VISION, MISSION, PEO, PO, PSO & CO

DEPARTMENT OF PHARMACEUTICAL SCIENCES,

SIR J. C. BOSE TECHNICAL CAMPUS, BHIMTAL

Vision

Transforming young minds to develop Entrepreneurial skill and creativity to enable them become global Pharma leaders.

Mission

The Department of Pharmaceutical Sciences, Bhimtal :-

- Rests its faith in Need Based Education (NBE)
- Helps in ideal molding of students to be leaders in the field of Pharma profession and health care.
- Has developed concept based teaching and training (CBTT).
- Makes the student understand the value of training to become a good pharmacist
- Teaches the students to imbibe theoretical knowledge for perfection.
- Inspires the faculty and staff to constantly upgrade their knowledge and skill to achieve goals well aligned with the Vision and Mission

Programme Educational Objectives (PEOs)

- To produce future pharmacy leaders.
- To develop professionals adept to provide pharmaceutical care.
- To develop out of box thinkers that can be future innovators, researchers and entrepreneurs.
- To transform students as lifelong learners focused on value based education.
- To train professionals as champions of social cause.
- To impart professional knowledge to the future pharmacists, technocrats and entrepreneurs.
- To develop core competencies in the field of drug development and pharmaceutical care.

Programme Outcomes (POs)

The graduates of Pharmacy will be able to attain:

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, evaluate and 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, professional and 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: Honour 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 and documentation, and give and receive clear instructions.

9. 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.

10. 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.

11. 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. Selfassess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Programme Specific Outcome (PSOs)

After the successful completion of the course offered the graduates will attain

- Ability to resolve problems in drug development process by application of knowledge attained.
- Ability to initiate new startup and entrepreneurship avenues.
- Ability to provide critical patient care to in patients and community pharmacies.
- Ability to conduct research for new drug development process.

Course Outcomes (COs):

S.No.	Class	Sub code	Subject	Scope	Course Outcomes
B.Pharm I Sem					
1-	**B.Pharm I sem**	**BP101T**	**HUMAN ANATOMY AND PHYSIOLOGY-I (Theory)**	This subject is designed to impart fundamental knowledge on the structure and functions of the various systems of the human body. It also helps in understanding both homeostatic mechanisms. The subject provides the basic knowledge required to understand the various disciplines of pharmacy.	Upon completion of this course the student should be able to 1. Explain the gross morphology, structure and functions of various organs of the human body. 2. Describe the various homeostatic mechanisms and their imbalances. 3. Identify the various tissues and organs of different systems of human body. 4. Perform the various experiments related to special senses and nervous system. 5. Appreciate coordinated working pattern of different organs of each system
2-	**B.Pharm I sem**	**BP102T.**	**PHARMACEUTICAL ANALYSIS (Theory)**	This course deals with the fundamentals of analytical chemistry and principles of electrochemical analysis of drugs	Upon completion of the course student shall be able to 1.understand the principles of volumetric and electro chemical analysis 2. Carryout various volumetric and electrochemical titrations 3. Develop analytical skills

3.	**B.Pharm I sem**	**BP103T.**	**PHARMACEUTICS- I (Theory)**	This course is designed to impart a fundamental knowledge on the preparatory pharmacy with arts and science of preparing the different conventional dosage forms.	Upon completion of this course the student should be able to: 1.Know the history of profession of pharmacy 2.Understand the basics of different dosage forms, pharmaceutical incompatibilities and pharmaceutical calculations 3.Understand the professional way of handling the prescription 4. Preparation of various conventional dosage forms
4.	**B.Pharm I sem**	**BP104T.**	**PHARMACEUTICAL INORGANIC CHEMISTRY (Theory)**	This subject deals with the monographs of inorganic drugs and pharmaceuticals.	Upon completion of course student shall be able to 1.Know the sources of impurities and methods to determine the impurities in inorganic drugs and pharmaceuticals 2.Understand the medicinal and pharmaceutical importance of inorganic compounds
5.	**B.Pharm I sem**	**BP105T.**	**COMMUNICATION SKILLS (Theory)**	This course will prepare the young pharmacy student to interact effectively with doctors, nurses, dentists, physiotherapists and other health workers. At the end of this course the student will get the soft skills set to work cohesively with the team as a team player and will add value to the pharmaceutical business.	Upon completion of the course the student shall be able to 1. Understand the behavioral needs for a Pharmacist to function effectively in the areas of pharmaceutical operation 2. Communicate effectively (Verbal and Non Verbal) 3. Effectively manage the team as a team player 4. Develop interview skills 5. Develop Leadership qualities and essentials
6.	**B.Pharm I sem**	**BP 106RBT.**	**REMEDIAL BIOLOGY (Theory)**	To learn and understand the components of living world, structure and functional system of plant and animal kingdom.	Upon completion of the course, the student shall be able to 1. Know the classification and salient features of five kingdoms of life 2. Understand the basic components of anatomy & physiology of plant 3. Know understand the basic components of anatomy & physiology animal with special reference to human
7.	**B.Pharm I sem**	**BP 106RMT.**	**REMEDIAL MATHEMATICS (Theory)**	This is an introductory course in mathematics. This subject deals with the introduction to Partial fraction, Logarithm, matrices and Determinant, Analytical geometry, Calculus, differential equation and Laplace transform.	Upon completion of the course the student shall be able to:- 1. Know the theory and their application in Pharmacy 2. Solve the different types of problems by applying theory 3.Appreciate the important application of mathematics in Pharmacy

