



**CAYM Education Trusts**  
**Siddhant College of Pharmacy**  
 A/P Sudumbare, Talegaon – Chakan Road, Tal: Maval, Dist: Pune -412109

**Course outcomes**

**B Pharmacy**

<b>First Year B. Pharm (Semester I)</b>	
<b>BP101T-Human Anatomy and Physiology I</b>	The students should be able to: CO 1. Explain the gross morphology, structure and functions of various organs of the human body. CO 2. Describe the various homeostatic mechanisms and their imbalances. CO3. Identify the various tissues and organs of different systems of human body. CO4. Perform the various experiments related to special senses and nervous system. CO5. Appreciate coordinated working pattern of different organs of each system
<b>BP102T- Pharmaceutical Analysis I</b>	The students should be able to: CO 1. Understand and explain the methods assuring the quality and safety of pharmaceuticals. CO 2. Explain about accuracy, precision, and significant figure error concepts. CO 3. Understand the principles of volumetric and electro chemical analysis CO 4. Carryout various volumetric and electrochemical titrations
<b>BP103T- Pharmaceutics-I</b>	The student should be able to CO1. Know the history of profession of pharmacy CO2, Understand the basics of different dosage forms, pharmaceutical incompatibilities and pharmaceutical calculations CO3. Understand the professional way of handling the prescription CO4. Preparation of various conventional dosage forms
<b>BP104T- Pharmaceutical Inorganic Chemistry</b>	The students should be able to: CO 1. know the sources of impurities and methods to determine the impurities in inorganic drugs and pharmaceuticals CO 2. understand the medicinal and pharmaceutical importance of inorganic compounds CO3. To perform the identification of inorganic compounds
<b>BP105T- Communication skills</b>	The students should be able to: CO 1. Understand the behavioural needs for a pharmacist to function effectively in the areas of pharmaceutical operation CO 2. Communicate effectively (Verbal and Non-Verbal) CO 3. Effectively manage the team as a team player
<b>BP106RBT- Remedial Biology</b>	The students should be able to: CO 1. know the classification and salient features of five kingdoms of life CO 2. understand the basic components of anatomy & physiology of plant CO 3. know understand the basic components of anatomy & physiology animal with special reference to human
<b>BP106RMT- Remedial Mathematics</b>	The students should be able to: CO1: Know the theory and their application in Pharmacy CO2: Solve the different types of problems by applying theory

	<b>CO3: Appreciate the important application of mathematics in Pharmacy</b>
<b>First Year II Sem</b>	
<b>BP201T- Human Anatomy and Physiology II</b>	<b>The students should be able to: CO1: Explain the gross morphology, structure and functions of various organs of the human body. CO2: Describe the various homeostatic mechanisms and their imbalances CO3: Identify the various tissues and organs of different systems of human body. CO4. Perform the hematological tests like blood cell counts, haemoglobin estimation, bleeding/clotting time etc and also record blood pressure, heart rate, pulse and respiratory volume.</b>
<b>BP202T- Pharmaceutical Organic Chemistry I</b>	<b>The students should be able to: CO 1. Understand and explain the concepts of hybridization, electronic and steric effects of organic molecules and to appreciate the chemistry of hydrocarbons CO 2. Acquire knowledge about preparation and reactivity of compounds with functional groups, such as aldehydes and ketones, carboxylic acids, amino and azo compounds CO 3. Explain the mechanism involved in the substitution, addition, nucleophilic and elimination reactions.</b>
<b>BP203T Biochemistry</b>	<b>The students should be able to: CO 1. Understand the catalytic role of enzymes, importance of enzyme inhibitors in design of new drugs, therapeutic and diagnostic applications of enzymes. CO 2. Understand the metabolism of nutrient molecules in physiological and pathological conditions CO 3. Understand the genetic organization of mammalian genome and functions of DNA in the synthesis of RNAs and proteins</b>
<b>BP204T Pathophysiology</b>	<b>CO1: Describe the etiology and pathogenesis of the selected disease states. CO2: Name the signs and symptoms of the diseases; and CO3: Mention the complications of the diseases.</b>
<b>BP205T Computer Applications in Pharmacy</b>	<b>CO1. know the various types of application of computers in pharmacy CO2. know the various types of databases CO3. know the various applications of databases in pharmacy</b>
<b>BP206T Environmental sciences</b>	<b>The students should be able to: CO 1. Create the awareness about environmental problems among learners CO 2. Impart basic knowledge about the environment and its allied problems. CO 3. Develop an attitude of concern for the environment. CO 4. Motivate learner to participate in environment protection and environment improvement.</b>
<b>Second Year B.Pharm (III sem)</b>	
<b>BP301T Pharmaceutical Organic Chemistry II</b>	<b>The students should be able to: CO 1. Acquire knowledge on Nucleophilic and Electrophilic reactions and chemistry of carbohydrate, protein and hetero aromatic compounds. CO 2. write the structure, name and the type of isomerism of the organic compound CO 3. Understand and explain the pharmaceutical applications of synthetic reagents and reactions. CO 4. account for reactivity/stability of compounds</b>
<b>BP302T Physical Pharmaceutics I</b>	<b>The students should be able to: CO 1. Understand various physicochemical properties of drug molecules in the designing the dosage forms CO2. Know the principles of chemical kinetics &amp; to use them for stability testing and determination of expiry date of formulations CO 3. Demonstrate use of physicochemical properties in the formulation development and evaluation of dosage forms.</b>
<b>BP303T Pharmaceutical</b>	<b>The students should be able to: CO1: Understand methods of identification,</b>

