,7,8,9,11
BP601T.03	Plan the synthesis of different class of selective medicinal drugs.	1,2,3,4,5,6,7,8,9,11
BP601T.04	Explain the approaches in drug design, concept of QSAR and combinatorial chemistry.	1,2,3,4,5,6,7,8,9,11

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BP602T	Pharmacology III – Theory	PO
BP602T.01	Explain the pharmacological action and its relevance of drugs acting on respiratory system and gastrointestinal system.	1,2,6,7,8,9,11
BP602T.02	Explain general principle of chemotherapy of disease, mechanism of bacterial resistance and pharmacology of antimicrobial and antineoplastic agent.	1,2,6,7,8,9,11
BP602T.03	Explain the pharmacological action and its relevance of drugs acting on immunopharmacological drugs and chronopharmacology.	1,2,6,7,8,9,11
BP602T.04	Summarize principle of toxicology and treatment of various acute and chronic poisoning.	1,2,6,7,8,9,11

BP603T	Herbal Drug Technology – Theory	PO
BP603T.01	Explain the source of herbs, identification, authentication, cultivation and processing of herbal raw materials in various systems of medicines.	1,2,3,6,7,8,9,11
BP603T.02	Explain the general aspects benefits and role of neutraceuticals and herbal cosmetics.	1,2,3,6,7,8,9,11
BP603T.03	Relate the evaluation and assessment of herbal drugs by WHO and ICH guidelines.	1,2,3,6,7,8,9,11
BP603T.04	Use of schedule T in the manufacturing of herbal drugs and Indian system of medicine.	1,2,3,6,7,8,9,11

BP604T	Bio pharmaceutics and Pharmacokinetics – Theory	PO
BP604T.01	Describe the basic concept of absorption, distribution, metabolism and excretion of drugs.	1,2,3,6,7,8,9,11
BP604T.02	Explain the principles and methods of bioavailability and bioequivalence studies.	1,2,3,4, 6,7,8,9,11
BP604T.03	Describe the primary, secondary and tertiary pharmacokinetic parameters in clinical setting.	1,2,3,6,7,8,9,11
BP604T .04	Explain the factors and parameters of nonlinear pharmacokinetics.	1,2,3,6,7,8,9,11

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BP605T	Pharmaceutical Biotechnology – Theory	PO
BP605T.01	Summarize the importance of Immobilized enzymes in Pharmaceutical Industries.	1,2,4,6,7,8, 9,11
BP605T.02	Describe genetic engineering applications in relation to production of pharmaceuticals.	1,2,4,7,8,9,11
BP605T.03	Explain of Monoclonal antibodies in Industries.	1,2,4,5,7,8,11
BP605T.04	Illustrated the use of microorganisms in fermentation technology.	1,2,4,5,6,7,8,9,11

BP606T	Quality Assurance –Theory	PO
BP606T.01	Explain the concept and control of quality management systems.	1,2,3,5,6,7,8,9,11
BP606T.02	Describe the quality control tests for raw materials, containers and secondary packaging materials.	1,2,3,5,6,7,8,9,11
BP606T.03	Describe the documentation in pharmaceutical industry.	1,2,3,5,6,7,8,9,11
BP606T.04	Explain the general principles of calibration, validation process and equipment qualification.	1,2,3,4,5,6,7,8,9,11

BP607P	Medicinal chemistry III – Practical	PO
BP607P.01	Synthesize drugs and drug intermediates of selective medicinal compounds.	1,2,3,4,5,6,7, 8,9,11
BP607P.02	Assess the percentage purity and physichochemical properties of selective drugs.	1,2,3,4,5,6,7, 8,9,11
BP607P.03	Illustrate the structures and reactions using chem draw.	1,2,3,4,5,6,7, 8,9,11