B.Pharm II Semester					
1.	**B.Pharm II sem**	**BP 201T.**	**HUMAN ANATOMY AND PHYSIOLOGY-II (Theory)**	This subject is designed to impart fundamental knowledge on the structure and functions of the various systems of the human body. It also helps in understanding both homeostatic mechanisms. The subject provides the basic knowledge required to understand the various disciplines of pharmacy.	Upon completion of this course the student should be able to: 1. Explain the gross morphology, structure and functions of various organs of the human body. 2. Describe the various homeostatic mechanisms and their imbalances. 3. Identify the various tissues and organs of different systems of human body. 4. 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. 5. Appreciate coordinated working pattern of different organs of each system 6. Appreciate the interlinked mechanisms in the maintenance of normal functioning (homeostasis) of human body.
2.	**B.Pharm II sem**	**BP202T.**	**PHARMACEUTICAL ORGANIC CHEMISTRY –I (Theory)**	This subject deals with classification and nomenclature of simple organic compounds, structural isomerism, intermediates forming in reactions, important physical properties, reactions and methods of preparation of these compounds. The syllabus also emphasizes on mechanisms and orientation of reactions.	Upon completion of the course the student shall be able to 1. Write the structure, name and the type of isomerism of the organic compound 2. Write the reaction, name the reaction and orientation of reactions 3. Account for reactivity/stability of compounds, 4. Identify/confirm the identification of organic compound
3.	**B.Pharm II sem**	**BP203 T.**	**BIOCHEMISTRY (Theory)**	Biochemistry deals with complete understanding of the molecular levels of the chemical process associated with living cells. The scope of the subject is providing biochemical facts and the principles to understand metabolism of nutrient molecules in physiological and pathological conditions. It is also emphasizing on genetic organization of mammalian genome and hetero & autocatalytic functions of DNA.	Upon completion of course student shell able to 1. Understand the catalytic role of enzymes, importance of enzyme inhibitors in design of new drugs, therapeutic and diagnostic applications of enzymes. 2. Understand the metabolism of nutrient molecules in physiological and pathological conditions. 3. Understand the genetic organization of mammalian genome and functions of DNA in the synthesis of RNAs and proteins.
4.	**B.Pharm**	**BP 204T.**	**PATHOPHYSIOLOGY**	Pathophysiology is the study of causes of diseases	Upon completion of the subject student shall be able to –

	II sem		**(THEORY)**	and reactions of the body to such disease producing causes. This course is designed to impart a thorough knowledge of the relevant aspects of pathology of various conditions with reference to its pharmacological applications, and understanding of basic pathophysiological mechanisms. Hence it will not only help to study the syllabus of pathology, but also to get baseline knowledge required to practice medicine safely, confidently, rationally and effectively.	1. Describe the etiology and pathogenesis of the selected disease states; 2. Name the signs and symptoms of the diseases; and 3. Mention the complications of the diseases
5.	**B.Pharm II sem**	**BP205 T.**	**COMPUTER APPLICATIONS IN PHARMACY (Theory)**	This subject deals with the introduction Database, Database Management system, computer application in clinical studies and use of databases.	Upon completion of the course the student shall be able to 1. Know the various types of application of computers in pharmacy 2. Know the various types of databases 3. Know the various applications of databases in pharmacy
6.	**B.Pharm II sem**	**BP 206 T.**	**ENVIRONMENTAL SCIENCES (Theory)**	Environmental Sciences is the scientific study of the environmental system and the status of its inherent or induced changes on organisms. It includes not only the study of physical and biological characters of the environment but also the social and cultural factors and the impact of man on environment.	Upon completion of the course the student shall be able to: 1. Create the awareness about environmental problems among learners. 2. Impart basic knowledge about the environment and its allied problems. 3. Develop an attitude of concern for the environment. 4. Motivate learner to participate in environment protection and environment improvement. 5. Acquire skills to help the concerned individuals in identifying and solving environmental problems. 6. Strive to attain harmony with Nature.
B.Pharm III semester					
1.	**B.Pharm III sem**	**BP301T**	**PHARMACEUTICAL ORGANIC CHEMISTRY –II (Theory)**	This subject deals with general methods of preparation and reactions of some organic compounds. Reactivity of organic compounds are also studied here. The syllabus emphasizes on mechanisms and orientation of reactions. Chemistry of fats and oils are also included in the syllabus.	Upon completion of the course the student shall be able to 1. Write the structure, name and the type of isomerism of the organic compound 2. Write the reaction, name the reaction and orientation of reactions 3. Account for reactivity/stability of compounds, 4. Prepare

					organic compounds
2.	**B.Pharm III sem**	**BP302T.**	**PHYSICAL PHARMACEUTICS-I (Theory)**	The course deals with the various physica and physicochemical properties, and principles involved in dosage forms/formulations. Theory and practical components of the subject help the student to get a better insight into various areas of formulation research and development, and stability studies of pharmaceutical dosage forms.	Upon the completion of the course student shall be able to 1. Understand various physicochemical properties of drug molecules in the designing the dosage forms 2. Know the principles of chemical kinetics & to use them for stability testing nad determination of expiry date of formulations 3. Demonstrate use of physicochemical properties in the formulation development and evaluation of dosage forms.
3.	**B.Pharm III sem**	**BP 303 T.**	**PHARMACEUTICAL MICROBIOLOGY (Theory)**	• Study of all categories of microorganisims especially for the production of alchol antibiotics, vaccines, vitamins enzymes etc..	Upon completion of the subject student shall be able to; 1. Understand methods of identification, cultivation and preservation of various microorganisms 2. To understand the importance and implementation of sterlization in pharmaceutical processing and industry 3. Learn sterility testing of pharmaceutical products. 4. Carried out microbiological standardization of Pharmaceuticals. 5. Understand the cell culture technology and its applications in pharmaceutical industries.
4.	**B.Pharm III sem**	**BP 304 T.**	**PHARMACEUTICAL ENGINEERING (Theory)**	This course is designed to impart a fundamental knowledge on the art and science of various unit operations used in pharmaceutical industry.	Upon completion of the course student shall be able: 1. To know various unit operations used in Pharmaceutical industries. 2. To understand the material handling techniques. 3. To perform various processes involved in pharmaceutical manufacturing process. 4. To carry out various test to prevent environmental pollution. 5. To appreciate and comprehend significance of plant lay out design for optimum use of resources. 6. To appreciate the various preventive methods used for corrosion control in Pharmaceutical industries.
B.Phram IV semester					
1.	**B.Phram IV sem**	**BP401T.**	**PHARMACEUTICAL ORGANIC CHEMISTRY**	This subject imparts knowledge on stereo-chemical aspects of organic compounds and organic reactions,	At the end of the course, the student shall be able to 1. Understand the methods of preparation and properties of