<b>Microbiology</b>	<b>cultivation and preservation of various microorganisms CO2: To understand the importance and implementation of sterilization in pharmaceutical processing and industry CO3: Learn sterility testing of pharmaceutical products CO4: Carried out microbiological standardization of Pharmaceuticals</b>
<b>BP304T Pharmaceutical Engineering</b>	<b>The students should be able to: CO 1. To know various unit operations used in pharmaceutical industries CO 2. To understand the material handling techniques CO 3. To perform various processes involved in pharmaceutical manufacturing process. CO 4. To carry out various test to prevent environmental pollution CO5. To appreciate and comprehend significance of plant lay out design for optimum use of resources.</b>
<b>Second Year IV sem</b>	
<b>BP401T Pharmaceutical Organic Chemistry III</b>	<b>CO1. understand the methods of preparation and properties of organic compounds CO2. explain the stereo chemical aspects of organic compounds and stereo chemical reactions CO3. know the medicinal uses and other applications of organic compounds.</b>
<b>BP402T Medicinal Chemistry I</b>	<b>The students should be able to: CO 1. understand the chemistry of drugs with respect to their pharmacological activity CO 2. understand the drug metabolic pathways, adverse effect and therapeutic value of drugs CO 3. know the Structural Activity Relationship (SAR) of different class of drugs CO 4. write the chemical synthesis of some drugs</b>
<b>BP403T Physical Pharmaceutics II</b>	<b>The students should be able to: CO 1. Understand various physicochemical properties of drug molecules in the designing the dosage forms CO 2. Know the principles of chemical kinetics &amp; to use them for stability testing and determination of expiry date of formulations CO 3. Demonstrate use of physicochemical properties in the formulation development and evaluation of dosage forms.</b>
<b>BP404T Pharmacology I</b>	<b>The students should be able to: CO 1. To understand basic concepts in Pharmacology CO2: To Explain Role of Pharmacologists in drug development and drug use CO3: To impart knowledge regarding mechanisms of drug action, ADR, drug interactions CO4: To inform them regarding the steps involved in drug discovery.</b>
<b>BP405T Pharmacognosy and Phytochemistry I</b>	<b>The student should be able to CO1: understand sources of drugs from various natural sources CO2: Understand about Plant taxonomy &amp; Cultivation, Collection, Processing, and storage of crude drugs CO3: Understand about active constituents of drugs, their isolation &amp; different properties CO4: carry out the microscopic and morphological evaluation of crude drugs</b>
<b>T.Y. Year B.Pharm V sem</b>	
<b>BP501T Medicinal Chemistry II</b>	<b>The students should be able to: CO 1. Explain the influence of the metabolic profile of drugs and their impact on biological system. CO 2. Outline the synthetic route for the selective medicinal compounds of each category and acquire knowledge on the mechanism of action of pharmacodynamics agents. CO 3. Classify the therapeutic agents and based on the chemical nature. CO 4. Acquire knowledge about the relationship between the biological activity and structure of therapeutic agents.</b>
<b>BP502T Industrial</b>	<b>The students should be able to: CO1: Explain the properties and selection of</b>