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BP608P	Pharmacology III – Practical	PO
BP608P.01	Demonstrate the screening of different category of drugs.	1,5,6,7,8,11
BP608P.02	Assess the dose calculation, acute oral toxicity study and acute skin and eye irritation study.	1,9,10,11
BP608P.03	Estimation of serum biochemical parameters and biostatistics methods in experimental pharmacology.	1,2,3,9,11

BP609P	Herbal Drug Technology – Practical	PO
BP609P.01	Assess the evaluation of crude drugs by preliminary phytochemical screening.	1,2,3,4,6,7,8,9,11
BP609P.02	Assess the preparation and standardization of Herbal drugs and herbal cosmetics by evaluation parameters.	1,2,3,4,6,7,8,9,11
BP609P.03	Illustrate the Monograph analysis of herbal drugs from recent Pharmacopoeias.	1,2,3,4,6,7,8,9,11

FINAL YEAR B. PHARMACY

BP701T	Instrumental Methods of Analysis – Theory	PO
BP701T.01	To summarize the interaction of matter with electromagnetic radiations and instrumentation in various spectroscopic techniques.	1,2,3,4,6,7, 8,9,10,11
BP701T.02	To illustrate the principle and technique behind various chromatographic separations.	1,2,3,4,6,7, 9,10,11
BP701T.03	To emphasize qualitative and quantitative analysis of drugs using various chromatographic techniques.	1,2,3,4,6, 8,10,11
BP701T.04	To articulate the qualitative and quantitative applications of various spectroscopic techniques in the analysis of drugs.	1,2,3,4,6,8,10,11

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BP702T	Industrial Pharmacy II – Theory	PO
BP702T.01	Describe the process of pilot plant scale up of pharmaceutical dosage forms.	1,2,3,4,5,6,7,8,9,11
BP702T.02	Develop the practice and the process of technology transfer from lab scale to production.	1,2,3,4,5,6,7,8,9,11
BP702T.03	Explain the different laws, approval process, role and responsibility of Regulatory agencies.	1,2,3,4,5,6,7,8,9,11
BP702T.04	Explain the different Quality Management systems and their role.	1,2,3,4,5,6,7,8,9,11

BP703T	Pharmacy Practice – Theory	PO
BP703T.01	Describe the knowledge on organization of hospital, community pharmacy, various methods of distribution and hospital formulary in hospitals and apply it in in the practice of pharmacy.	1,2,5,6,7,8,9,11
BP703T.02	Categorize the role of hospital pharmacist in pharmacy, therapeutic committee, drug information services, patient counseling, education and training programme in hospitals.	1,2,5,6,7,8,9,11
BP703T.03	Explain concept, function and responsibility of clinical pharmacist.	1,2,5,6,7,8,9,11
BP703T.04	Explain organization of drug store management and inventory control.	1,2,5,6,7,8,9,11

BP704T	Novel Drug Delivery System – Theory	PO
BP704T.01	Explain the various approaches for development of novel drug delivery system.	1,2,3,4,6,7,8,9,11
BP704T.02	Identify the criteria for selection of drugs and polymer for the development of novel drug delivery system.	1,2,3,4,6,7,8,9,11
BP704T.03	Explain the concept, methodology and their applications by various drug delivery systems.	1,2,3,4,6,7,8,9,11
BP704T.04	Explain the concept, methodology and their applications by various targeted drug delivery system.	1,2,3,4,6,7,8,9,11

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BP705P	Instrumental Methods of Analysis – Practical	PO
BP705P.01	To interpret the absorption maxima, assay by Colorimeter and UV Visible Spectrophotometer.	1,2,3,4,5,6, 8,9,10,11
BP705P.02	To relate the estimation of concentration of ions by Flame Photometer and turbidance by Nepheloturbidimeter.	1,2,3,4,5, 6,9,10,11
BP705P.03	To relate the purity of the drugs by various chromatographic techniques such as TLC, PC, Column chromatography, and HPLC.	1,2,3,4,5, 8,9,11