			–III (Theory)	important named reactions, chemistry of important hetero cyclic compounds. It also emphasizes on medicinal and other uses of organic compounds.	organic compounds 2. Explain the stereo chemical aspects of organic compounds and stereo chemical reactions 3. Know the medicinal uses and other applications of organic compounds
2.	**B.Phram IV sem**	**BP402T.**	**MEDICINAL CHEMISTRY – I (Theory)**	This subject is designed to impart fundamental knowledge on the structure, chemistry and therapeutic value of drugs. The subject emphasizes on structure activity relationships of drugs, importance of physicochemical properties and metabolism of drugs. The syllabus also emphasizes on chemical synthesis of important drugs under each class.	Upon completion of the course the student shall be able to 1. Understand the chemistry of drugs with respect to their pharmacological activity 2. Understand the drug metabolic pathways, adverse effect and therapeutic value of drugs 3. Know the Structural Activity Relationship (SAR) of different class of drugs 4. Write the chemical synthesis of some drugs
3.	**B.Phram IV sem**	**BP 403 T.**	**PHYSICAL PHARMACEUTICS-II (Theory)**	The course deals with the various physica and physicochemical properties, and principles involved in dosage forms/formulations. Theory and practical components of the subject help the student to get a better insight into various areas of formulation research and development, and stability studies of pharmaceutical dosage forms.	Upon the completion of the course student shall be able to 1. Understand various physicochemical properties of drug molecules in the designing the dosage forms 2. Know the principles of chemical kinetics & to use them for stability testing nad determination of expiry date of formulations 3. Demonstrate use of physicochemical properties in the formulation development and evaluation of dosage forms.
4.	**B.Phram IV sem**	**BP 404 T.**	**PHARMACOLOGY-I (Theory)**	The main purpose of the subject is to understand what drugs do to the living organisms and how their effects can be applied to therapeutics. The subject covers the information about the drugs like, mechanism of action, physiological and biochemical effects (pharmacodynamics) as well as absorption, distribution, metabolism and excretion (pharmacokinetics) along with the adverse effects, clinical uses, interactions, doses, contraindications and routes of administration of different classes of drugs.	Upon completion of this course the student should be able to 1. Understand the pharmacological actions of different categories of drugs 2. Explain the mechanism of drug action at organ system/sub cellular/ macromolecular levels. 3. Apply the basic pharmacological knowledge in the prevention and treatment of various diseases. 4. Observe the effect of drugs on animals by simulated experiments 5. Appreciate correlation of pharmacology with other bio medical sciences
5.	**B.Phram**	**BP 405 T.**	**PHARMACOGNOSY**	The subject involves the fundamentals of	Upon completion of the course, the student shall be able

	IV sem		**AND PHYTOCHEMISTRY I (Theory)**	Pharmacognosy like scope, classification of crude drugs, their identification and evaluation, phytochemicals present in them and their medicinal properties.	1. To know the techniques in the cultivation and production of crude drugs 2. To know the crude drugs, their uses and chemical nature 3. Know the evaluation techniques for the herbal drugs 4. To carry out the microscopic and morphological evaluation of crude drugs
B.Pharm V Semester					
1.	**B.Phram V sem**	**BP501T.**	**MEDICINAL CHEMISTRY – II (Theory)**	This subject is designed to impart fundamental knowledge on the structure, chemistry and therapeutic value of drugs. The subject emphasizes on structure activity relationships of drugs, importance of physicochemical properties and metabolism of drugs. The syllabus also emphasizes on chemical synthesis of important drugs under each class.	Upon completion of the course the student shall be able to 1. Understand the chemistry of drugs with respect to their pharmacological activity 2. Understand the drug metabolic pathways, adverse effect and therapeutic value of drugs 3. Know the Structural Activity Relationship of different class of drugs 4. Study the chemical synthesis of selected drugs
2.	**B.Phram V sem**	**BP 502 T.**	**Industrial Pharmacy I (Theory)**	Course enables the student to understand and appreciate the influence of pharmaceutical additives and various pharmaceutical dosage forms on the performance of the drug product.	Upon completion of the course the student shall be able to 1. Know the various pharmaceutical dosage forms and their manufacturing techniques. 2. Know various considerations in development of pharmaceutical dosage forms 3. Formulate solid, liquid and semisolid dosage forms and evaluate them for their quality
3.	**B.Phram V sem**	**BP503.T.**	**PHARMACOLOGY-II (Theory)**	This subject is intended to impart the fundamental knowledge on various aspects (classification, mechanism of action, therapeutic effects, clinical uses, side effects and contraindications) of drugs acting on different systems of body and in addition,emphasis on the basic concepts of bioassay.	Upon completion of this course the student should be able to 1. Understand the mechanism of drug action and its relevance in the treatment of different diseases 2. Demonstrate isolation of different organs/tissues from the laboratory animals by simulated experiments 3. Demonstrate the various receptor actions using isolated tissue preparation 4. Appreciate correlation of pharmacology with related medical sciences
4.	**B.Phram V sem**	**BP504 T.**	**PHARMACOGNOSY AND**	The main purpose of subject is to impart the students the knowledge of how the secondary metabolites are	Upon completion of the course, the student shall be able 1. to know the modern extraction techniques, characterization

			PHYTOCHEMISTRY II (Theory)	produced in the crude drugs, how to isolate and identify and produce them industrially. Also this subject involves the study of producing the plants and phytochemicals through plant tissue culture, drug interactions and basic principles of traditional system of medicine	and identification of the herbal drugs and phytoconstituents 2. to understand the preparation and development of herbal formulation. 3. to understand the herbal drug interactions 4. to carryout isolation and identification of phytoconstituents
5.	**B.Phram V sem**	**BP 505 T.**	**PHARMACEUTICAL JURISPRUDENCE (Theory)**	This course is designed to impart basic knowledge on important legislations related to the profession of pharmacy in India.	Upon completion of the course, the student shall be able to understand: 1. The Pharmaceutical legislations and their implications in the development and marketing of pharmaceuticals. 2. Various Indian pharmaceutical Acts and Laws 3. The regulatory authorities and agencies governing the manufacture and sale of pharmaceuticals 4. The code of ethics during the pharmaceutical practice
B.Pharm VI Semester					
1.	**B.Phram VI sem**	**BP601T.**	**MEDICINAL CHEMISTRY – III (Theory)**	This subject is designed to impart fundamental knowledge on the structure, chemistry and therapeutic value of drugs. The subject emphasis on modern techniques of rational drug design like quantitative structure activity relationship (QSAR), Prodrug concept, combinatorial chemistry and Computer aided drug design (CADD). The subject also emphasizes on the chemistry, mechanism of action, metabolism, adverse effects, Structure Activity Relationships (SAR), therapeutic uses and synthesis of important drugs.	Upon completion of the course student shall be able to 1. Understand the importance of drug design and different techniques of drug design. 2. Understand the chemistry of drugs with respect to their biological activity. 3. Know the metabolism, adverse effects and therapeutic value of drugs. 4. Know the importance of SAR of drugs
2.	**B.Phram VI sem**	**BP602 T.**	**PHARMACOLOGY-III (Theory)**	This subject is intended to impart the fundamental knowledge on various aspects (classification, mechanism of action, therapeutic effects, clinical uses, side effects and contraindications) of drugs acting on respiratory and gastrointestinal system, infectious diseases, immuno-pharmacology and in addition,emphasis on the principles of toxicology	Upon completion of this course the student should be able to: 1. Understand the mechanism of drug action and its relevance in the treatment of different infectious diseases 2. Comprehend the principles of toxicology and treatment of various poisonings. 3. Appreciate correlation of pharmacology with related medical sciences.