<b>Pharmacy-I</b>	<b>excipients used in different dosage forms. CO2: Know the various pharmaceutical dosage forms and their manufacturing techniques. CO3: Explain the quality control and quality analysis of dosage forms. CO4: Formulate solid, liquid and semisolid dosage forms and evaluate them for their quality</b>
<b>BP503T Pharmacology II</b>	<b>The students should be able to CO 1. Demonstrate isolation of different organs/tissues from the laboratory animals by simulated experiments CO 2. Describe the bioassay and its role in drug discovery CO 3. To Explain Pharmacology of drugs acting on respiratory system CO 4. Appreciate correlation of pharmacology with related medical sciences</b>
<b>BP504T Pharmacognosy and Phytochemistry II</b>	<b>The students should be able to: CO 1. to know the modern extraction techniques, characterization and identification of the herbal drugs and phytoconstituents CO 2. to understand the preparation and development of herbal formulation CO 3. understand the herbal drug interactions CO 4. to carryout isolation and identification of phytoconstituents</b>
<b>BP505T Pharmaceutical Jurisprudence</b>	<b>The students should be able to: CO 1. Acquire knowledge on schedule rules, laws and regulations related to drugs and cosmetics. CO 2. Explain pharmaceutical legislation, history, evolution and growth of pharmaceutical industry. CO 3. Describe the pharmaceutical education and its regulatory bodies, pharmacy profession in concern to code of ethics. CO 4. Explain other acts and rules associated with food and factories CO 5. Explain the intellectual property rights and regulatory guidelines</b>
<b>T.Y. B.Pharm VI sem"</b>	
<b>BP601T Medicinal Chemistry III</b>	<b>The students should be able to: CO 1. Understand the importance of drug design and different techniques of drug design. CO 2. Understand the chemistry of drugs with respect to their biological activity CO 3. Know the metabolism, adverse effects and therapeutic value of drugs. CO 4. Know the importance of SAR of drugs CO 5. Write the synthetic route</b>
<b>BP602T Pharmacology III</b>	<b>The students should be able to CO 1. understand the mechanism of drug action and its relevance in the treatment of different infectious diseases CO 2. comprehend the principles of toxicology and treatment of various poisonings CO 3. appreciate correlation of pharmacology with related medical sciences</b>
<b>BP603T Herbal Drug Technology</b>	<b>The students should be able to: CO 1. understand raw material as source of herbal drugs from cultivation to herbal drug product CO 2. know the WHO and ICH guidelines for evaluation of herbal drugs CO 3. know the herbal cosmetics, natural sweeteners, nutraceuticals CO 4. appreciate patenting of herbal drugs, GMP</b>
<b>BP604T- Biopharmaceutics and Pharmacokinetics</b>	<b>The students should be able to: CO 1. Able to understand the concepts of biopharmaceutics &amp; pharmacokinetics. CO 2. Determine factors affecting drug absorption, bioavailability and bioequivalence. CO 3. Describe disposition kinetic models, first order and second order. CO 4. Understand various pharmacokinetic parameters, their significance &amp; applications.</b>
<b>BP605T Pharmaceutical Biotechnology</b>	<b>The students should be able to: CO 1. Understanding the importance of Immobilized enzymes in Pharmaceutical Industries CO 2. Genetic engineering applications in relation to production of pharmaceuticals CO 3. Importance of Monoclonal antibodies in Industries CO4: Appreciate the use of microorganisms in fermentation technology</b>