BP801T	Biostatistics and Research Methodology	PO
BP801T.01	Relate the basic terminologies involved in Statistics and measures of central tendency, dispersion and correlation.	1,3,4,6,7,8,11
BP801T.02	Compare and measure the various parametric and non-parametric statistical techniques.	1,3,4,5,6,7,8,11
BP801T.03	Explain the concept of research and various methodologies involved in research.	1,3,4,6,7,8,11
BP801T.04	Explain the measure of different statistical software's using design of experiments and clinical trial study.	1,2,3,4,5,7,8,11

BP802T	Social and Preventive Pharmacy	PO
BP802T.01	Illustrate the concept and evaluation of public health.	1,5,6,7,8,9,11
BP802T.02	Explain the principle on prevention and control of communicable and non communicable diseases.	1,5,6,7,8,9,11
BP802T.03	Identify current issues related with various diseases in related to the prevention and control within the country.	1,5,6,7,8,9,11
BP802T.04	Role play of the community services in improvement of ruler sanitation, urban health care and promotion of school health.	1,5,6,7,8,9,11

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BP803ET	Pharma Marketing Management	PO
BP803ET.01	Explain the general concepts and scope of pharmaceutical marketing.	1,2,5,6,7,8,9,11
BP803ET.02	Describe the product decision and management in pharmaceutical industry.	1,2,5,6,7,8,9,11
BP803ET.03	Describe the methods of promotion, role of PSR and various applications of marketing channels.	1,2,5,6,7,8,9,11
BP803ET.03	Relate the emerging concepts in marketing and price management as per BPCO and NPPA.	1,2,5,6,7,8,9,11

BP805ET	Pharmacovigilance	PO
BP805ET.01	Discuss the importance of drug safety monitoring and the development of pharmacovigilance programme.	1,2,6,7,8,9,11
BP805ET.02	Identify methods and management of adverse drug reaction.	1,2,3,4,6,7,8,9,11
BP805ET.03	Assess international standards for classification of diseases and drugs.	1,2,3,4,6,7,8,9,11
BP805ET.04	Explain various methods of programmes and terminologies in drug safety surveillance and communication in pharmacovigilance programme.	1,2,3,4,6,7,8,9,11

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M. Pharmacy (Pharmaceutics)

Sem I

MPH 101T	Modern pharmaceutical analytical techniques	PO
MPH101T.01	Illustrate assay of single and multiple component Pharmaceuticals by using various analytical instruments.	1,2,3,4,5,6,7,8,9,11
MPH101T.02	Describe basic practical skills using Instrumentation techniques.	1,2,3,4,5,6,7,8,9,11
MPH101T.03	Identify the theoretical knowledge on various instrumental techniques for analysis of organic substances.	1,2,3,4,5,6,7,8,9,11
MPH101T.04	Explain the knowledge in developing new procedures for analysis.	1,2,3,4,5,6,7,8,9,11

MPH 102T	Drug Delivery System	PO
MPH102T.01	Describe concept, principle involved, formulation and evaluation methods for sustained release and controlled formulations.	1,2,3,4,6,7, 8,9,11
MPH102T.02	Explain the principle and fundamentals involved in personalized medicines and rate controlled drug delivery systems.	1,2,3,4,6,7,8,9,11
MPH102T.03	Explain the principle, formulation and evaluation of ocular and transdermal drug delivery systems.	1,2,3,4,6,7,8,9,11
MPH102T.04	Describe fundamentals, formulation and evaluation of drug delivery system of proteins, macromolecules and vaccines.	1,2,3,4,6,7,8,9,11

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MPH 103T	Modern Pharmaceutics	PO
MPH103T.01	Describe preformulation concepts, formulation considerations of pharmaceutical Dispersion parenterals and application of optimization technique in formulation design.	1,2,3,4,6,7,9,10,11
MPH103T.02	Explain the elements, methods of equipment and process parameters validation.	1,2,3,4,6,7,9,10,11
MPH103T.03	Explain the industrial management and cGMP considerations.	1,2,3,4,6,7,9,10,11
MPH103T.04	Explain the principles involved in statistics and kinetic models in formulation consideration.	1,2,3,4,6,7,9,10,11