				and chronopharmacology.	
3.	**B.Phram VI sem**	**BP 603 T.**	**HERBAL DRUG TECHNOLOGY (Theory)**	This subject gives the student the knowledge of basic understanding of herbal drug industry, the quality of raw material, guidelines for quality of herbal drugs, herbal cosmetics, natural sweeteners, neutraceuticals etc. The subject also emphasizes on Good Manufacturing Practices (GMP), patenting and regulatory issues of herbal drugs	Upon completion of this course the student should be able to: 1. Understand raw material as source of herbal drugs from cultivation to herbal drug product 2. Know the WHO and ICH guidelines for evaluation of herbal drugs 3. Know the herbal cosmetics, natural sweeteners, neutraceuticals 4. Appreciate patenting of herbal drugs, GMP .
4.	**B.Phram VI sem**	**BP 604 T.**	**BIOPHARMACEUTICS AND PHARMACOKINETICS (Theory)**	This subject is designed to impart knowledge and skills of Biopharmaceutics and pharmacokinetics and their applications in pharmaceutical development, design of dose and dosage regimen and in solving the problems arised therein.	Upon completion of the course student shall be able to: 1. Understand the basic concepts in biopharmaceutics and pharmacokinetics and their significance. 2. Use of plasma drug concentration-time data to calculate the pharmacokinetic parameters to describe the kinetics of drug absorption, distribution, metabolism, excretion, elimination. 3. To understand the concepts of bioavailability and bioequivalence of drug products and their significance. 4. Understand various pharmacokinetic parameters, their significance & applications.
5.	**B.Phram VI sem**	**BP 605 T.**	**PHARMACEUTICAL BIOTECHNOLOGY (Theory)**	• Biotechnology has a long promise to revolutionize the biological sciences and technology. • Scientific application of biotechnology in the field of genetic engineering, medicine and fermentation technology makes the subject interesting. • Biotechnology is leading to new biological revolutions in diagnosis, prevention and cure of diseases, new and cheaper pharmaceutical drugs. • Biotechnology has already produced transgenic crops and animals and the future promises lot more. • It is basically a research-based subject.	Upon completion of the subject student shall be able to; 1. Understanding the importance of Immobilized enzymes in Pharmaceutical Industries 2. Genetic engineering applications in relation to production of pharmaceuticals 3. Importance of Monoclonal antibodies in Industries 4. Appreciate the use of microorganisms in fermentation technology
6.	**B.Phram VI sem**	**BP606T**	**PHARMACEUTICAL QUALITY ASSURANCE (Theory)**	This course deals with the various aspects of quality control and quality assurance aspects of pharmaceutical industries. It deals with the important	Upon completion of the course student shall be able to: 1.Understand the cGMP aspects in a pharmaceutical industry 2. Appreciate the importance of documentation

				aspects like cGMP, QC tests, documentation, quality certifications and regulatory affairs.	3.Understand the scope of quality certifications applicable to pharmaceutical industries 4. Understand the responsibilities of QA & QC departments
B.Pharm VII Semester					
1.	**B.Phram VII sem**	**BP701T.**	**INSTRUMENTAL METHODS OF ANALYSIS (Theory)**	This subject deals with the application of instrumental methods in qualitative and quantitative analysis of drugs. This subject is designed to impart a fundamental knowledge on the principles and instrumentation of spectroscopic and chromatographic technique. This also emphasizes on theoretical and practical knowledge on modern analytical instruments that are used for drug testing.	Upon completion of the course the student shall be able to 1. Understand the interaction of matter with electromagnetic radiations and its applications in drug analysis 2. Understand the chromatographic separation and analysis of drugs. 3. Perform quantitative & qualitative analysis of drugs using various analytical instruments.
2.	**B.Phram VII sem**	**BP 702 T.**	**INDUSTRIAL PHARMACYII (Theory)**	This course is designed to impart fundamental knowledge on pharmaceutical product development and translation from laboratory to market	Upon completion of the course, the student shall be able to: 1. Know the process of pilot plant and scale up of pharmaceutical dosage forms 2. Understand the process of technology transfer from lab scale to commercial batch 3. Know different Laws and Acts that regulate pharmaceutical industry 4. Understand the approval process and regulatory requirements for drug products
3.	**B.Phram VII sem**	**BP 703T.**	**PHARMACY PRACTICE (Theory)**	In the changing scenario of pharmacy practice in India, for successful practice of Hospital Pharmacy, the students are required to learn various skills like drug distribution, drug information, and therapeutic drug monitoring for improved patient care. In community pharmacy, students will be learning various skills such as dispensing of drugs, responding to minor ailments by providing suitable safe medication, patient counselling for improved patient care in the community set up.	Upon completion of the course, the student shall be able to 1. Know various drug distribution methods in a hospital 2. Appreciate the pharmacy stores management and inventory control 3. Monitor drug therapy of patient through medication chart review and clinical review 4. Obtain medication history interview and counsel the patients 5. Identify drug related problems 6. detect and assess adverse drug reactions 7. Interpret selected laboratory results (as monitoring parameters in therapeutics) of specific disease states

