Criteria No: 2

Metric no: 2.6.1

Programme and course outcomes for all Programmes offered by the institution are stated and displayed on website and communicated to teachers and students.

Sr. No.	Content
1	Program Outcome (PO)
2	Program specific outcome (PSO)
3	Course outcome (CO)

Principal
Pravara Rural College of Pharmacy
Pravaranagar, A/p.Loni-413 736

PRAVARA RURAL EDUCATION SOCIETY'S
PRAVARA RURAL COLLEGE OF PHARMACY
LONI

Program Outcomes (POs)

The Program Outcomes of Bachelor in Pharmacy course are:

1. **Pharmacy Knowledge:** An ability to acquire , demonstrate, core and basic knowledge of Pharmaceutical and Life Sciences
2. **Planning Abilities:** An ability to develop, implement, effectively plan and organize work using time management, resource management, delegation skills and organizational skills to achieve goals in specified timeline.
3. **Problem Analysis:** An ability to identify, analyze, interpret data and take appropriate decision to solve problems related to routine Pharmacy Practices by applying acquired knowledge.
4. **Modern Tool Usage:** An ability to understand, choose and utilize Modern techniques and computing tools for Pharmacy practices by considering constraints.
5. **Leadership Skills:** An understanding of pharmaceutical management principles and apply these to one's own work, as a member and leader in a team, to manage projects tofacilitate improvement in social health and well being.
6. **Professional Identity:** An ability to recognize, analyze and communicate Pharmacy professional values as a healthcare promoter.
7. **Pharmaceutical Ethics:** ability to understand and use professional, ethical, legal, social issues and responsibilities for well being of the society.
8. **Communication:** An ability to comprehend, write reports, present and document to communicate effectively for exchange of professional information to Pharmacy community and society.
9. **The Pharmacist and Society:** An ability to overcome the societal, health and legal problemsby providing better pharmaceutical care relevant to the Pharmacy profession.
10. **Environment and Sustainability**: An ability to recognize the impact of the professional Pharmaceutical solutions in social and environmental circumstances for sustainable development.
11. **Life-Long Learning:** An ability to recognize the need to engage in continuous Professional development by taking in consideration timely feedback and technological changes for life long learning process.

Principal
Pravara Rural College of Pharmacy
Pravaranagar, A/p.Loni-413 736

Program Specific Outcomes (PSO)

Pharmacy Students are able to:

PSO 1: To build graduate to excel in technical or professional careers in various pharmaceuticalindustry and/ or institute and /or Health care system through rigorous education. Also analyze and communicate the skills, values of their professional roles in society.

PSO 2: To learn, select, apply appropriate methods, procedures, resources and modern pharmacy-related computing tools with an understanding of the limitations.

PSO 3: To operate, control, analyze and evaluate chemical substances and finished products also processes within permissible limits.

PSO 4: To design a system, component or process to meet desired needs within realistic constraints such as economic, environmental, sustainability social, ethical, health, safety and manufacturability for humans.

ANNEXURE I: PROGRAM OUTCOMES D.PHARMACY

1. Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy.

2. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

3. 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.

4. 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).

5. 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.

6. 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.

Principal

7. 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.

8. 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.

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

Principal
Pravara Rural College of Pharmacy
Pravaranagar, At.Loni-413 736

First Year B.Pharmacy			
Semester-I			
Course code	**Course Name**	**Course Outcome**	
BP101T	Human Anatomy & Physiology I	1	Define various terminologies, different level of organization, organ system and homeostsis mechanism of human body
		2	Explain anatomical organization, morphology & physiological functions of the skeletal system and joints.
		3	Dicuss the role of body fluids & blood in homeostasis and body fluid regulation.
		4	Explain anatomical organization, morphology & physiological functions of the Peripheral nervous system and special sense organs with their disorders.
		5	Explain anatomical organization, morphology & physiological functions of the cardiovascular system with their disorders
BP107P	Human Anatomy & Physiology I	1	Explain the gross morphology, structure and functions of various organizations of the human body by using compound microscope.
		2	Explain anatomical organization, morphology & physiological functions of the skeletal system and joints
		3	Determination of various counts of cells by using haemocytometer.
		4	Determination of bleeding, clotting time, haemoglobin content, blood group, erythrocyte sedimentation rate, heart rate and pulse rate blood pressure.
BP102T	Pharmaceutical Analysis-1 (T)	1	Explain volumetric analysis method for estimation of selected compound officially pharmacopeia.
		2	Explain electrochemical analysis method for estimation of selected compound officially pharmacopeia.

Principal
Pravara Rural College of Pharmacy
Pravaranagar, At.Loni-413 736

		3	Explain gravimetric analysis method for estimation of selected compound officially pharmacopeia.
		4	Explain various method of expressing conc. & uses of primary and secondary std. for chemical analysis.
		5	Explain error in measurement.
BP108 P	Pharmaceutical Analyisis-I	1	Prepare & standardization different chemical reagent as per pharmacopoeia.
		2	Measure percentage purity of given pharmaceutical drugs by titrimetric analysis
		3	Measure / calculate Determine normality of a solution by electro-analytical methods
		4	Measure refracto index as selected sample by using refract meter.
BP 104 T	Pharmaceutical Inorganic Chemistry	1	Explain various of type, sources & significance of impurities & procedure involved in their identification with their official limit in pharmaceutical substances.
		2	Describe theory & monograph of acid base, bufferes & there role in pharmaceutical & isotonicity preparation.
		3	Summarize physiological function of ion & acid bace balance with their significance & monograph of specified electrolyte preparation of electrolyte replacement therapy solution.
		4	Explain various dental product used as dentifrices, anticaries, desentization & cementing agents. (Level 02)
		5	Classify various inorganic agents used in preparation of acidifier, antacid, catheretics,antimicrobial as gastrointenstinal agents including monograph of specified agents . (Level 02)
		6	Classify various inorganic agents used in preparation of expectorant, emetics, antidotes, Haematinics, astringent agents including their monograph of specified agents

Principal
Pravara Rural College of Pharmacy
Pravaranagar, At.Loni-413 736

		7	Explain principle & measurement of radiation therapy including handling, storage & uses of specified radio isotopes.
BP 110 P	Pharmaceutical Inorganic Chemistry	1	Evaluate presence of inorganic impurities in pharmaceutical subtances
		2	Identify inorganic pharmaceutical compounds using appropriate pharmacopeial procedure.
		3	Assess to purity of inorganic pharmaceutical compound based on its physical & chemical properties.
		4	Prepare various Pharmaceutical Inorganic Compounds using pharmacopeial procedure
BP 103T	Pharmaceutics I	1	Explain history of pharmacy profession and Pharmacopoeias
		2	Explain various dosage form solid(powder),liquid, semisolid dosage form with respect to nature,classification,preparation,advantage and disadvantage.
		3	Explain parts of prescription and errors of prescription including calculation of dose.
		4	Describe different pharmaceutical incompatibilities in pharmaceutical preparation.
		5	Use imperial and metric system to prepare percentage solution, alligation, proof spirit, isotonic solution based on freezing point and molecular weight.
BP 109 P	Pharmaceutics 1	1	To use procedure and material to prepare solid, liquid and semi-solid dosage forms.
		2	Identify an appropriate container for storing the the prepared dosage form.
		3	To prepare label of pharmaceutical product..
Second Year B.Pharmacy			
Semester-III			
BP301T	Pharmaceutical Organic	1	Discuss the reactions & orientation of reaction of benzene & its derivatives towards electrophilic substitution reactions

Principal
Pravara Rural College of Pharmacy
Pravaranagar, At.Loni-413 736

	Chemistry II – Theory	2	Explain general methods of preparation and reactions of phenols and aromatic amines
		3	Discuss stereoisomerism of organic compounds with respective types, structure, nomenclature, assigning the configuration & their significance on biological activity.
		4	Differentiate the polynuclear medicinal organic compounds with respect to their chemistry.
		5	Summarize different theories related to stability of cyloalkane & reactivity of cyclopropane & cyclobutane.
		6	Describe the chemistry of fats and oils
BP302T	Physical Pharmaceutics I – Theory	1	Explain solubility of various states of matter with respect to principles, expressions, laws governing the solubility and their applications in drug solubilization.
		2	Discuss various states and properties of matter.
		3	Discuss surface and interfacial phenomenon , methods for its instrumentation, surface active agents and HLB Scale.
		4	Classify the complexation , applications, stability of drug complexes and biological actions.
		5	Apply pH and buffer concepts in pharmaceutical and biological systems
BP303T	Pharmaceutical Microbiology – Theory	1	Describe the classification, methods of identification, microbial growth/reproduction, cultivation, quantification and preservation of microorganisms
		2	Explain the microbial control techniques such as sterilization, sterility tests, disinfection and preservation of pharmaceutical products.
		3	Predict appropriate methods for microbiological standardization and cell culture technology.
		4	Discuss on types, factors affecting, sources and assessment of microbial contamination and spoilage.
		5	Examine stability of microbial cultures and its applications in pharmaceutical industry and research.