MPH 104T	Regulatory affairs	PO
MPH104T.01	Describe the chemistry, manufacturing controls and various regulatory agencies involved.	1,2,3,4,6, 7,8,9,10,11
MPH104T.02	Explain the regulatory requirements for drug approval process.	1,2,3,4,6,7, 8,9,10,11
MPH 104T.03	Explain the non clinical drug development process.	1,2,3,4,6, 7,8,9,10,11
MPH 104T.04	Illustrate the clinical trial requirements and protocols.	1,2,3,4,6,7, 8,9,10,11

MPH 105P	Pharmaceutics Practical I	PO
MPH 105P.01	Illustrate the analysis of pharmacopoeial compounds and formulation using various instrumental techniques.	1,2,3,4,5,6,7,8,9,11
MPH 105P.02	Design the formulation and evaluation methods for various sustained and controlled release formulation.	1,2,3,4,5,6,7,8,9,11
MPH 105P.03	Summarize the pre formulation concept, micromeritic properties and application of pharmacokinetic models for various dosage forms.	1,2,3,4,5,6,7,8,9,11

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Sem II

MPH 201T	Molecular Pharmaceutics	PO
MPH201T.01	Explain concepts, preparations and evaluation of various targeted drug delivery systems.	1,2,3,4,6,7,8,9,11
MPH201T.02	Explain preparation, evaluation and applications of micro particulate drug delivery systems.	1,2,3,4,6,7,8,9,11
MPH201T.03	Explain the principle, preparation and evaluation involved in pulmonary drug delivery systems.	1,2,3,4,6,7,8,9,11
MPH201T.04	Describe fundamentals and applications of nucleic acid based therapeutic delivery system.	1,2,3,4,6,7,8,9,11

MPH 202T	Advanced Bio pharmaceutics and pharmacokinetics	PO
MPH202T.01	Explain the principles of absorption, distribution, metabolism and excretion of the drug from various dosage forms.	1,2,3,4,5, 6,7,8,11
MPH202T.02	Explain the various biopharmaceutical considerations in drug product design and in vitro drug product performance.	1,2,3,4,5, 6,7,8,11
MPH202T.03	Describe the basic consideration and pharmacokinetic model and application of pharmacokinetics in conventional and modified drug delivery system.	1,2,3,4,5, 6,7,8,11
MPH202T.04	Explain the drug product performance in vivo Bioavailability and bioequivalence for generic drugs and biologics.	1,2,3,4,5, 6,7,8,11

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MPH203T	Computer Aided Drug Delivery	PO
MPH203T.01	Explain the QbD in formulation development by computer modeling and statistical application.	1,2,3,4,5,6,7,8,11
MPH203T.02	Explain the computational modeling of drug disposition.	1,2,3,4,5,6,7,8,11
MPH203T.03	Explain the computer-aided biopharmaceutical characterization, simulations in pharmacokinetics and pharmacodynamics, and clinical development.	1,2,3,4,5,6,7,8,11
MPH203T.04	Explain artificial intelligence, robotics and Computational fluid dynamics in pharmaceuticals.	1,2,3,4,5,6,7,8,11

MPH204T	Cosmetics & Cosmeceuticals	PO
MPH204T.01	Describe the regulatory provisions related to the import and manufacture of cosmetics as per the Drugs and Cosmetics Act 1940 and the Rules 1945.	1,2,3,4,5,6,7,8,11
MPH204T.02	Explain various formulation considerations in the various cosmeticeutical products.	1,2,3,4,5,6,7,8,11
MPH204T.03	Explain the biological aspects and various problems related to the skin, hair and oral hygienic products.	1,2,3,4,5,6,7,8,11
MPH204T.04	Explain herbal ingredients used in formulating various cosmeticeutical products.	1,2,3,4,5,6,7,8,11

