


First Year B Pharm (2015 course) SEM-I

**Pharmaceutics- I:**

Student should be able to


No.	Course Outcomes
1	Know Introduction to pharmaceutics and its various branches. Special emphasis on different official Compendia.
2	Understand Concept of drug and dosage forms. Various solid and liquid dosage forms and excipients required in formulation and evaluation
3	Understand Concept of Preformualtion, aspects of bulk drug characterization, solubility and stability studies
4	Know History and general principles of alternative system of medicines

  
Bhavken D.S.  
subject D/c.

**Modern Dispensing Practices:**

Student should be able to

No.	Course Outcomes
1	Apply basic mathematical calculations in the compounding and dispensing.
2	Review basic requirements in the compounding and dispensing of pharmaceutical products.
3	Generate accurate and appropriate drug information and report health care professionals.
4	Counsel patient for prescription drug, OTC products and cosmetics and read, interpret.
5	Identify the type of incompatibility and explain the methods to remove these incompatibilities.
6	Demonstrate a working knowledge of drug dosages, routes of administration, and dosage forms and incompatibility.


  
S.P. Kabeed

First Year B Pharm (2015 course) SEM-I

**Pharmaceutical Inorganic Chemistry:**

Student should be able to

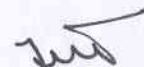
No.	Course Outcomes
1	Know significance of Inorganic chemistry and overview of various pharmacopoeias.
2	Study purity of chemical compounds, limit tests, water and its official quality control tests.
3	Study gastrointestinal tract agents.
4	Study extracellular and intracellular ions in the body, discuss the biological importance of essential and trace elements and study official compounds.
5	Study topical agents, dental products, expectorants, antidepressant, antidotes, cytotoxic agents.
6	Perform qualitative analysis for detection of acidic and basic radicals.

  
R. S. Ahire  
(Subject IIC)

**Pharmaceutical Organic Chemistry I:**

Student should be able to

No.	Course Outcomes
1	Clarify different reagents in Organic Reactions and explain different Reaction Intermediates & their application in reaction mechanism.
2	Explain the factors affecting strength of acid & base.
3	Comprehend & explain how Addition & Elimination Reactions are performed with respect to Alkenes and alkynes.
4	learn planning and synthesis of NCEs
5	learn purification and physical constants recording
6	learn different chemical tests required for qualitative analysis

  
Dr. S. S. Ch'hajed,  
(Subject IIC)



First Year B Pharm (2015 course) SEM-II

**Pharmaceutics- II:**

Student should be able to

No.	Course Outcomes
1	Understand the importance of packaging, packaging materials as well as types of packaging for various dosage forms like liquid, solids and semisolid dosage forms.
2	Understand the significance and concept of unit operations like mixing, filtration, size reduction, size separation required in the processing of finished dosage forms.
3	Understand the principle, construction and working of various equipments used in unit operations like mixing, filtration, size reduction, size separation required in the processing of finished dosage forms.
4	Understand the importance of Good manufacturing practices (GMP) described as per schedule M.
5	Understand the concept of Bioavailability and bioequivalence. Concepts and mechanisms related to absorption, distribution, metabolism and excretion.
6	Understand the various departments in pharmaceutical manufacturing unit. Flow of materials in manufacturing unit by studying plant layout design.

*[Signature]*  
V.D. Kulkarni  
(Sub. II/C)

**Dosage Form Design:**

Student should be able to

No.	Course Outcomes
1	List reasons for the incorporation of drugs into various dosage forms.
2	Compare and contrast the advantages/disadvantages of various drug dosage forms.
3	Identify factors that affect drug solubility and describe approaches to optimizing drug solubility.
4	Describe appropriate uses of pharmaceutical powders and granules.
5	find corresponding marketed preparations along with the contents, name of the manufacturer, study the label and note the shelf life period.
6	Know Evaluation parameters for liquids include organoleptic properties.