Principal
Pravara Rural College of Pharmacy
Pravaranagar, At.Loni-413 736

BP304T	Pharmaceutical Engineering – Theory	1	Explain significance of Reynold's number, Bernoulli's theory, working of various manometer and flow meters with respect to flow of fluids.
		2	Explain objective, principle, application, and working of various unit operations like size reduction, size separation, heat transfer, evaporation, distillation, drying, mixing, filtration and centrifugation in pharmaceutical industry.
		3	Illustrate various equipments used in pharmaceutical industry during unit operations.
		4	Distinguish various factors affecting material selection for pharmaceutical plant constructions.
		5	Describe theories of corrosion, type of corrosion and their preventions.
BP305P	Pharmaceutical Organic Chemistry II – Practical	1	Apply recrystallization and steam distillation methods for purification of synthesized organic compounds
		2	Categorize the binary mixture of organic compounds by using procedure.
		3	Demonstrate saponification value of fats and oils using giving procedure
		4	Prepared purified specified organic compounds using a given synthetic procedure
BP306P	Physical Pharmaceutics I – Practical	1	To measure the pKa value, partition coefficient and solubility of drugs.
		2	To measure HLB Number ,CMC of surfactant , Freundlich and Langmuir Constant.
		3	To demonstrate solubility and pH titration method for stability constant and donor acceptor ratio.
		4	To measure surface tension of the given liquids by drop count and drop weight method.

Principal
Pravara Rural College of Pharmacy
Pravaranagar, At.Loni-413 736

		5	To calculate percentage composition of NaCl in a solution using phenol -water system by CST Method.
BP307P	Pharmaceutical Microbiology – Practical	1	List and study of apparatus used in microbiology
		2	Discuss on different methods of sterilization and sterility testing of pharmaceuticals
		3	Prepare and use culture media for the growth of microorganisms
		4	Identify and isolate bacteria
		5	Apply aseptic procedures for inoculation
BP 308P	Pharmaceutical Engineering – Practical	1	Perform experiments related to unit operations.
		2	Operate equipment used in the manufacturing of pharmaceutical products.
		3	Interpret results of the experiments conducted.
		4	Illustrate the material and energy requirements for optimizing the pharmaceutical unit process.
Third Year B.Pharmacy			
Semester-V			
BP502T	Industrial Pharmacy I	1	Determine physicochemical properties of drugs as a tool in the optimization of solid and liquid dosage forms.
		2	Discuss the formulation and preparation of tablets, capsules and liquid orals using established procedures and technology
		3	Summarize the formulation and preparation of different types of parenteral and ophthalmic dosage forms.
		4	Evaluate the pharmaceutical dosage form for quality and stability and compare with standards prescribed in the pharmacopoeia
		5	Select ingredients and formulate cosmetics such as lipsticks, shampoos, cold cream and vanishing cream, toothpastes, hair dyes and sunscreens.
		6	Identify containers, closures, valves and propellants for different types of aerosol system and evaluate appropriate packaging material.

Principal
Pravara Rural College of Pharmacy
Pravaranagar, At.Loni-413 736

		7	Discuss nature of materials and legal requirements of packing material used in pharmaceuticals
BP 501 T	Medicinal chemistry-II	1	Classify antihistaminics, antianginals, antihypertensives, antiarrhythmics, antihyperlipidemics, autocoids, diuretics, local anaesthetics and drugs acting on endocrinal system based on their chemical structure
		2	Explain relationship between chemical structure and biological activity of antihistaminics, antianginals, antihypertensives, antiarrhythmics, antihyperlipidemics, autocoids, diuretics, local anaesthetics and drugs acting on endocrinal system
		3	Illustrate chemical synthesis pathway of specified drug molecules
		4	Explain mechanism of action of of antihistaminics, antianginals, antihypertensives, antiarrhythmics, antihyperlipidemics, autocoids, diuretics, local anaesthetics and drugs acting on endocrinal system
		5	Discuss therapeutic uses and adverse effects of antihistaminics, antianginals, antihypertensives, antiarrhythmics, antihyperlipidemics, autocoids, diuretics, local anaesthetics and drugs acting on endocrinal system
BP 505 T	Pharmaceutical Jurisprudence	1	Discuss the Pharmaceutical legislations and their implications in the development and marketing of pharmaceuticals.
		2	Discuss Various Indian pharmaceutical Acts and Laws
		3	Explain the regulatory authorities and agencies governing the manufacture and sale of pharmaceuticals
		4	Explain various code of ethics, standards & amp; regulatory practices related to pharmacy profession
		5	Describe concept of Right to Information Act & amp; related IPR of new drugs

Principal
Pravara Rural College of Pharmacy
Pravaranagar, A/p.Loni-413 736

BP 504 T	Pharmacognosy & Phytochemistry-II	1	Discuss the various metabolite pathways for formation of Secondary metabolites and their biogenetic studies using radioisotope techniques.
		2	Summarize various techniques of extraction, isolation, purification and identification of secondary metabolites of crude drugs.
		3	Utilize different techniques used in extraction of different secondary metabolites
		4	Discuss isolation, identification and analysis of specified classes of secondsry metabolites
		5	Discuss industrial production,estimation and utilization of specified secondary metabolites.
BP 503 T	Pharmacology-II	1	classify the drugs acting on cardiovasular, endocrine and urinary systems
		2	explain pathophysiological role of autocoids and pharmaology of drugs related to autocoids
		3	describe pharmacology of NSAID's, antigoute and antirheumatic drugs
		4	illustrare bioassay of insulin, oxytocin, vasopressin, ACTH, d-tubocurarine, digitalis, histamine and 5-HT
		5	discuss the basics of mechanism of action of various classes of cardiovasular, endocrine and urinary systems
BP 506 P	Industrial Pharmacy I	1	Determine physicochemical properties of drugs before formulation of Dosage form.
		2	Determine preparation and evaluation of tablets and capsules.
		3	Discuss the benefits and properties of coating of tablets and granules over uncoated variety.
		4	Determine the preparation and evaluation of Sterile dosage form like injections, eye drops, eye ointments and Cosmetics like cold cream and vanishing cream.

Principal
Pravara Rural College of Pharmacy
Pravaranagar, A/p.Loni-413 736

		5	Summarize the Quality Control test of marketed tablets and capsules as per IP.
		6	Discuss the evaluation of glass containers as per IP.
BP508P	Pharmacognosy & Phytochemistry-II	1	Evaluate morphology, Microscopy, Powder characteristics, extraction & detection of crude drugs.
		2	Apply techniques of extraction and detection of isolated active constituents from crude drug.
		3	Analyze and identify the extracts of crude drugs by using various chromatographic techniques like paper, TLC.
		4	Analyze and identify the extracts of crude drugs by steam distillation method.
		5	Identify unorganized powdered drugs by powder microscopy, physical, chemical, morphological, characteristics
BP 507P	Pharmacology-II Practical	1	Understand in-vitro pharmacology and physiological salt solutions.
		2	Analyse effect of drugs on blood pressure and heart rate of dog/ Frog
		3	Perform bioassay of varius drugs on isolated ilem preperation
		4	Demonstrate analgesic, anti-inflammatory antidiuretic activity by using software
		5	Estimate unknown concentration by using various isolated preparation
BP 701 T	Instrumental Method of Analysis	1	Explain principle of spectroscopic techniques includes UV – Visible spectroscopy, fluorimetry, IRspectroscopy, Flame photometery, atomic absorbtion spectroscopy and nepheloturibidometry
		2	Illustrate instrumentation of UV –Visible spectroscopy, fluorimetry , IR spectroscopy, Flame photometery, atomic absorbtion spectroscopy and nepheloturibidometry
		3	Apply spectroscopic methods for quantitative & qualitative analysis of drugs using UV –Visible spectroscopy,