					8. Know pharmaceutical care services 9. Do patient counseling in community pharmacy; 10. Appreciate the concept of Rational drug therapy.
4.	**B.Phram VII sem**	**BP 704T:**	**NOVEL DRUG DELIVERY SYSTEMS (Theory)**	This subject is designed to impart basic knowledge on the area of novel drug delivery systems.	Upon completion of the course student shall be able 1. To understand various approaches for development of novel drug delivery systems. 2. To understand the criteria for selection of drugs and polymers for the development of Novel drug delivery systems, their formulation and evaluation
B.Pharm VIII Semester					
1.	**B.Phram VIII sem**	**BP801T.**	**BIOSTATISITCS AND RESEARCH METHODOLOGY (Theory)**	To understand the applications of Biostatics in Pharmacy. This subject deals with descriptive statistics, Graphics, Correlation, Regression, logistic regression Probability theory, Sampling technique, Parametric tests, Non Parametric tests, ANOVA, Introduction to Design of Experiments, Phases of Clinical trials and Observational and Experimental studies, SPSS, R and MINITAB statistical software's, analyzing the statistical data using Excel.	Upon completion of the course the student shall be able to 1.Know the operation of M.S. Excel, SPSS, R and MINITAB ® , DoE (Design of Experiment) 2. Know the various statistical techniques to solve statistical problems 3. Appreciate statistical techniques in solving the problems.
2.	**B.Phram VIII sem**	**BP 802T**	**SOCIAL AND PREVENTIVE PHARMACY**	The purpose of this course is to introduce to students a number of health issues and their challenges. This course also introduced a number of national health programmes. The roles of the pharmacist in these contexts are also discussed.	After the successful completion of this course, the student shall be able to: 1. Acquire high consciousness/realization of current issues related to health and pharmaceutical problems within the country and worldwide. 2. Have a critical way of thinking based on current healthcare development. 3. Evaluate alternative ways of solving problems related to health and pharmaceutical issues
3.	**B.Phram VIII sem**	**BP803ET.**	**PHARMA MARKETING MANAGEMENT (Theory)**	The pharmaceutical industry not only needs highly qualified researchers, chemists and, technical people, but also requires skilled managers who can take the industry forward by managing and taking the complex decisions which are imperative for the	The course aims to provide an understanding of marketing concepts and techniques and their applications in the pharmaceutical industry.

				growth of the industry. The Knowledge and Know-how of marketing management groom the people for taking a challenging role in Sales and Product management.	
4.	**B.Phram VIII sem**	**BP804 ET**	**PHARMACEUTICAL REGULATORY SCIENCE (Theory)**	This course is designed to impart the fundamental knowledge on the regulatory requirements for approval of new drugs, and drug products in regulated markets of India & other countries like US, EU, Japan, Australia,UK etc. It prepares the students to learn in detail on the regulatory requirements, documentation requirements, and registration procedures for marketing the drug products.	Upon completion of the subject student shall be able to; 1. Know about the process of drug discovery and development 2. Know the regulatory authorities and agencies governing the manufacture and sale of pharmaceuticals 3. Know the regulatory approval process and their registration in Indian and international markets
5.	**B.Phram VIII sem**	**BP 805T**	**PHARMACOVIGILANCE (Theory)**	This paper will provide an opportunity for the student to learn about development of pharmacovigilance as a science, basic terminologies used in pharmacovigilance, global scenario of Pharmacovigilance, train students on establishing pharmacovigilance programme in an organization, various methods that can be used to generate safety data and signal detection. This paper also develops the skills of classifying drugs, diseases and adverse drug reactions.	At completion of this paper it is expected that students will be able to (know, do, and appreciate): 1. Why drug safety monitoring is important? 2. History and development of pharmacovigilance 3. National and international scenario of pharmacovigilance 4. Dictionaries, coding and terminologies used in pharmacovigilance 5. Detection of new adverse drug reactions and their assessment 6. International standards for classification of diseases and drugs 7. Adverse drug reaction reporting systems and communication in pharmacovigilance 8. Methods to generate safety data during pre clinical, clinical and post approval phases of drugs' life cycle 9. Drug safety evaluation in paediatrics, geriatrics, pregnancy and lactation 10. Pharmacovigilance Program of India (PvPI) requirement for ADR reporting in India 11. ICH guidelines for ICSR, PSUR, expedited reporting, pharmacovigilance planning 12. CIOMS requirements for ADR reporting

					13. Writing case narratives of adverse events and their quality.
6.	**B.Phram VIII sem**	**BP 806 ET**	**QUALITY CONTROL AND STANDARDIZATION OF HERBALS (Theory)**	Scope: In this subject the student learns about the various methods and guidelines for evaluation and standardization of herbs and herbal drugs. The subject also provides an opportunity for the student to learn cGMP, GAP and GLP in traditional system of medicines.	Objectives: Upon completion of the subject student shall be able to; 1. know WHO guidelines for quality control of herbal drugs 2. know Quality assurance in herbal drug industry 3. know the regulatory approval process and their registration in Indian and international markets 4. appreciate EU and ICH guidelines for quality control of herbal drugs
7.	**B.Phram VIII sem**	**BP 807 ET.**	**COMPUTER AIDED DRUG DESIGN (Theory)**	This subject is designed to provide detailed knowledge of rational drug design process and various techniques used in rational drug design process.	Upon completion of the course, the student shall be able to understand 1.Design and discovery of lead molecules 2.The role of drug design in drug discovery process 3.The concept of QSAR and docking 4.Various strategies to develop new drug like molecules. 5.The design of new drug molecules using molecular modeling software
8.	**B.Phram VIII sem**	**BP808ET:**	**CELL AND MOLECULAR BIOLOGY (Elective subject)**	• Cell biology is a branch of biology that studies cells – their physiological properties, their structure, the organelles they contain, interactions with their environment, their life cycle, division, death and cell function. • This is done both on a microscopic and molecular level. • Cell biology research encompasses both the great diversity of single-celled organisms like bacteria and protozoa, as well as the many specialized cells in multi-cellular organismssuch as humans, plants, and sponges.	Upon completion of the subject student shall be able to; 1. Summarize cell and molecular biology history. 2. Summarize cellular functioning and composition. 3. Describe the chemical foundations of cell biology. 4. Summarize the DNA properties of cell biology. 5. Describe protein structure and function. 5. Describe cellular membrane structure and function. 6. Describe basic molecular genetic mechanisms. 7. Summarize the Cell Cycle C
9.	**B.Phram VIII sem**	**BP810 ET.**	**PHARMACOLOGICAL SCREENING METHODS**	This subject is designed to impart the basic knowledge of preclinical studies in experimental animals including design, conduct and interpretations of results.	Upon completion of the course the student shall be able to, 1. Appreciate the applications of various commonly used laboratory animals. 2. Appreciate and demonstrate the various screening methods