<b>BP606T Quality Assurance</b>	<b>The students should be able to: CO 1. Understand the cGMP aspects in a pharmaceutical industry appreciate the importance of documentation CO2. Understand the scope of quality certifications applicable to pharmaceutical industries CO3. Understand the responsibilities of QA &amp; QC departments</b>
<b>B.Pharm Final Year VII sem</b>	
<b>BP701T Instrumental Methods of Analysis</b>	<b>The students should be able to: CO 1. Understand the interaction of matter with electromagnetic radiations and its applications in drug analysis CO 2. Understand the chromatographic separation and analysis of drugs. CO 3. Perform quantitative &amp; qualitative analysis of drugs using various analytical instruments.</b>
<b>BP702T Industrial Pharmacy-II</b>	<b>The students should be able to: CO 1. Know the process of pilot plant and scale up of pharmaceutical dosage forms CO 2. Understand the process of technology transfer from lab scale to commercial batch CO3. Know different Laws and Acts that regulate pharmaceutical industry CO4. Understand the approval process and regulatory requirements for drug products</b>
<b>BP703T Pharmacy Practice</b>	<b>The students should be able to: CO 1 knows various drug distribution methods in a hospital CO 2 appreciates the pharmacy stores management and inventory control CO 3 monitor drug therapy of patient through medication chart review and clinical review CO 4 obtains medication history interview and counsel the patients CO 5 identifies drug related</b>
<b>BP704T Novel Drug Delivery System</b>	<b>The students should be able to: CO1. To understand various approaches for development of novel drug delivery systems CO2. To understand the criteria for selection of drugs and polymers for the development of Novel drug delivery systems, their formulation and evaluation</b>
<b>B.Pharm Final Year VIII sem</b>	
<b>BP801T Biostatistics and Research Methodology</b>	<b>The students should be able to: CO1 Know the operation of M.S. Excel, SPSS, R and MINITAB®, DoE (Design of Experiment) CO2 Know the various statistical techniques to solve statistical problems CO3. Appreciate statistical techniques in solving the problems</b>
<b>BP802T Social and Preventive Pharmacy</b>	<b>The students should be able to: CO1. Acquire high consciousness/realization of current issues related to health and pharmaceutical problems within the country and worldwide CO2. Have a critical way of thinking based on current healthcare development CO3. Evaluate alternative ways of solving problems related to health and pharmaceutical issues</b>
<b>BP804ET Pharmaceutical Regulatory Science</b>	<b>The students should be able to: CO1 Know about the process of drug discovery and development CO2 Know the regulatory authorities and agencies governing the manufacture and sale of pharmaceuticals CO3. Know the regulatory approval process and their registration in Indian and international markets</b>
<b>BP805 ET Pharmacovigilance</b>	<b>The students should be able to: CO1 History and development of pharmacovigilance CO2 National and international scenario of pharmacovigilance CO3 Dictionaries, coding and terminologies used in pharmacovigilance CO4 Detection of new adverse drug reactions and their assessment CO5 International standards for classification of diseases and drugs CO6 Adverse drug reaction reporting systems and communication in pharmacovigilance</b>

**BP811ET Advanced Instrumentation Techniques**

**The students should be able to: CO1 understand the advanced instruments used and its applications in drug analysis CO2 understand the chromatographic separation and analysis of drugs CO3. understand the calibration of various analytical instruments**

## Course Outcomes

### M Pharm.: Pharmaceutical Quality Assurance

Sr. No.	Name of the Program	Name of the Course	Course Outcome
1	M Pharm	Modern Pharmaceutical Analytical Techniques	<ul style="list-style-type: none"><li>➤ Develops clear insight about theoretical and practical skills of the instruments used in pharmaceutical industry</li><li>➤ The students will understand principle and instrumentation</li></ul>
2		Quality Management System	<ul style="list-style-type: none"><li>➤ The student will understand the quality parameters and quality attribute in Pharmaceutical industry sectors</li><li>➤ By studying and practicing the guidelines iso, NABL and other regulatory agencies student will predicts the current need of changes.</li><li>➤ It provide the idea in the customers expectations in the quality pharmaceutical product.</li><li>➤ student will know the importance of the quality of medicines in the public.</li><li>➤ The subject will afford methodology in the regulatory body requirements for the import and export pharmaceutical products.</li></ul>
3		Quality control and Quality Assurance	<ul style="list-style-type: none"><li>➤ Student shall be able to understand the cGMP aspects in a pharmaceutical industry</li><li>➤ Student shall be able to understand the importance of documentation</li><li>➤ Student shall be able to understand the scope of quality certifications applicable to Pharmaceutical industries</li><li>➤ Student shall be able to understand the responsibilities of QA department</li><li>➤ Student shall be able to understand the responsibilities of QC department</li><li>➤ Student shall be able to understand GLP and regulatory Affairs</li></ul>
4		Product development and Technology Transfer	<ul style="list-style-type: none"><li>➤ To apply the knowledge to develop new procedures of their own design of Pilot layouts</li><li>➤ Student shall be able to understand the Quality by design practices of sterile and non sterile dosage</li></ul>