Principal
Pravara Rural College of Pharmacy
Pravaranagar, At.Loni-413 736

			fluorimetry , IR spectroscopy, Flame photometery, atomic absorbtion spectroscopy and nepheloturibidometry methods
		4	Explain principle of chromatographic techniques including paper chromatography , thin layer chromatography ,column chromatography , HPLC, HPTLC , Ion exchange chromatography , gel chromatography
		5	Illustrate instrumentation of chromatographic techniques including paper chromatography , thin layer chromatography ,column chromatography , HPLC, HPTLC , Ion exchange chromatography , gel chromatography
		6	Apply chromatoghraphic methods for quantitative & qualitative analysis of drugs using HPLC,TLC, Paper,coloum,GC-Chromatographic methods
BP702T	Industrial Pharmacy-II	1	discuss the process of pilot plant scale up, relevant documentation, and SUPAC guidelines for manufacturing of solids, Liquid orals, and semisolid dosage form.
		2	outline WHO guidelines for technology transfer with respect to production, documentation, quality management of pharmaceuticals, and regulatory bodies for approval and commercialization.
		3	explain role and requirement of regulatory affairs & authorities involved in various stages of drug development including from non-clinical stages to clinical studies.
		4	explain quality management system of pharmaceuticals and various certification agencies defining the quality standards.
		5	summarize the approval process and regulatory requirements for new drug products.
BP 705 P	Instrumental Method of Analysis	1	Apply various UV spectroscopic methods of analysis for Quantitative analysis of Drug.
		2	Use various chromatographic techniques for the separation and isolation of compounds

Principal
Pravara Rural College of Pharmacy
Pravaranagar, A/p.Loni-413 736

		3	Measure the fluorescence by using Fluorimeteric
		4	Detect alkali metal by using Flame Photometer
BP704T	Novel Drug Delivery System	1	Summarize the concept and apllications of Novel Drug Delivery system
		2	Apply various principals of drug release in designing of controlled release formulations by using different classes of polymers
		3	Discuss types, methods of preparation and applications of microencapsulation
		4	Explain applications of liposomes ,nanosomes ,nanoparticals and monoclonal antibodies in develoment of targeted drug delivery dosage forms
		5	Discuss formulation ,evaluation and applications of Drug Delivery systems like Mucoadhesive, Implants, Transdermal, Gastroretentive, Nasopulmonary, Ocular and Intrauterine
	Practice School	1	Identify appropriate literature for design of experiments.
		2	Illustrate various steps involved in experimental design
		3	Use of various tools to conduct designed experiments
		4	Analyze results of experiments
		5	Prepare a written report on activities conducted in practice school
		6	Explain the design and results of activities conducted in practice school by using suitable communication skill

Principal
Pravara Rural College of Pharmacy
Pravaranagar, At.Loni-413 736

First Year B.Pharmacy Semester-II			
Course code	Course Name	Course Outcome	
BP201T	Human Anatomy and Physiology II – Theory	1.	Explain anatomical organization, morphology & physiological functions of the Nervous system with their disorders
		2.	Explain anatomical organization, morphology & physiological functions of the Digestive system and Energetics with their disorders
		3.	Explain anatomical organization, morphology & physiological functions of the Respiratory system and Urinary system with their disorders
		4.	Explain anatomical organization, morphology & physiological functions of the Endocrine system with their disorders
		5.	Explain anatomical organization, morphology & physiological functions of the Reproductive system and genetics with their disorders.
BP202T	Pharmaceutical Organic Chemistry I – Theory	1.	Describe basic principle of organic chemistry and its significance.
		2.	Explain classification IUPAC, Nomenclature and isomerism of given organic compound.
		3.	Understand reaction synthesis important of alkene, alkane, conjugated dines.
		4.	Understand reaction synthesis important of carbonyl compound.
		5.	Understand reaction synthesis important of carboxylic acid.
BP203T	Biochemistry – Theory	1.	Classify biomolecules with chemical nature & significance.
		2.	Illustrate metabolic pathway of carbohydrate in physiological & pathological condition
		3.	Explain biological oxidation process &bioenergetics involved in biological reactions
		4.	Describe metabolic pathway of lipid, amino acids & its metabolic disorder.
		5.	Understand the genetic organization of mammalian genome and functions of DNA in synthesis of RNA and proteins.
		6.	Discuss types, mechanism of action& application of enzymes.

Principal
Pravara Rural College of Pharmacy
Pravaranagar, At.Post-Loni-413 736

BP204T	Pathophysiology – Theory	1.	Understand basic principles of cell injury its adaptations and process of inflammation.
		2.	Understand etiology and pathogenesis of cardiovascular, respiratory and renal disorders.
		3.	Describe pathophysiology and complications of hematological, endocrine, nervous and gastrointestinal system.
		4.	Summarize signs and symptoms of different inflammatory diseases, diseases of bones, joints and cancer.
		5.	Explain etiology and pathogenesis of infectious diseases.
BP207P	Human Anatomy and Physiology II – Practical	1.	Study of Nervous, Endocrine ,digestive, respiratory, cardiovascular ,urinary ,reproductive, integumentary system and special senses with the help of models, charts and specimens.
		2.	Demonstrate general neurological examination, the function of olfactory nerve, visual acuity, reflex activity , positive and negative feedback mechanism and total blood count by cell analyser.
		3.	Record body temperature,basal mass index, determine DLC, arneth index, platelet count and osmatic fragility.
		4.	Examine the different types of taste and determine tidal volume and vital capacity.
		5.	Identify the Permanent slides of vital organs and gonads and study family planning devices and pregnancy diagnosis test
BP208P	Pharmaceutical Organic Chemistry I– Practical	1.	Students should be able to know safety lab.
		2.	Students should be able to calibrate instrument like melting point/boiling point apparatus.
		3.	Students should be able to Identify different organic compound.
		4.	Students should be able to synthesis organic chemistry.
		5.	Students should be able to create molecular model.
BP209P	Biochemistry – Practical	1.	Identify primary metabolite in given sample of carbohydrate, protein & Amino acid by qualitative test.
		2.	Predict abnormal and normal constituents in urine sample.
		3.	Prepare and measure the PH of buffer solutions.

Principal
Pravara Rural College of Pharmacy
Pravaranagar, At.Post.Loni-413 736

		4.	Analyze the factor such as temp, concentration & time affect enzyme activity
		5.	Investigate the clinical significance of creatinine Glucose, proteins and serum total cholesterol in blood.
Second Year B. Pharmacy Semester-IV			
BP401T	Pharmaceutical Organic Chemistry III– Theory	1.	Explain fundamentals of sterochemical aspect and chiral molecule of organic compound.
		2.	Summarize stereoisomerism and Stereospecific reactions of organic compound and condition for optical activity.
		3.	Apply nomenclature fundamentals to various class of heterocyclic compounds.(level3)
		4.	Explain variousrearrangement reactions used in synthesis of organic compound. (level2)(unit 5)
		5.	Summarize synthesis, their reactions and medicinal uses of specified class of heterocyclic moieties. (level 2) unit-3 and 4 ,16hrs
BP402T	Medicinal Chemistry I – Theory	1.	Describe the concept and contribution of scientist in the development of Medicinal Chemistry.
		2.	Discuss concept historical aspect of medicinal chemistry and effect of physicochemical properties on biological action of drug.
		3.	Explain principle of phase I and phase II and factors affecting these phases.
		4.	Classify drugs acting on Autonomic nervous system and Central nervous system based on their chemical structure.
		5.	Explain relationship between chemical structure and biological activity of specified drugs acting on Autonomic nervous system and Central nervous system.
BP403T	Physical Pharmaceutics II –	1.	determine the particle size and the size distribution by using microscopic and sieving techniques
		2.	Determine the bulk density, true density , porosity and the angle of repose of powders.
		3.	Demonstrate the use of Ostwald's and Brookfield's viscometer to determine the viscocity of liquids and semisolids.
		4.	Experiment effect of suspending agents and their concentration on the sedimentation volume