					used in preclinical research 3. Appreciate and demonstrate the importance of biostatistics and research methodology 4. Design and execute a research hypothesis independently
10.	**B.Phram VIII sem**	**BP 811 ET**	**ADVANCED INSTRUMENTATION TECHNIQUES**	This subject deals with the application of instrumental methods in qualitative and quantitative analysis of drugs. This subject is designed to impart advanced knowledge on the principles and instrumentation of spectroscopic and chromatographic hyphenated techniques. This also emphasizes on theoretical and practical knowledge on modern analytical instruments that are used for drug testing.	Upon completion of the course the student shall be able to 1. Understand the advanced instruments used and its applications in drug analysis 2. Understand the chromatographic separation and analysis of drugs. 3. Understand the calibration of various analytical instruments 4. Know analysis of drugs using various analytical instruments.
11.	**B.Phram VIII sem**	**BP 812 ET.**	**DIETARY SUPPLEMENTS AND NUTRACEUTICALS**	This subject covers foundational topic that are important for understanding the need and requirements of dietary supplements among different groups in the population.	This module aims to provide an understanding of the concepts behind the theoretical applications of dietary supplements. By the end of the course, students should be able to : 1. Understand the need of supplements by the different group of people to maintain healthy life. 2. Understand the outcome of deficiencies in dietary supplements. 3. Appreciate the components in dietary supplements and the application. 4. Appreciate the regulatory and commercial aspects of dietary supplements including health claims.

S.No.	Class	Sub code	Subject	Scope	Course Outcomes
M.Pharm I Sem PHARMACEUTICS (MPH)					
1-	**M.Pharm I Sem**	**MPH 101T**	**MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES**	This subject deals with various advanced analytical instrumental techniques for identification, characterization and quantification of drugs. Instruments dealt are NMR, Mass spectrometer, IR, HPLC, GC etc.	After completion of course student is able to know, • Chemicals and Excipients • The analysis of various drugs in single and combination dosage forms • Theoretical and practical skills of the instruments
2.	**„**	**MPH 102T**	**DRUG DELIVERY SYSTEMS**	This course is designed to impart knowledge on the area of advances in novel drug delivery systems.	Upon completion of the course, student shall be able to understand • The various approaches for development of novel drug delivery systems. • The criteria for selection of drugs and polymers for the development of delivering system • The formulation and evaluation of Novel drug delivery systems.
3.	**„**	**MPH 103T**	**MODERN PHARMACEUTICS**	Course designed to impart advanced knowledge and skills required to learn various aspects and concepts at pharmaceutical industries	Upon completion of the course, student shall be able to understand • The elements of preformulation studies. • The Active Pharmaceutical Ingredients and Generic drug Product development • Industrial Management and GMP Considerations. • Optimization Techniques & Pilot Plant Scale Up Techniques • Stability Testing, sterilization process & packaging of dosage forms.

4.	**„**	**MPH 104T**	**REGULATORY AFFAIRS**	Course designed to impart advanced knowledge and skills required to learn the concept of generic drug and their development, various regulatory filings in different countries, different phases of clinical trials and submitting regulatory documents : filing process of IND, NDA and ANDA • To know the approval process of • To know the chemistry, manufacturing controls and their regulatory importance • To learn the documentation requirements for • To learn the importance	Upon completion of the course, it is expected that the students will be able to understand • The Concepts of innovator and generic drugs, drug development process • The Regulatory guidance's and guidelines for filing and approval process • Preparation of Dossiers and their submission to regulatory agencies in different countries • Post approval regulatory requirements for actives and drug products • Submission of global documents in CTD/ eCTD formats • Clinical trials requirements for approvals for conducting clinical trials • Pharmacovigilence and process of monitoring in clinical trials.
5.	**M.Pharm II Sem**	**MPH 201T**	**MOLECULAR PHARMACEUTICS (NANO TECHNOLOGY & TARGETED DDS) (NTDS)**	This course is designed to impart knowledge on the area of advances in novel drug delivery systems.	Upon completion of the course student shall be able to understand • The various approaches for development of novel drug delivery systems. • The criteria for selection of drugs and polymers for the development of NTDS • The formulation and evaluation of novel drug delivery systems.
6.	**„**	**MPH 202T**	**ADVANCED BIOPHARMACEUTICS & PHARMACOKINETICS**	This course is designed to impart knowledge and skills necessary for dose calculations, dose adjustments and to apply biopharmaceutics theories in practical problem solving. Basic theoretical discussions of the principles of biopharmaceutics and pharmacokinetics are provided to help the students' to clarify the concepts.	Upon completion of this course it is expected that students will be able understand, • The basic concepts in biopharmaceutics and pharmacokinetics. • The use raw data and derive the pharmacokinetic models and parameters the best describe the process of drug absorption, distribution, metabolism and elimination. • The critical evaluation of biopharmaceutic studies involving drug product equivalency.

					• The design and evaluation of dosage regimens of the drugs using pharmacokinetic and biopharmaceutic parameters. • The potential clinical pharmacokinetic problems and application of basics of pharmacokinetic
7.	**„**	**MPH 203T**	**COMPUTER AIDED DRUG DEVELOPMENT**	This course is designed to impart knowledge and skills necessary for computer Applications in pharmaceutical research and development who want to understand the application of computers across the entire drug research and development process. Basic theoretical discussions of the principles of more integrated and coherent use of computerized information (informatics) in the drug development process are provided to help the students to clarify the concepts.	Upon completion of this course it is expected that students will be able to understand, • History of Computers in Pharmaceutical Research and Development • Computational Modeling of Drug Disposition • Computers in Preclinical Development • Optimization Techniques in Pharmaceutical Formulation • Computers in Market Analysis • Computers in Clinical Development • Artificial Intelligence (AI) and Robotics • Computational fluid dynamics(CFD)
8.	**„**	**MPH 204T**	**COSMETICS AND COSMECEUTICALS**	This course is designed to impart knowledge and skills necessary forthefundamental need for cosmetic and cosmeceutical products.	Upon completion of the course, the students shall be able to understand • Key ingredients used in cosmetics and cosmeceuticals. • Key building blocks for various formulations. • Current technologies in the market • Various key ingredients and basic science to develop cosmetics and cosmeceuticals • Scientific knowledge to develop cosmetics and cosmeceuticals with desired Safety, stability, and efficacy.
PHARMACEUTICAL CHEMISTRY (MPC)					