MPH205P	Pharmaceutics Practical II	PO
MPH205P.01	Design the formulation and evaluation methods for various NDDS.	1,2,3,4,5,6,7,8,9,11
MPH205P.02	Illustrate dissolution, protein binding, bioavailability studies and application of pharmamacokinetics *in-vivo in-vitro* correlation by software.	1,2,3,4,5,6,7,8,9,11
MPH205P.03	Design the formulation and evaluation methods for various cosmetics product and herbal cosmetics.	1,2,3,4,5,6,7,8,9,11

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Sem III

MRM301T	Research Methodology and Biostatistics	PO
MRM301T.01	Explain the concept of general &Medical Research and various methodologies and guidelines involved in research.	1,2,3,4,5,6,7,8,11
MRM301T.02	Apply Statistics and Statistical tests for significance and measure the various parametric and non-parametric tests.	1,2,3,4,5,6,7,8,11
MRM301T.03	Relate to the CPCSEA guidelines for laboratory animal facility and handling.	1,2,3,4,5,6,7,8,11
MRM301T.04	Articulate the basic principles of Helsinki in medical research and medical care.	1,2,3,4,5,6,7,8,11

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M. Pharmacy (Pharmaceutical Quality Assurance)

Sem I

MQA101T	Modern pharmaceutical analytical technique	PO
MQA101T.01	Illustrate assay of single and multiple component Pharmaceuticals by using various analytical instruments.	1,2,3,4,5,6,7,8,9,11
MQA101T.02	Describe basic practical skills using Instrumentation techniques.	1,2,3,4,5,6,7,8,9,11
MQA101T.03	Identify the theoretical knowledge on various instrumental techniques for analysis of organic substances.	1,2,3,4,5,6,7,8,9,11
MQA101T.04	Explain the knowledge in developing new procedures for analysis.	1,2,3,4,5,6,7,8,9,11

MQA102T	Quality Management System	PO
MQA102T.01	Explain the importance of quality, tools for quality improvement and analysis of issues in quality.	1,2,3,4,5,6,7,8,9,11
MQA102T.02	Describe the quality evaluation of pharmaceuticals by different Quality Management systems.	1,2,3,4,5,6,7,8,9,11
MQA102T.03	Explain the stability testing of drug and drug substances and Statistical approaches for quality.	1,2,3,4,5,6,7,8,9,11
MQA102T.04	Explain the Regulatory compliance and Benchmarking for the Quality Management.	1,2,3,4,5,6,7,8,9,11

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MQA103T	Quality Control and Quality Assurance	PO
MQA103T.01	Explain the concept of cGMP, GLP, ICH guidelines and non-clinical aspects in a pharmaceutical industry.	1,2,3,4,5,6,7,8,9,11
MQA103T.02	Explain the role of different regulatory affairs and the scope of quality certifications applicable to Pharmaceutical industries.	1,2,3,4,5,6,7,8,9,11
MQA103T.03	Relate the importance of documentation as per different Regulatory guidelines.	1,2,3,4,5,6,7,8,9,11
MQA103T.04	Explain the conditions of Manufacturing operations and controls for API and finished products.	1,2,3,4,5,6,7,8,9,11

MQA 104T	Product Development and Technology Transfer	PO
MQA104T.01	Describe the principles of drug discovery and drug approval process as per the regulatory guidelines.	1,2,3,4,5,6,7,8,9,11
MQA104T.02	Explain the preformulation studies in product development and application of packaging materials for the same.	1,2,3,4,5,6,7,8,9,11
MQA104T.03	Describe the significance design and layout of pilot plant scale up for various dosage forms.	1,2,3,4,5,6,7,8,9,11
MQA104T.04	Describe the technology transfer process from R & D to production.	1,2,3,4,5,6,7,8,9,11