Principal
Pravara Rural College of Pharmacy
Pravaranagar, At.Post-Loni-413 736

		5.	Determine the reaction rate constant using the specified experiments.
BP404T	Pharmacology I – Theory	1.	Discuss various branches of pharmacology, source of drugs, route of drug administration and principles of pharmacokinetics
		2.	Discuss principles of receptor and non receptor mediated mechanism of drug action and factors modifying drug action
		3.	Explain adverse effects of drug, drug–drug interaction and new drug discovery process
		4.	Discuss classification, pharmacological effects, uses and adverse effects of drugs acting on Peripheral Nervous System
		5.	List out various neurotransmitters, their receptors and effects on CNS
		6.	Discuss classification, pharmacological effects, uses and adverse effects of drugs acting on Central Nervous System
BP405T	Pharmacognosy and Phytochemistry I– Theory	1.	Discuss the various metabolite pathways for formation of Secondary metabolites and their biogenetic studies using radioisotope techniques.
		2.	Summarize various techniques of extraction, isolation, purification and identification of secondary metabolites of crude drugs.
		3.	Utilize different techniques used in extraction of different secondary metabolites
		4.	Discuss isolation, identification and analysis of specified classes of secondsry metabolites
		5.	Discuss industrial production,estimation and utilization of specified secondary metabolites.
BP406P	Medicinal Chemistry I – Practical	1.	Prepared purified organic compounds using a given synthetic procedure.
		2.	To purified specified organic compounds using a Column chromatography techniques.
		3.	To perform physicochemical properties of drugs.
		4.	To understand about TLC and other purification techniques.
BP407P	Physical Pharmaceutics II – Practical	1.	determine the particle size and the size distribution by using microscopic and sieving techniques
		2.	Determine the bulk density, true density , porosity and the angle of repose of powders.
		3.	Demonstrate the use of Ostwald's and Brookfield's viscometer to determine the viscocity of liquids and semisolids.

Principal
Pravara Rural College of Pharmacy
Pravaranagar, At.Post-Loni-413 736

		4.	Experiment effect of suspending agents and their concentration on the sedimentation volume
		5.	Determine the reaction rate constant using the specified experiments.
BP408P	Pharmacology I – Practical	1.	Discuss Various branches of experimental pharmacology and discuss in detail various terminologies of experimental pharmacology
		2.	Study working and principle of different instruments used in In Vivo and in vitro experimental pharmacology
		3.	Explain in detail various animals used in experimental pharmacology along with their handling and maintenance as per CPCSEA Guidelines.
		4.	Illustrate common laboratory techniques used for animal study.
		5.	Describe different routes of administration of drug in Lab animals along with its dosage form .
		6.	Demonstrate different activity of drug on animals and record its response on them and understand pharmacological action of different categories of drug
BP409P	Pharmacognosy and Phytochemistry I – Practical	1.	Evaluate morphology, Microscopy, Powder characteristics, extraction & detection of crude drugs.
		2.	Apply techniques of extraction and detection of isolated active constituents from crude drug.
		3.	Analyze and identify the extracts of crude drugs by using various chromatographic techniques like paper, TLC.
		4.	Analyze and identify the extracts of crude drugs by steam distillation method.
		5.	Identify unorganized powdered drugs by powder microscopy, physical, chemical, morphological, characteristics
Third Year B Pharm Semester VI			
BP601T	Medicinal Chemistry III – Theory	1.	Classify anti-infective and antineoplastic agents based on their chemical structure
		2.	Explain relationship between chemical structure and biological activity of specified anti-infective and antineoplastic agents

Principal
Pravara Rural College of Pharmacy
Pravaranagar, At.Post-Loni-413 736

		3.	Illustrate chemical synthesis pathway of specified drug molecules
		4.	Explain the relationship between QSAR and physicochemical properties of drug molecules and various approaches of drug design
BP602T	Pharmacology III – Theory	1.	To Understand the mechanism of drug action and its relevance in the treatment of respiratory and gastrointestinal disorders.
		2.	To discuss about pharmacology and pharmacotherapy of drugs used in infectious diseases.
		3.	To analyse about drugs used in malignancy
		4.	To explain concept of Immunopharmacology
		5.	To describe basic concepts of chronopharmacology and Toxicology.
BP603T	Herbal Drug Technology – Theory	1.	Evaluate Phytochemical screening and excipients from natural origin by physical & chemical tests
		2.	Develop & evaluate herbal cosmetic and Ayurvedic Formulation as per pharmacopoeial requirements.
		3.	Apply specific procedures for analysis of herbal drugs as per Pharmacopoeias.
		4.	Identify the contents of various ayurvedic formulations and herbal drugs.
BP604T	Biopharmaceutics and Pharmacokinetics – Theory	1.	Discuss the processes, factors affecting and related parameters of drug absorption, distribution, metabolism and excretion.
		2.	Explain concept of bioavailability, bioequivalence, regulatory requirements of bioequivalence and biowaivers studies.
		3.	Explain methods to enhance bioavailability of poorly soluble drugs
		4.	Explain various pharmacokinetic compartment models, associated pharmacokinetic parameters and their applications in pharmacokinetic studies of drug.
		5.	Discuss concept of non-linear pharmacokinetics, Michaelis menton equation and determination of Vmax, Km.
BP605T	Biotechnology – Theory	1.	Define various biotechnological techniques and its application in pharmaceuticals
		2.	Discuss principles of genetic engineering and DNA technology and their application in

Principal
Pravara Rural College of Pharmacy
Pravaranagar, At.Loni-413 736

			production of interferon, hepatitis B vaccine, and insulin.
		3.	Describe type of Immunity and general method and hybridoma technology in the immunological products.
		4.	Explain the process of microbial gene expression, DNA damage and repair in microbial genetics.
		5.	Explain fermentation technology and its application in production of different pharmaceutical products.
BP606T	Quality Assurance – Theory	1.	Summarize the concept of quality assurance, TQM, cGMP, GLP, QBD and ware housing practices in pharmaceutical industry
		2.	Compare guidelines of different regulatory agenciesincluding CDSCO, USFDA,WHO, ICH for pharmaceuticals
		3.	Discuss role and requirement of organization, personnel, premises, equipment, raw material and packaging material towards QMS in pharmaceutical industry
		4.	Discuss concept, type and application of calibration and validation technique in TQM
		5.	Summarize document maintenance and handling of complaints in pharmaceutical industry
BP607P	Medicinal chemistry III – Practical	1.	Prepare specified organic compounds using a synthetic procedure
		2.	Prepare specified organic compounds using microwave assisted synthetic procedure
		3.	Write structures and reactions using Chem draw software
		4.	Determine physicochemical properties of drug using drug design software
BP608P	Pharmacology III – Practical	1.	To understand anti-ulcer activity, gastrointestinal motility, serum biochemical parameters, Hypoglycemic effect
		2.	To perform oral toxicity,skin irritation, eye irritation, pyrogens test
		3.	To analyse biostatistics, mydriatic and miotic effects

Principal
Pravara Rural College of Pharmacy
Pravaranagar, At.Post-Loni-413 736

		4.	To demonstrate bioassay of acetylcholine, serotonine
BP609P	Herbal Drug Technology – Practical	1.	Evaluate Phytochemical screening and excipients from natural origin by physical & chemical tests
		2.	Develop & evaluate herbal cosmetic and Ayurvedic Formulation as per pharmacopoeial requirements.
		3.	Apply specific procedures for analysis of herbal drugs as per Pharmacopoeias.
		4.	Identify the contents of various ayurvedic formulations and herbal drugs.
Final Year B.Pharmacy Semester-VIII			
BP801T	Biostatistics and Research Methodology	1	Calculate measure of centre of data and spread of data using mean,median, mode, standard deviation and standard error.
		2	Explain concepts of correlation,various correlation coefficient and regration concepts.
		3	Explain concept of probability in sampling techniques used testing and research.
		4	Summarise parametric and nonparametric statistical test in reasearch data analysis
		5	Explain characteristics,approach and process of research.
		6	Choose appropriate study design and graphs in different type of reasearch and handling of research data.
		7	Develop scientific report and research protocol
		8	Use statastical softwares package including SPSS,Minitab,Design of Expert for computation with data.
BP802T	Social and Preventive Pharmacy	1	Explain the concept of health, prevention of diseases & social aspects regarding health
		2	Describe the prevention & control of diseases.