1.	**M.Pharm I Sem**	**MPC 101T**	**MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES**	This subject deals with various advanced analytical instrumental techniques for identification, characterization and quantification of drugs. Instruments dealt are NMR, Mass spectrometer, IR, HPLC, GC etc.	After completion of course student is able to know about chemicals and excipients • The analysis of various drugs in single and combination dosage forms • Theoretical and practical skills of the instruments
2.	**„**	**MPC 102T**	**ADVANCED ORGANIC CHEMISTRY - I**	The subject is designed to provide in-depth knowledge about advances in organic chemistry, different techniques of organic synthesis and their applications to process chemistry as well as drug discovery.	Upon completion of course, the student shall be to understand • The principles and applications of reterosynthesis • The mechanism & applications of various named reactions • The concept of disconnection to develop synthetic routes for small target molecule. • The various catalysts used in organic reactions • The chemistry of heterocyclic compounds
3.	**„**	**MPC 103T**	**ADVANCED MEDICINAL CHEMISTRY**	The subject is designed to impart knowledge about recent advances in the field of medicinal chemistry at the molecular level including different techniques for the rational drug design.	At completion of this course it is expected that students will be able to understand • Different stages of drug discovery • Role of medicinal chemistry in drug research • Different techniques for drug discovery • Various strategies to design and develop new drug like molecules for biological targets • Peptidomimetics
4.	**„**	**MPC 104T**	**CHEMISTRY OF NATURAL PRODUCTS**	The subject is designed to provide detail knowledge about chemistry of medicinal compounds from natural origin and general methods of structural elucidation of such compounds. It also emphasizes on isolation, purification and characterization of medicinal compounds from natural origin.	At completion of this course it is expected that students will be able to understand- • Different types of natural compounds and their chemistry and medicinal importance • The importance of natural compounds as lead molecules for new drug discovery • The concept of rDNA technology tool for new drug discovery • General methods of structural elucidation of compounds of natural origin • Isolation, purification and characterization of simple

					chemical constituents from natural source
5.	**M.Pharm II Sem**	**MPC 201T**	**ADVANCED SPECTRAL ANALYSIS**	This subject deals with various hyphenated analytical instrumental techniques for identification, characterization and quantification of drugs. Instruments dealt are LC-MS, GC-MS, ATR-IR, DSC etc.	At completion of this course it is expected that students will be able to understand- • Interpretation of the NMR, Mass and IR spectra of various organic compounds • Theoretical and practical skills of the hyphenated instruments • Identification of organic compounds
6.	**„**	**MPC 202T**	**ADVANCED ORGANIC CHEMISTRY - II**	The subject is designed to provide in-depth knowledge about advances in organic chemistry, different techniques of organic synthesis and their applications to process chemistry as well as drug discovery..	Upon completion of course, the student shall able to understand • The principles and applications of Green chemistry • The concept of peptide chemistry. • The various catalysts used in organic reactions • The concept of stereochemistry and asymmetric synthesis
7.	**„**	**MPC 203T**	**COMPUTER AIDED DRUG DESIGN**	The subject is designed to impart knowledge on the current state of the art techniques involved in computer assisted drug design.	At completion of this course it is expected that students will be able to understand • Role of CADD in drug discovery • Different CADD techniques and their applications • Various strategies to design and develop new drug like molecules. • Working with molecular modeling softwares to design new drug molecules • The in silico virtual screening protocols
8.	**„**	**MPC 204T**	**PHARMACEUTICAL PROCESS CHEMISTRY**	Process chemistry is often described as scale up reactions, taking them from small quantities created in the research lab to the larger quantities that are needed for further testing and then to even larger quantities required for commercial production. The goal of a process chemist is to develop synthetic routes that are	At completion of this course it is expected that students will be able to understand • The strategies of scale up process of apis and intermediates • The various unit operations and various reactions in process chemistry

				safe, cost-effective, environmentally friendly, and efficient. The subject is designed to impart knowledge on the development and optimization of a synthetic route/s and the pilot plant procedure for the manufacture of Active Pharmaceutical Ingredients (APIs) and new chemical entities (NCEs) for the drug development phase.	
PHARMACOLOGY (MPL)					
1.	**M.Pharm I Sem**	**MPL 101T**	**MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES**	This subject deals with various advanced analytical instrumental techniques for identification, characterization and quantification of drugs. Instruments dealt are NMR, Mass spectrometer, IR, HPLC, GC etc.	After completion of course student is able to know about, • Chemicals and Excipients • The analysis of various drugs in single and combination dosage forms • Theoretical and practical skills of the instruments
2.	**„**	**MPL 102T)**	**ADVANCED PHARMACOLOGY- I**	The subject is designed to strengthen the basic knowledge in the field of pharmacology and to impart recent advances in the drugs used for the treatment of various diseases. In addition, this subject helps the students to understand the concepts of drug action and mechanisms involved	Upon completion of the course the student shall be able to : • Discuss the pathophysiology and pharmacotherapy of certain diseases • Explain the mechanism of drug actions at cellular and molecular level • Understand the adverse effects, contraindications and clinical uses of drugs used in treatment of diseases
3.	**„**	**MPL 103T**	**PHARMACOLOGICAL AND TOXICOLOGICAL SCREENING METHODS - I**	This subject is designed to impart the knowledge on preclinical evaluation of drugs and recent experimental techniques in the drug discovery and development. The subject content helps the student to understand the maintenance of laboratory animals as per the guidelines, basic knowledge of various in-vitro and in-vivo preclinical evaluation processes	Upon completion of the course the student shall be able to, • Appraise the regulations and ethical requirement for the usage of experimental animals. • Describe the various animals used in the drug discovery process and good laboratory practices in maintenance and handling of experimental animals • Describe the various newer screening methods involved in the drug discovery process • Appreciate and correlate the preclinical data to humans