*[Signature]*  
S.P. Kulkarni

First Year B Pharm (2015 course) SEM-II

**Pharmaceutical Organic Chemistry-II:**

Student should be able to

No.	Course Outcomes
1	Explain and clarify common and IUPAC nomenclatures of different alcohols and ethers. Synthesis and general reactions of the alcohols and ethers.
2	Memorize chemistry of amines, separation of amines. Outline the synthesis, chemical reactions of amines. Illustrate the use.
3	Clarify the synthesis, chemical reactions of a given carboxylic acid along with mechanism
4	learn planning and synthesis of NCEs
5	learn purification and physical constants recording
6	learn different chemical tests required for qualitative analysis

*Dr. S.S. Chhajed*  
(Subject IIC)

**Human Anatomy & Physiology -II:**

Student should be able to

No.	Course Outcomes
1	explain the anatomy & physiology of Nervous system, various sense organs, respiratory, Urinary, Endocrine and reproductive system of the human body contribute to the maintenance of homeostasis.
2	demonstrate and aware the students various parameters are use to check and regulate the normal functions of Human body - Lung volumes and capacities, pH of urine and ECG.
3	demonstrate techniques for identification, counting, determination of various integral components of the body -Differential leukocyte count, Reticulocyte count, Platelet count, cooks arneth Index and osmotic fragility count.

*H.C. Pahal*  
(SEI)

First Year B Pharm (2015 course) SEM-II

**Pharmacognosy:**

Student should be able to

No.	Course Outcomes
1	Know Significance of Biology and its relevance in Pharmacy. Understood basic components of cell, its division, tissue systems along with morphology.
2	Identify the parts of plants from its morphological & microscopical features by applying experimental & theoretical knowledge of morphology & anatomy obtained in theory classes.
3	Know Principle of Genetics which helps in further understanding of plant tissue culture and recombinant technology
4	Understand Concept of Pharmacognosy, classification systems and global understanding of nomenclature.
5	Understand modes of nutrition, photosynthetic and chemosynthetic mechanism, also, environmental conditions to be taken care of so as to preserve plant biodiversity.
6	Handle microscope and microtome.

*JM*  
*Dr. S. N. Supe*  
*Sub I/c*

**Pharmaceutical Analysis- I:**

Student should be able to

No.	Course Outcomes
1	Illuminate relevance & significance of Analytical Chemistry to Pharmaceutical Sciences.
2	Understand basic principles of data treatment and data handling.
3	Explain basic concepts and principles of aqueous acid base titrations and non-aqueous acid base titrations and perform standardization and estimation of compounds.
4	Understand different terms, types and basic principles of precipitation titrations and redox titrations and perform standardization and estimation of compounds.
5	Explain concept and reaction conditions for complexation and perform standardization and estimation of compounds.
6	Understand and explain the difference between precipitation and gravimetric analysis and perform standardization and estimation of compounds.

*Subject Incharge*


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Second Year B Pharm (2015 course) SEM-III

**Physical Pharmaceutics-I:**

Student should be able to

No.	Course Outcomes
1	Know basic phenomena and concepts of solubility and distribution, partition phenomena, etc. and interrelationships between physiochemical properties of a drug, its dosage form, route of administration and bioavailability.
2	Understand Physical principles of states of matter and phase rule, compare one, two and three component system, pharmaceutical applications, various laws and theories of gases and correlate them into formation of aerosols.
3	Know about crystallization, crystal analysis, polymorphism, Non-electrolytic, Electrolytic solutions, their types and various properties and applications of thermodynamics in the pharmacy.
4	Calculate critical solution temperature (CST), construct ternary phase diagram for three-component system and determine the effect of electrolyte on CST of phenol water system.
5	Predict solubility at different temperature, solvents, determine the effect of pH & Cosolvent on solubility of given compound, determine molecular weight & understand the principle of Rast Camphor method.
6	Determine partition coefficient & effect of pH on it of given compound, determine the normality of acid by conductometric titration.

  
U.D. Ladhakar  
(Sub. I/C)