Principal
Pravara Rural College of Pharmacy
Pravaranagar, At.Post-Loni-413 736

		3	Discuss the various national health programmes with objectives and outcomes to control the diseases.
		4	Describe the community services which is responsible for improvement of health in rural as well as urban areas.
BP805ET	Pharmacovigilance	1	To Describe Basics Involved In Pharmacovigilance And Adverse Drug Reaction.
		2	Understand Various Terminology Of Pharmacovigilance , Dictionaries , Coding Along With Drug And Disease Classification .
		3	To Illustrate Various Methods And Communication Techniques In Pharmacovigilance.
		4	Explain ICH Guideline For ICSR, PSUR , Expedited Reporting , Pharmacovigilance Planning
		5	Discuss About Drug Safety Evaluation And Pharmacogenomics In Pediatrics, Geriatrics, Pregnancy And Lactation
BP806ET	Quality Control and Standardization of Herbals	1	To Understand WHO guidelines for quality control of herbal drugs
		2	To Understand the GMP, GLP and GDP while working in pharmaceutical industry with document and record
		3	To discuss the regulatory approval process and their registration in Indian and international markets
		4	To Recognize EU and ICH guidelines for quality control of herbal drugs.
BP809ET	Cosmetic Science	1	List out various cosmetic and cosmeceutical products and their regulations as OTC product.
		2	Explain basic structure, growth cycle of skin, hair, oral cavity and conditions associated with them as a target for cosmetic products.
		3	Apply principles of formulations and building blocks including excipients of skin care products, hair care products and oral care products.

Principal
Pravara Rural College of Pharmacy
Pravaranagar, At.Post-Loni-413 736

		4	Apply the basics of formulation science to formulate various types of cosmetic formulations using suitable building blocks and excipients.
		5	Analyse quality of cosmetics based on their efficiency on respective substrate using various measuring tools.
		6	Discuss role of herbs in cosmetic formulation with respect to specified skin care, oral care and hair care products.
		7	Discuss BIS specification and analytical methods for shampoo, skin cream and toothpaste.
BP813PW	Project Work	1	Set the objectives of research using current literature
		2	Use appropriate sources and techniques to conduct research and data analysis
		3	Evaluate results in relation to the research question and the existing literature
		4	Rate the research findings in relation to its scope and limitations
		5	Write an extended scientific report and show research skills (including the use of library and web resources)
		6	Demonstrate good oral communication skills
		7	Demonstrate a detailed knowledge and understanding of one area of pharmaceutical science at, or an approach to research

Principal
Pravara Rural College of Pharmacy
Pravaranagar, At.Post-Loni-413 736

F.Y.M.Pharm			
SEM-I			
Course Code	**Course Name**	**CO**	**Course Outcome Statement**
MPC 101T	Modern Pharmaceutical Analytical Techniques	1	To describe and understand identification characterization and quantification ofdrugs using instrumentaltechniques.
		2	To learn and understand principle and instrumentation ofdifferent spectroscopictechniques.
		3	To learn and understand principle and instrumentation ofdifferentchromatographic techniques
		4	To learn and understand principle and instrumentation ofelectrophoresis and Xraytechniques
		5	To understand application of different instrumentaltechniques.
MQA102T	Quality Management System	1	To explain the importance of quality, justify the parameteraffect the quality.
		2	To understand the six system inspection model.
		3	To explain drug stability and justify design & processdevelopment.
		4	To examine the statistical process control for quality & toplan for statisticalprocess control.
MQA103T	Quality Control and Quality Assurance	1	To explain concept of Quality Control, Quality Assurance and Documentation in pharmaceutical industry.
		2	To discuss cGMP guidelines and use of it in pharmaceutical industry.
			To investigate raw material and finished product.
		4	To illustrate Manufacturing operations and controls:Sanitation of manufacturingpremises.

Principal
Pravara Rural College of Pharmacy
Pravaranagar, A/p.Loni-413 736

MQA104T	Product Development andTechnology transfer	1	To describe and understand the principles of new drugdiscovery and development
		2	To explain role of preformulation, stability study andpilot plant scale up in drugproduct development
		3	To explain role of packaging material in pharmaceutical dosage form and theirquality control test
		4	To discuss and apply various aspects of technology transfer from R&D to actualmanufacturing
MQA105P	Pharmaceutical quality assurance Practical	1	To Analyse quantitatively organic and inorganicconstituents by usingInstrumental Methods of Analysis.
		2	To build case studies and protocol of various processes of quality assuranceand quality control
		3	To evaluate preformulation parameters, in process,finished product andpackaging material quality.

Principal
Pravara Rural College of Pharmacy
Pravaranagar, A/p.Loni-413 736

Pharmaceutical Chemistry			
MPC102T	Advance Organic Chemistry 1	1	To understand the various intermediate formed in organic reactions and mechanisms of reactions
		2	To describe the mechanism & applications of various named reactions
		3	To discuss application of catalysts, Synthetic Reagents and protectinggroups used in organic reactions
		4	To Explain the chemistry of heterocyclic compounds and to studySynthesis of few representative drugs containing these heterocyclic nucleus
		5	To elaborate the principles and applications of reterosynthesis and theconcept of disconnection to develop synthetic routes for small target molecule
MPC 103T	Advanced Medicinal Chemistry	1	To Understand the importance of drug design anddifferent techniques ofdrug design.
		2	To Know design & development of Medicinal Chemistry drug study of Anti–hypertensive drugs, psychoactive drugs, Anticonvulsant drugs, H1 & H2 receptor antagonist, COX-1 &COX-2 inhibitors, Alzheimer's and Parkinson's disease, Antineoplastic and Antiviral agents.
		3	To Understand design and development ofpeptidomimetics.
		4	To Explain development of Rational Design of EnzymeInhibitors
		5	To Understand the importance of Pro drug Design andAnalog design
MPC 104T	Chemistry of Natural Products	1	To understand different types of natural compounds andtheir chemistryand medical importance
		2	To apply the importance of natural compound as leadmolecule for newdrug discovery.
		3	To analyze general methods of structural elucidation of compounds of natural origin
		4	To evaluate isolation, purification, and characterization ofsimple chemical constituent from natural source

Principal
Pravara Rural College of Pharmacy
Pravaranagar, A/p.Loni-413 736

MPC 105P	Pharmaceutical Chemistry Practical – I	1	To learn the concept of disconnection to developsynthetic routes for small target molecule.
		2	To understand and impart knowledge about recent advances in the field of medicinal chemistry at the molecular level including different techniques for the rational drug design.
		3	To learn designed to provide detail knowledge about chemistry of medicinal compounds from various reagents and general methods of structural elucidation ofsuch compounds. It also emphasizes on isolation, purification and characterization ofmedicinal compounds
		4	To Explain development of different techniques of organic synthesis and their applications to process chemistry aswell as drug discovery.
		5	To examine the importance of recent advances in the field of medicinal chemistry at the molecular level including different techniques for the rational drug design.
Pharmacognosy (SEM-I)			
MPG102T	Advanced Pharmacognosy I	1	To get Brief knowledge about specific care in herbal material, & various approaches in extraction processes with theirtheoretical consideration, methodological steps, & applications.
		2	To Know various chromatographic & non- chromatographic separation methods.
		3	To understand theoretical source material & extraction methods of phytochemicals specified; andto draw schematic representation of such processes.
		4	To Study need of analysis of natural products & explaintheir significance; Understand & explain various parameters with their principles, significance & applications.
MPG103T	Phytochemistry	1	To discuss the skills for Separation of the active constituents obtainedfrom natural sources and different methods of separation .
		2	To identify the active ingredients and methods to evaluate natural

Principal
Pravara Rural College of Pharmacy
Pravaranagar, A/p.Loni-413 736

			components .
		3	To explain the actual process of Herbal Drug discoveryand development.
		4	To compare and contrast extraction, Isolation andPhytochemical analysis of Natural products.
		5	To predict the principle of sophisticated instruments and To study of chromatographic fingerprinting methods
MPG104T	Industrial Pharmacognostical technology	1	To identify requirement for setting of herbal drugindustry.
		2	To learn guidelines for quality and regulatory issues ofherbal /natural medicines .
		3	To explain and compare general parameters of monographs of herbal drugs asper various pharmacopeia.
		4	To assess various clinical laboratory and stability testingof herbal drugs.
		5	To learn patenting of herbal/natural drugs.
MPG105P	Pharmacognosy Practical I	1	To illustrate the Pharmacopoeial compounds of natural origin and formulations byUV Vis spectrophotometer.
		2	To design Estimation of sodium/potassium by flame photometry
		3	To investigate Development of fingerprint of medicinalplant extracts used in herbal drug industry by TLC/HPTLC method.
		4	To identify the Methods of extraction and phytochemical screening
		5	To predict the Monograph analysis of clove oil and castor oil.
Pharmaceutics SEM-I			
MPH 102T		1	To explain various principles of drug release in designing of Sustained and control release formulations by using different classes of polymers