3.	**„**	**MPL 104T**	**CELLULAR AND MOLECULAR PHARMACOLOGY**	The subject imparts a fundamental knowledge on the structure and functions of cellular components and help to understand the interaction of these components with drugs. This information will further help the student to apply the knowledge in drug discovery process.	Upon completion of the course, the student shall be able to, • Explain the receptor signal transduction processes. • Explain the molecular pathways affected by drugs. • Appreciate the applicability of molecular pharmacology and biomarkers in drug discovery process. • Demonstrate molecular biology techniques as applicable for pharmacology
4.	**M.Pharm II Sem**	**MPL 201T**	**ADVANCED PHARMACOLOGY - II**	The subject is designed to strengthen the basic knowledge in the field of pharmacology and to impart recent advances in the drugs used for the treatment of various diseases. In addition, the subject helps the student to understand the concepts of drug action and mechanism involved	Upon completion of the course the student shall be able to: • Explain the mechanism of drug actions at cellular and molecular level • Discuss the Pathophysiology and pharmacotherapy of certain diseases • Understand the adverse effects, contraindications and clinical uses of drugs used in treatment of diseases
5.	**„**	**MPL 202T**	**PHARMACOLOGICAL AND TOXICOLOGICAL SCREENING METHODS-II**	This subject imparts knowledge on the preclinical safety and toxicological evaluation of drug & new chemical entity. This knowledge will make the student competent in regulatory toxicological evaluation.	Upon completion of the course, the student shall be able to, • Explain the various types of toxicity studies. • Appreciate the importance of ethical and regulatory requirements for toxicity studies. • Demonstrate the practical skills required to conduct the preclinical toxicity studies
6.	**„**	**MPL 203T**	**PRINCIPLES OF DRUG DISCOVERY**	The subject imparts basic knowledge of drug discovery process. This information will make the student competent in drug discovery process	Upon completion of the course, the student shall be able to, • Explain the various stages of drug discovery. • Appreciate the importance of the role of genomics, proteomics and bioinformatics in drug discovery • Explain various targets for drug discovery. • Explain various lead seeking method and lead optimization • Appreciate the importance of the role of computer aided drug design in drug discovery

7.	**„**	**MPL 204T**	**CLINICAL RESEARCH AND PHARMACOVIGILANCE**	This subject will provide a value addition and current requirement for the students in clinical research and pharmacovigilance. It will teach the students on conceptualizing, designing, conducting, managing and reporting of clinical trials. This subject also focuses on global scenario of Pharmacovigilance in different methods that can be used to generate safety data. It will teach the students in developing drug safety data in Pre-clinical, Clinical phases of Drug development and post market surveillance.	Upon completion of the course, the student shall be able to, • Explain the regulatory requirements for conducting clinical trial • Demonstrate the types of clinical trial designs • Explain the responsibilities of key players involved in clinical trials • Execute safety monitoring, reporting and close-out activities • Explain the principles of Pharmacovigilance • Detect new adverse drug reactions and their assessment • Perform the adverse drug reaction reporting systems and communication in Pharmacovigilance
PHARMACOGNOSY (MPG)					
1.	**M.Pharm I Sem**	**MPG 101T**	**MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES**	This subject deals with various advanced analytical instrumental techniques for identification, characterization and quantification of drugs. Instruments dealt are NMR, Mass spectrometer, IR, HPLC, GC etc.	Objectives After completion of course student is able to know, • The analysis of various drugs in single and combination dosage forms • Theoretical and practical skills of the instruments
2.	**„**	**MPG 102T**	**ADVANCED PHARMACOGNOSY - I**	To learn and understand the advances in the field of cultivation and isolation of drugs of natural origin, various phytopharmaceuticals, nutraceuticals and their medicinal use and health benefits.	OBJECTIVES Upon completion of the course, the student shall be able to know the, • Advances in the cultivation and production of drugs •Various phyto-pharmaceuticals and their source, its utilization and medicinal value. • Various nutraceuticals/herbs and their health benefits • Drugs of marine origin • Pharmacovigilance of drugs of natural origin
3.	**„**	**MPG 103T**	**PHYTOCHEMISTRY**	Students shall be equipped with the knowledge of natural product drug discovery and will be able to isolate, identify and extract and the phytoconstituents	Upon completion of the course, the student shall be able to know the, • Different classes of phytoconstituents, their biosynthetic pathways, their properties, extraction and general process of natural product drug discovery

					• Phytochemical fingerprinting and structure elucidation of phytoconstituents.
4.	**„**	**MPG 104T**	**INDUSTRIAL PHARMACOGNOSTICAL TECHNOLOGY**	To understand the Industrial and commercial potential of drugs of natural origin, integrate traditional Indian systems of medicine with modern medicine and also to know regulatory and quality policy for the trade of herbals and drugs of natural origin.	OBJECTIVES By the end of the course the student shall be able to know, • the requirements for setting up the herbal/natural drug industry. • the guidelines for quality of herbal/natural medicines and regulatory issues. • the patenting/IPR of herbals/natural drugs and trade of raw and finished materials.
5.	**M.Pharm II Sem**	**MPG 201T**	**MEDICINAL PLANT BIOTECHNOLOGY**	To explore the knowledge of Biotechnology and its application in the improvement of quality of medicinal plants	Upon completion of the course, the student shall be able to, • Know the process like genetic engineering in medicinal plants for higher yield of Phytopharmaceuticals. • Use the biotechnological techniques for obtaining and improving the quality of natural products/medicinal plants
6.	**„**	**MPG 202T**	**ADVANCED PHARMACOGNOSY - II**	To know and understand the Adulteration and Deterioration that occurs in herbal/natural drugs and methods of detection of the same. Study of herbal remedies and their validations, including methods of screening	Upon completion of the course, the student shall be able to know the, • validation of herbal remedies • methods of detection of adulteration and evaluation techniques for the herbal drugs • methods of screening of herbals for various biological properties
7.	**„**	**MPG 203T**	**INDIAN SYSTEMS OF MEDICINE**	To make the students understand thoroughly the principles, preparations of medicines of various Indian systems of medicine like Ayurveda, Siddha, Homeopathy and Unani. Also focusing on clinical research of traditional medicines, quality assurance and challenges in monitoring the safety of herbal medicines.	After completion of the course, student is able to • To understand the basic principles of various Indian systems of medicine • To know the clinical research of traditional medicines, Current Good Manufacturing Practice of Indian systems of medicine and their formulations

8.	**„**	**MPG 204T**	**HERBAL COSMETICS**	This subject deals with the study of preparation and standardization of herbal/natural cosmetics. This subject gives emphasis to various national and international standards prescribed regarding herbal cosmeceuticals.	After completion of the course, student shall be able to, • understand the basic principles of various herbal/natural cosmetic preparations • current Good Manufacturing Practices of herbal/natural cosmetics as per the regulatory authorities