			<p>forms</p> <ul style="list-style-type: none"> <li>➤ Student shall be understand the Regulatory requirements in drug development stages</li> <li>➤ Students shall understand the phase of technology transfer</li> </ul>
5		Hazards and Safety Management	<ul style="list-style-type: none"> <li>➤ To understand the energy resources in the to make eco-friendly industry environment</li> <li>➤ The course knowledge useful to Find hazards in work atmosphere</li> <li>➤ It creates the passage to understand, Determine and to take control measures to eliminate or minimize the level of the risks</li> <li>➤ It support the student to recognize the control measures to eliminate or minimize the level of the risks</li> <li>➤ It provides platform for formal process for hazard identification, risk assessment and control to effectively manage workplace and safety hazards</li> <li>➤ It develop proper understanding in the stages of risk assesment</li> </ul>
6		Pharmaceutical Validation	<ul style="list-style-type: none"> <li>➤ The Students learn on the importance of validation.</li> <li>➤ The student learns on the importance of patent and intellectual property rights.</li> <li>➤ The students are trained on the qualification aspects of instruments.</li> <li>➤ The importance of calibration to be performed for the instruments.</li> <li>➤ The various validation aspects to be carried out in the industry.</li> <li>➤ The students gain knowledge on how validation are carried for various components. Such as instrument validation, cleaning validation and process validation</li> </ul>
7		Audit and Regulatory Compliance	<ul style="list-style-type: none"> <li>➤ The student gain knowledge on the importance of auditing in pharmaceutical preparation.</li> <li>➤ The various forms of auditing are and how an audit process happens are briefed to the students.</li> <li>➤ Preparation of various audit checklist for the auditing.</li> <li>➤ when and what are the areas the auditing to</li> </ul>

			<p>be carried is taught to the student.</p> <ul style="list-style-type: none"> <li>➤ The Reporting form of the auditing process is taught to the student.</li> <li>➤ The student practices the auditing process and reporting process</li> </ul>
8		Pharmaceutical Manufacturing Technology	<ul style="list-style-type: none"> <li>➤ Student shall be able to understand the common practice in the pharmaceutical industry developments</li> <li>➤ Student shall be able to understand the practices of aseptic process technology</li> <li>➤ Student shall be able to understand the practices of non-sterile manufacturing technology</li> <li>➤ Student shall be able to understand the practices of packaging technology</li> <li>➤ Student shall be able to understand understanding of principles and implementation of Quality by design (QbD)</li> </ul>

#### **Programme Outcomes:**

1. Interpret the requirements for testing of raw materials, in-process samples, and finished product in accordance with pharmacopoeia standards.
2. Predict a variety of Quality Control activities including developing QC policies and Standard Operation Procedures, analyzing and archiving data, and interpreting results.
3. Evaluate the performance of a variety of laboratory equipment used in pharmaceutical industrial labs.
4. Assess instruments malfunction and troubleshoot the analytical equipment failure in compliance with regulatory requirements.
5. Identify and analyze unexpected results during routine analyses and find the solutions based on scientific and regulatory considerations by implementing preventive action and corrective action programs.
6. Apply a working knowledge of GMP (Good Manufacturing Practice), GLP, ISO 9000 requirements to the manufacture of pharmaceuticals.
7. Understand the concept of quality systems and compliance in the regulated industry and the role of quality assurance.
8. Understand the use of controlled documentation.

#### **Programme Specific outcomes (PSOs)**

1. To Understand the applications of Quality assurance and Quality control throughout product life cycle.
2. To Analyze the Application Based Importance of Emerging Quality Building Concepts in Product Manufacturing.
3. To Perform Procedures like Method Validation, Process Validation, Equipment /Facilities/Utilities
4. Validation, Documents and Records Designing as per the Regulatory Standards Leading to compliance of cGMP.
5. To Understand the Regulatory requirements of Pharmaceuticals.

**COURSE OUTCOME (CO)**  
**M.PHARM(PHARMACEUTICS)**

S.no	Name of the program	Name of the course	Course outcome
1	M.Pharm	Modern Pharmaceutica Analytical Techniques	Develops clear insight about theoretical and practical skills of the instruments used in pharmaceutical industry.
2		Drug Delivery system	Categorizes new drug delivery systems and formulations.
3		Modern Pharmaceutis	Establishes process of development of ethical and quality considerations of medical devices.
4		Regulatory Affairs	Develops Pharmacovigilence and process of monitoring in clinical trials
5		Molecular Pharmaceutis (NanoTech and Targeted DDS)	Establishes knowledge of Novel drug delivery systems.
6		Advanced Biopharmaceutis and pharmacokinetic	Develops the student for designing and evaluation of dosage regimens of the drugs using pharmacokinetic and biopharmaceutic parameters.
7		Computer Aided drug delivery System	Develops Computer skills for Preclinical Development and Optimization Techniques in Pharmaceutical Formulation.
8		Cosmetics and Cosmeceuticals	Establishes skills of new combinations and formulations.