Principal
Pravara Rural College of Pharmacy
Pravaranagar, A/p.Loni-413 736

	Drug Delivery System	2	To explain the concept and apllications of Personalized medicines and Customized DDS,Bioelectric medicines,3D printing ,Telepharmacy
		3	To summerize the principles and funadamentals of rate controlled DDS like Activation Modulated,Mechanically activated,PH-activated,Enzymes activated and Osmotic activated,Feedback regulated
		4	To discuss concept,principles formulation ,evaluation and applications of Gastro-retentive,Ocular,Transdermal.
		5	Illustrate the need and application of novel strategies in delivery of biosimilars like proteins, peptides and vaccines
MPH 103 T	Modern Pharmaceutics	1	Summerize the concept and importance of preformulation parameters for diffrent formulations.
		2	Explain optimization techniques and their applications in pharmaceutical industries.
		3	Apply ICH and WHO guidelines for calibration and validation of equipments
		4	Explain the importance of industrial management principles and GMP Considerations.
		5	Illustrate the compression and consolidation parameters for powders and granules in tablet development.
		6	Describe Dissolution parameters and Pharmacokinetic parameters, Similarity factorsfor designing of dosage form.
MPH 104T	Regulatory Affaires	1	Differentiate the concepts of innovator and generic drugs in drug development process
		2	To describe Regulatory requirements for new drug application approval in pharmaceuticals
		3	To explain ICH guidelines for filing and approval process of drug products in different countries
		4	To enumerate the documents required for submission in CTD/eCTD

Principal
Pravara Rural College of Pharmacy
Pravaranagar, A/p.Loni-413 736

		5	Illustrate the regulatory procedures involved in non-clinical and clinical drug development
		6	Apply the principles of regulatory affairs in drug development process, filing and approval, non-clinical and clinical drug development in global scenario
MPH 105 P	Pharmaceutics Practical -I	1	Analyze pharmacopoieal compounds and their single and multi component containing formulations by UV spectrophotometry
		2	Measure % purity of Compounds by using Fluorimeteric methods
		3	Measure Alkali metals by using Flame Photometer
		4	Assess marketed CR/SR formulation as per pharmacopial standard.
		5	Prepare and evaluate sustained release ,osmotically controlled floating,Muco-adhesive and Transdermal Drug delivery systems
		6	Illustrate effect of compressional force on tablet disitegration time , particle size and binders on dissolution of tablets.
		7	Assess the preformulation studies of tablets
		8	Construct the Heckal ,Higuchi and Peppas plot
M. Pharm Pharmacology SEM-I			
MPL 102T	Advanced Pharmacology-I	1	Understand Pharmacokinetics and Pharmacodynamic concepts related to drugs and its applications
		2	Study and get the knowledge of neurohumoral transmission of drug with regards to ANS,CNS and NANC and relate the drug acting on the ANS
		3	Study and relate the drug acting on the CNS and CVS.
		4	Get in depth knowledge of Autocoid Pharmacology to utilize in the field of drug science.

Principal
Pravara Rural College of Pharmacy
Pravaranagar, A/p.Loni-413 736

MPL 105P	Pharmacology Practical-I	1	Carry out estimation of compounds and study and use the knowledge by different analytical tools.
		2	Study various in-vivo experiments using experimental animals to investigate the effect of drugs using different pharmacological screening models.
		3	Get in depth knowledge of various techniques in biotechnological processes to utilize in the field of drug science
MPL 104T	Cellular & Molecular Pharmacology	1	Understand Cell Biology and cell signaling pathways which includes receptors, secondary messangers and intracellular signaling pathways to correlate the effect of drug at molecular level.
		2	Study r-DNA technology,gene therapy and different DNA analysis methods and relatE it to molecular pharmacology.
		3	Study pharmacogenomics and immunotherapeutics and use it to know the applications of proteomic science.
		4	Get in depth knowledge of cell culture techniques, cell viability assay, glucose uptake assay, calcium influx assay, and use it in the field of drug science.
MPL 103T	Pharmacological and Toxicological Screening Methods–I	1	To discuss regulations and ethical requirement for the usage of experimental animals
		2	To describe the various animals used in the drug discovery process and good laboratory practices in maintenance and handling of experimental animals
		3	To describe preclinical screening of new substances for the pharmacological activity using in vivo, in vitro and other possible alternative methods in animals
		4	To illustrare the various newer screening methods involved in the drug discovery process

Principal
Pravara Rural College of Pharmacy
Pravaranagar, A/p.Loni-413 736

F.Y.M.Pharm			
SEM-II			
Course Code	**Course Name**	**CO**	**Course Outcome Statement**
MQA201T	Hazards and safety Management	1	To explain Natural resources and associated problems
		2	To discuss Types of Hazards and its prevention.
		3	To Classify chemical based hazards and their controlmeasures.
		4	To describe and illustrate Fire and Explosion hazards andPreventive and protectivemanagement from fires and explosion
		5	To describe and compose Hazard and risk management
MQA202T	Pharmaceutical Validation	1	To describe various aspects of validation and IPR
		2	To discuss and apply the concepts of validation of equipment and instruments,analytical methods and cleaningprocesses in pharmaceutical manufacturing
		3	To discuss and Design validation documents, plant lay out of processing and testing area, check list for pharmaceuticalmanufacturingprocesses
MQA203T	Audits and regulatory compliance	1	To explain the importance of auditing.
		2	.To compose the auditing report and check list for auditing
		3	To plan out the audit process.
		4	To compose the auditing report And check list forauditing.
		5	To illustrate the methodology of auditing
MQA204T	Pharmaceutical manufacturing technology	1	To identify the legal requirements and licenses for API &formulation industry andJustify the plant location factors influenced on API & formulation industry.
		2	To design & construct Non sterile manufacturing processtechnology inpharmaceutical industry
		3	To explain the importance of Quality by design (QbD)and process

Principal
Pravara Rural College of Pharmacy
Pravaranagar, A/p.Loni-413 736

			analyticaltechnology in pharmaceutical industry.
		4	To design and construct aspectic process technology inpharmaceutical industry.
MQA205P	Pharmaceutical Quality assurance Practical II	1	To Validate equipment and instruments, analyticalmethods and cleaningprocesses
		2	To Design validation documents, plant lay out of processing and testing area,check list for pharmaceuticalmanufacturing processes
		3	To build case studies of various processes of qualityassurance and quality control
		4	To Analyse quantitatively organic and inorganic constituents by usingInstrumental Methods of Analysis
F.Y.M.Pharm (SEM-II) Pharmaceutical Chemistry			
MPC 201 T	Adavanced spectralAnalysis	1	To discuss interpretation of organic compound by usingUV,IR ,mass spectroscopy
		2	To understand theoretical technique of NMR spectroscopy and assess organiccompound using NMR data
		3	To explain principle, instrumentation and application Chromatographic and itshyphenated analytical technique
		4	To illustrate principle, instrumentation and use of DTA,DTA and TGA.
		5	To discuss the general theory and principles of bioassay ,ELISA and assessquantity of Digitalis and insulin
MPC202T	Advance Organic Chemistry 2	1	To discuss the principle of Green Chemistry and use techniques of greenchemistry in synthesis of pharmaceutical compounds.
		2	To understand Chemistry of peptides and use solid phase and solution phasesynthesis reaction for synthesis of pharmaceutical compounds.
		3	To learn principle and mechanism for photochemical andpericyclic reaction
		4	To explain basic concept of Stereochemistry

Principal
Pravara Rural College of Pharmacy
Pravaranagar, A/p.Loni-413 736

			&Asymmetric Synthesisusing chiral pool, chiral axillaries.
		5	To classify and explain use of various catalyst in heterogeneous and homogeneousreactions and transitional phase transfer, and bio catalysis reactions.
MPC 203 T	Computer Aided Drug Design	1	To understand the role of CADD in drug discovery
		2	To describe different CADD techniques and their applications
		3	To analyze the various strategies to design and developnew drug like molecules.
		4	To illustrate working with molecular modeling software"sto design new drugmolecules
		5	To describe the in silico virtual screening protocols.
MPC 204T	Pharmaceutical Process Chemistry	1	To illustrate the process chemistry and stages of scale-up.
		2	To understand the unit operation extraction, filtration, distillation, evaporation
		3	To learn the unit process of nitration , halogenations,oxidation, reduction
		4	To explain the fermentation of antibiotic, vitamin, static
		5	To understand industrial safety and fire hazards safety assessment series
MPC 205P	Pharmaceutical Chemistry Practical – II	1	To learn the designed to provide in–depth knowledge about advances in organicchemistry, different techniques of organic synthesis and their applications to process chemistry as well as drug discovery
		2	To impart knowledge on the development and optimization of a synthetic route/sand described as scale up reactions, taking them from small quantities created in the research lab to the larger quantities
		3	To Understand designed to provide detail knowledge about chemistry of medicinal compounds from various reagents and general methods of structural elucidation of such compounds. It