MQA105P	Pharmaceutical Quality Assurance I Practical	PO
MQA105P.01	Illustrate the analysis of pharmacopoeial compounds and formulation using various instrumental techniques.	1,2,3,4,5,6,7,8,9,11
MQA105P.02	Assess case studies related to quality management system in pharmaceutical practices.	1,2,3,4,5,6,7,8,9,11
MQA105P.03	Summarize preformulation, In process quality control, stability, and packaging for different dosage forms.	1,2,3,4,5,6,7,8,9,11

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SEM II

MQA201T	Safety and hazards	PO
MQA201T.01	Explain the multidisciplinary nature of environmental studies and concept, structure and function of an ecosystem.	1,2,3,4,5,6, 7,8,9,10,11
MQA201T.02	Illustrate the critical hazard management systems, sources, types and prevention of air and fire.	1,2,3,4,5,6, 7,8,9,10, 11
MQA201T.03	To plan the management and prevention of fire explosion and types of chemical based hazards.	1,2,3,4,5,6, 7,8,9,10, 11
MQA201T.04	To infer the rules and guidelines on risk assessment and management.	1,2,3,4,5,6, 7,8,9,10,11

MQA 202T	Pharmaceutical Vlidation	PO
MQA202T.01	Summarize the concepts of calibration, qualification specifications and validation types.	1,2,3,4,5,6,7, 8,9,10, 11
MQA202T.02	Explain the Qualification of manufacturing, Laboratory equipments and Analytical instruments.	1,2,3,4,5,6,7, 8,9,10,11
MQA202T.03	Explain the Concept, Process and documentation of Process validation and cleaning validation.	1,2,3,4,5,6,7, 8,9,10,11
MQA202T.04	Illustrate the General Principles of Intellectual Property and Significance of transfer technology (TOT).	1,2,3,4,5,6,7, 8,9,10,11

MQA203T	Audits & Regulatory Compliance	PO
MQA203T.01	Explain the roles and responsibility of audit system in pharmaceutical manufacturing.	1,2,5,6,7,8,9,11
MQA203T.02	Explain the auditing of vendors and production department.	1,2,5,6,7,8,9,11
MQA203T.03	Explain the auditing of microbiological laboratory.	1,2,5,6,7,8,9,11
MQA203T.04	Explain auditing of quality assurance and engineering department.	1,2,5,6,7,8,9,11

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MQA204T	Pharmaceutical Manufacturing Technology	PO
MQA204T.01	Describe the pharmaceutical industry developments, plant layout and production planning.	1,2,3,4,5,6,7,8,9,11
MQA204T.02	Explain the principles and practices of aseptic process technology.	1,2,3,4,5,6,7,8,9,11
MQA204T.03	Explain the principles and practices of non sterile manufacturing technology and packaging technology.	1,2,3,4,5,6,7,8,9,11
MQA204T.04	Illustrate the principles and implementation of Quality by design (QbD) and PAT.	1,2,3,4,5,6,7,8,9,11

MQA205P	Pharmaceutical Quality Assurance II Practical	PO
MQA205P.01	Assess different elements by using various instrumental analytical techniques.	1,2,3,4,5,6,7,8,9,11
MQA205P.02	Illustrate the validation of equipments and process.	1,2,3,4,5,6,7,8,9,11
MQA205P.03	Summarize case studies and check lists related to quality management system in pharmaceutical practices.	1,2,3,4,5,6,7,8,9,11

Sem III

MRM301T	Research Methodology and Biostatistics	PO
MRM301T.01	Explain the concept of general &Medical Research and various methodologies and guidelines involved in research.	1,2,3,4,5,6,7,8,11
MRM301T.02	Apply Statistics and Statistical tests for significance and measure the various parametric and non-parametric tests.	1,2,3,4,5,6,7,8,11
MRM301T.03	Relate to the CPCSEA guidelines for laboratory animal facility and handling.	1,2,3,4,5,6,7,8,11
MRM301T.04	Articulate the basic principles of Helsinki in medical research and medical care.	1,2,3,4,5,6,7,8,11

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