Principal
Pravara Rural College of Pharmacy
Pravaranagar, A/p.Loni-413 736

			also emphasizes on isolation, purification andcharacterization of medicinal compounds
		4	To examine development of different techniques of organic synthesis and theirapplications to process chemistry as well as drug discovery
		5	To learn the importance of recent advances in the field of medicinal chemistry atthe molecular level including differenttechniques for the rational drug design.
F.Y.M.Pharm (SEM-II) Pharmacognosy			
MPG201 T	Medicinal Plant Biotechnology	1	To provide students with the necessary skills tolearn different methods oftissue culture
		2	To study the various tissue culture techniques
		3	To explain the various immobilisation techniquesand to study the metabolites
		4	To learn various biotransformation techniques
		5	To learn various fermentation techniques
MPG202 T	Advanced Pharmacognosy II	1	To assess the Efficacy of Herbal medicine products
		2	To discuss the methods of screening of herbals for various biological properties
		3	To investigate the analytical profiles
		4	To investigate the analytical profiles of herbaldrugsof herbal drugs
		5	To examine ethnobotany in herbal drug evaluationand Impact ofEthnobotany in traditional medicine
MPG203T	Indian System of Medicine	1	Acquire knowledge of Primary concepts of traditional system of medicine as well as Formulationdevelopment and standardization of various traditionaldosage forms
		2	Describe the Basic principles and healing potentialsof Yoga, Naturopathy andAromatherapy.
		3	The course aims to provide students with the necessary skills in learning andacquiring knowledge in Formulation, development

Principal
Pravara Rural College of Pharmacy
Pravaranagar, A/p.Loni-413 736

			and standardization of varioustraditional formulations.
		4	To study Good manufacturing skills in traditional drug industry & Safety monitoring of herbal medicines. CO5:-To explain the Concepts of AYUSH,AYUSH, ISM, CCRAS, CCRS, CCRH, CCRU.
MPG204T	Herbal Cosmetics	1	To understand the basic principles of herbalcosmetics
		2	To learn the current good manufacturing practices ofherbal cosmetics
		3	To understand the various types of herbal cosmeticsused.
MPG205 P	Pharmacognosy-II	1	To illustrate the Isolation of nucleic acid.
		2	To design the Quantitative estimation of DNA,
		3	To identify total phenolic, total flavonoid contentand total alkaloid content inherbal raw materials.
		4	To investigate the Preparation and standardization ofvarious simple dosageforms from traditional medicine.
		5	To assess the herbal formulation and herbalcosmetic product.
MPH 201T	Molecular Pharmaceutics (Nano Technology & Targeted Dds) (Ntds)	1	To explain concepts and biological process involved in drug targeting system
		2	To discuss types ,preparation and evaluation of Nanoparticles,Liposomes,Microcapsules/microspheres,Intra nasal Route Delivery system
		3	To summerize the preparation and applications of Monoclonal antibodies,Niosomes,Aquasomes,Phtosomes,Electrosomes
		4	To explain the formulation aspects in respect to Aerosoles,propellents,containers in Pulmonary DDS
		5	To describe Applications of the potential target diseases for gene therapy
MPH 202 T		1	Understand the mechanisms and factors affecting ADME processes through GIT

Principal
Pravara Rural College of Pharmacy
Pravaranagar, A/p.Loni-413 736

	Advanced Biopharmaceutics & Pharmacokinetis	2	Discuss several biopharmaceutic considerations, BCS, IVIVC and permeability in drug product design and in vitro drug product performance
		3	Understand the impact of drug interactions on drug action
		4	Explain the protocol for bioavailability/bioequivalence studies and their role in generic product development
		5	Illustrate the assessment of pharmacokinetic parameters assuming different models
		6	Illustrate the application of pharmacokinetic principles in development of drug products and biosimilars
MPH 203 T	Computer Aided Drug Development	1	Explain the history of computers in pharmaceutical research and development
		2	Explain computational modeling of drug disposition
		3	Apply the approaches of optimization techniques in pharmaceutical formulation
		4	Understand the importance of computers in biopharmaceutical characterization
		5	Understand the role of computer simulations in PK-PD and clinical data management
		6	Illustrate the application of AI, robotics and CFD in pharmacy field
MPH 204T	Cosmetic and Cosmeceuticals	1	To explain the Regulatory provisions related to the import, manufacture and sale of cosmetics
		2	To describe the diverse skin problems and how to overcome through skin preparations
		3	To discuss key ingredients ,Formulation and evaluation of a variety of cosmetic products
		4	To explain the key ingredients and design of Cosmeceuticals products
		5	To explain the herbal ingredients and design of herbal cosmetics with their challenges
MPH 205P	Pharmaceutics Practical II	1	To demonstrate the practical skills in development and evaluation of novel systems

Principal
Pravara Rural College of Pharmacy
Pravaranagar, A/p.Loni-413 736

		2	To Demonstrate the BA studies, PK-PD analysis, and IVIVC
		3	To use computational tools in product development and optimization
		4	To explain the concept and application of PK-PD simulation models
		5	To explain the clinical data collection and population modeling
		6	To develop and evaluate cosmetics and cosmeceuticals
M. Pharm Pharmacology SEM-II			
MPL 201T	Advanced Pharmacology-II	1	Understand Cellular, molecular effects of drugs acting on endocrine system and study the action of different hormones and drugs regulating it.
		2	Study adverse effects, contraindications and clinical uses of various chemotherapeutic agents used in the treatment of diseases [L3: Applying].
		3	Study [L2: Understanding] and relate [L3: Applying] the pathophysiology and pharmacotherapy of drugs acting on Gastro Intestinal System.
		4	Get in depth knowledge [L1: Knowledge] of Biological and circadian rhythms & Free Radical Pharmacology to utilize [L3: Applying] in the field of drug science.
MPL 205P	Pharmacology Practical-II	1	Record DRC and determine potency & PA_2 or PD_2 of drug using different bioassay methods on suitable isolated tissue preparation
		2	Study Acute toxicity studies as per OECD guidelines and determine the effect of various drugs on heart, Blood Pressure of frog, rat using suitable computerized simulated software programme.
		3	Get in depth knowledge and study designing of protocol for clinical trial, ADR reporting and different docking studies.
MPL 202T	PTSM II	1	To impart knowledge on the preclinical safety and toxicological evaluation of drug and new chemical entity with regulatory aspects involved in it.

Principal
Pravara Rural College of Pharmacy
Pravaranagar, A/p.Loni-413 736

		2	To explain the various types of toxicity studies
		3	To appreciate the importance of ethical and regulatory requirements for toxicity studies
		4	To demonstrate the practical skills required for conducting the preclinical toxicity studies
MPL 203T	Principles of Drug Discovery	1	To impart basic knowledge of drug discovery process.
		2	Explain the various stages of drug discovery and the importance of the role of genomics, proteomics and bioinformatics in drug discovery
		3	To explain various targets, biomarkers and in vitro screening techniques, various lead seeking methods and lead optimization for drug discovery
		4	To appreciate the importance of the role of computer aided drug design in drug discovery.
MPL 204T	Clinical Research and Pharmacovigilance	1	To strengthen the basic knowledge in the field of clinical research and pharmacovigilance.
		2	To explain the regulatory requirements for conducting clinical trial and demonstrate the types of clinical trial designs.
		3	To explain the responsibilities key personnel involved in clinical trials and execute safety monitoring, reporting and close-out activities
		4	To explain the principles of Pharmacovigilance, detect new adverse drug reaction and their assessment and perform the adverse drug reaction reporting systems and communication in Pharmacovigilance
F.Y.Pharm D.			
1.1	Human Anatomy and Physiology	1	Define the basic concepts in Human Anatomy & Physiology
		2	Apply concepts and knowledge of Human Anatomy & Physiology to clinical scenarios.

Principal
Pravara Rural College of Pharmacy
Pravaranagar, A/p.Loni-413 736

		3	Explain how the separate systems interact to yield integrated physiological responses.
		4	Link the physiology and pathophysiology of several diseases
		5	Critically interpret the common laboratory values in medicine.
		6	Use scientific laboratory equipment in order to gather and analyze data on human anatomy and physiology
1.2	Pharmaceutics	1	To define the profession of pharmacy and pharmacoepias
		2	To outline the classification of dosage forms and summarise importance of prescription and posology
		3	To develop monophasic and biphasic liquid dosage forms
		4	To simplify and preapare suppositories
		5	To explain the concept of surgical aids and galenicals
		6	To elaborate the importance of pharmaceutical incompatibilities and solve calculation
1.3	Medicinal Biochemistry	1	To recall the importance of biochemistry, catalytic activity, mechanism of action and applications of enzymes.
		2	To understand the metabolism of carbohydrates, lipids, electron transport chain and ATP formation
		3	To apply the clinical chemistry knowledge in diagnosis and prognosis of diseases.
		4	To simplify the metabolism and disorders associated with nucleic acids and amino acids
		5	To interpret the genetic organization of mammalian genome, study protein synthesis and DNA replication.
		6	To elaborate the knowledge on immunochemical techniques and their applications

Principal
Pravara Rural College of Pharmacy
Pravaranagar, A/p.Loni-413 736

1.5	Pharmaceutical Inorganic Chemistry	1	Explain various of type, sources & minimization of errors & significant figure for measurements of errors.
		2	Describe the concepts of various Volumetric analysis methods like acid-base, Redox, complexometry, non-aqueous, gravimetry titration and theory of indicators.
		3	Explain various of type, sources & significance of impurities & procedure involved in their identification with their official limit in pharmaceutical substances.
		4	Describe various medicinal gases with their introduction, preparation, storage condition, uses of specified gases.
		5	Classify various inorganic agents used in preparation of acidifier, antacid, catheretics, antimicrobial as gastrointestinal agents including monograph of specified agents
		6	Summarize physiological function of ion & acid bace balance with their significance & monograph of specified electrolyte preparation of electrolyte replacement therapy solution and essential trace elements.
		7	Classify various inorganic agents used in preparation of Dental product,Pharmaceutical Aid, Expectorant, Emetics, Antidotes, Haematinics, Astringent agents including their monograph of specified agents.
		8	Explain principle & measurement of radiation therapy including handling, storage & uses of specified radio isotopes.
1.4	Pharmaceutical organic Chemistry	1	To understand general Structures and Physical properties and Nomenclature of organic compounds
		2	To summarize different theories related to stability of cycloalkane/ Alicyclic compounds and method of preparation of Alicyclic compounds. (level 5)

Principal
Pravara Rural College of Pharmacy
Pravaranagar, A/p.Loni-413 736

		3	To discuss Free radicals chain reactions of alkane; Nucleophilic SN1, SN2 reaction and Electrophilic E1, E2 reaction and free radicals addition mechanism
		4	To explain general methods of preparation and reactions Electrophilic aromatic substitution mechanism Nucleophilic addition reaction and theory of resonance
		5	To summarize different reaction and Mechanism of Aldol condensation, Claisen condensation, Cannizzaro reaction, crossed Aldol condensation, crossed Cannizzaro reaction, benzoin condensation, Hoffman rearrangement, Williamson synthesis, Fries rearrangement, Kolbe reaction, Reimer tie man'sreactions. etc
		6	To understand Oxidation reduction reaction
		7	To summarize different preparation, test for purity, assay and medicinal uses of organic compounds
F.Y.D.Pharmacy			
C101	Pharmaceutics-I (TH)	1	Describe historical aspects and significance of pharmacy profession and pharmacopoeias.
		2	Explain briefly about properties advantages, disadvantages, preparation, quality control test and packaging of various dosage forms
		3	Discuss principle and application of unit operations used in pharmaceutical preparations including construction and working of specified equipments.
		4	Outline quality control, cGMP, quality assurance concepts and layouts of pharmaceutical manufacturing units

Principal
Pravara Rural College of Pharmacy
Pravaranagar, A/p.Loni-413 736

		5	State various class of novel drug delivery systems and their advantages.
		6	Recognize various organoleptic pharmaceutical aids and preservatives.
C102	Pharmaceutical Chemistry I(TH)	1	Explain source of errors & pharmaceuticals impurities and procedures of various limit tests.
		2	Explain various volumetric and gravimetric analytical methods of drug estimation.
		3	Describe the chemical name, chemical formula, uses, marketed preparations and storage of inorganic pharmaceuticals
		4	Discuss classification, their formulations, stability, storage conditions, uses, popular brands of drugs belonging to different types of heterocyclic compounds acting on different organ systems along with chemical name and structure of specified compounds.
C103	Pharmacognosy(TH)	1	Discuss history of Pharmacognosy, classification & quality control of plant origin drugs.
		2	Explain occurrence, distribution, isolation, identification tests, therapeutic activity and pharmaceutical applications of different secondary metabolites.
		3	Identify the important/common crude drugs of natural origin.
		4	Describe the uses of herbs in nutraceuticals and cosmeceuticals
		5	Discuss the principles of alternative system of medicines
C104		1	Discuss the concept of anatomy,physiology,organ system and homeostasis

Principal
Pravara Rural College of Pharmacy
Pravaranagar, A/p.Loni-413 736

	Human Anatomy and Physiology (TH)	2	Explain concept of cell and tissue organization, functions of various cell components and characteristics of different types of tissues including their locations.
		3	Summarize anatomical features of different organs and their component organs.
		4	List out pharmacological functions of various organ systems.
		5	Discuss normal physiological parameters, disorders and their homeostasis related to different organ system.
C105	Social Pharmacy (TH)	1	Summarize WHO concept of health, NHP, NHM, MDG, SDG, FIP development goals and role of pharmacist in these systems.
		2	State the role of pharmacist in demography, family planning, mother health, child health, immunization, psychotropic substances and management of various kinds of pollution.
		3	Explain the healthcare issues associated with deficiency of food, nutritional substances & concept of balanced diet
		4	Discuss the causative agent, epidemiology, clinical presentation and role of pharmacist in educating the public in prevention of various communicable diseases and various kinds of microorganism.
		5	State the objectives, functioning, outcomes and role of pharmacist in various ongoing national health programs in India.
		6	Summarize the various pharmacoeconomic methods.
C106	Pharmaceutics-I(PR)	1	Use the working formula from the given master formula
		2	Prepare the dosage form and dispense in an appropriate container
		3	Develop the label with the necessary product and patient information

Principal
Pravara Rural College of Pharmacy
Pravaranagar, A/p.Loni-413 736

		4	Clarify the basic quality control tests for the common dosage forms
C107	Pharmaceutical Chemistry (PR)	1	Analyze and report the various inorganic impurities in pharmaceuticals.
		2	Prepare standard solutions and asses the quantity using the principles of volumetric analysis
		3	Identify the specified pharmaceutical compounds as per the monograph standards
		4	Prepare the selected organic compounds using synthetic scheme and report melting & boiling point.
		5	Apply Systematic Qualitative analysis for identification of organic compounds.
C108	Pharmacognosy (PR)	1	Identify the given crude drugs based on the morphological characteristics.
		2	Use the transverse section of different parts of crude drugs and record histological characteristics.
		3	Identify organized and unorganized crude drug by physical and chemical test.
C109	Human Anatomy and Physiology (PR)	1	Describe the microscopical features of important human tissues
		2	Recognize different parts of organ system of human body.
		3	Demonstrate use of specific tools used for measurement of different haematological parameters.
		4	Perform measurement of various physiological parameters using specific tools.
C110	Social Pharmacy(PR	1	Illustrate the national immunization Schedule and role of pharmacist in reproductive health, child health, Disaster Management, food & nutrition related programs.

Principal
Pravara Rural College of Pharmacy
Pravaranagar, A/p.Loni-413 736

		2	Identify microorganisms, family planning devices, various types of mask, menstrual hygiene products and marketed preparations of disinfectants, antiseptics, fumigating agents, antilarval agents, mosquito repellents.
		3	Explain personal hygiene techniques for maintaining the physical and mental health.
		4	Demonstrate first aid treatment for various emergency conditions including basic life support and cardiopulmonary resuscitation.
		5	Design various charts on nutrition, sources of nutrient available in local food, glycemic index of foods, junk food, balance diet, tobacco cessation& promotional material for public health awareness on various communicable disease