Second Year B Pharm (2015 course) SEM-III

**Pharmaceutical Microbiology & Immunology:**

Students should be able to

No.	Couse Outcomes
1	Classify microbes into various categories and aware about historical developments and contributions of scientists in the field of microbiology. Students should know the recent advances in microbiology, compare and contrast the various structural features, biology & characteristics of microbes, know the modes of reproduction in bacteria, growth characteristics, requirements and illustrate use of microorganism in pharmacy.
2	Demonstrate various basic aspects of immunology like microbial virulence, defense mechanism antigen, and antibody. Antigen- antibody reactions and their application. know the application, production and quality control of vaccines and seras.
3	Identify the causes and basis of microbial spoilage, the sources & types of microbial contamination, an importance of microbial limit tests, preservative efficacy test & standardization processes.
4	Know Mechanism of action and effectiveness of various sterilization processes, know the sterility testing as per I.P. and its importance, Classify disinfectants & be able to illustrate mechanism of action & its evaluation.
5	Explain the principle, construction and working of various instruments and perform their operations, handle microscope for observation of microbes. Student should able to learn how to prepare and sterilize nutrient broth, nutrient agar, slants, stabs and plates, adopt the skills required for maintaining strictly aseptic condition while inoculation and handling microbes.
6	Perform isolation and inoculation microorganism by streak plate technique & count them by pour plate technique, observe motility of bacteria, identify morphology bacteria by simple staining, negative staining & Gram staining, determine minimum inhibitory concentration by broth dilution method, should perform antibiotic assay.

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Second Year B Pharm (2015 course) SEM-III

**Pharmaceutical Organic Chemistry-III:**

Student should be able to

No.	Course Outcomes
1	Clarify Isomerism & apply that knowledge in understanding the structure property relationship.
2	Clarify mechanism and applications of rearrangement of electron deficient & electron rich systems.
3	Comprehend & explain basic concepts in pericyclic reactions.
4	Understand the chromatographic techniques in organic chemistry.
5	Understand the principle behind various qualitative tests and analyze the given unknown binary organic compounds having different functional groups.
6	Explain synthesis recrystallisation, filtration and precipitation techniques of organic compounds along with reaction & mechanism.

  
( Dr. P. S. KooKate )

**Pharmaceutical Biochemistry:**

Student should be able to

No.	Course Outcomes
1	Know the scope of Biochemistry in Pharmacy & role of biochemical processes in cell metabolism
2	Know the enzyme structures, their functions, mechanism for enzymatic activity and applications of enzymes.
3	Understand chemistry, function, classification, biological importance, qualitative tests & applications of various bio-molecules. e.g. proteins, carbohydrates, lipids, nucleic acids and vitamins
4	Understand types, their structures, biochemical functions & importance of fat-soluble and water-soluble vitamins
5	Identify proteins, amino acids and carbohydrates by various qualitative as well as quantitative chemical tests.
6	Separate, identify and characterize proteins from various samples like egg, milk, etc and understand principle behind the technique.


Subject Incharge  
P. S. D.  
P. S. D.

Second Year B Pharm (2015 course) SEM-III

**Pharmacology – I:**

Student should be able to

No.	Course Outcomes
1	Know the basics of pharmacology like history, scope & general principles
2	Understand the nature and sources of drugs and route of drug administration
3	Know the process of drug discovery and development
4	Understand pharmacokinetic and pharmacodynamics of drugs
5	Understand receptor, drug receptor interaction, drug toxicity, drug interaction and adverse drug reactions
6	Know basic principles of drug therapy for Pediatrics, geriatrics and Pregnant as well as lactating Women


  
P.B. Udavant  
Subject FIC

Second Year B Pharm (2015 course) SEM-III

**Pharmacognosy & Phytochemistry-I:**

Student should be able to

No.	Course Outcomes
1	Explain meaning & significance of Pharmacognostic parameters & Pharmacognostic study of crude drugs.
2	Explain primary and secondary metabolites, to identify drugs with qualitative and quantitative parameters.
3	Identify unorganized crude drugs & samples of powders of organized & unorganized crude drugs using morphological, chemical, physical & microscopical characteristics.
4	Conduct extractions/isolations & explain significance of use of various chemicals & physical conditions.
5	Identify the parts of plants from its morphological & microscopical features by applying experimental & theoretical knowledge of morphology & anatomy obtained in theory classes.

  
Mr. P. B. Pawar  
(Subject I/c)

Second Year B Pharm (2015 course) SEM-IV

**Physical Pharmaceutics-II:**

Students should be able to

No.	Couse Outcomes
1	Know about phenomena, concept principles and its measurement of surface and interfacial tension
2	Understand the properties of particles and pharmaceutical powders, their significance in formulation, and methods for characterization
3	Understand the different types of flow to identify and choose suitable flow characteristics for the formulation, applications of rheology. Study properties and applications of colloids in the formulations
4	Study reaction kinetics and order, degradation and stabilization of medicinal agents and accelerated stability testing.
5	Determine physical properties like surface tension, viscosity, adsorption and solubility, composition of binary mixture by viscosity method, particle size and distribution.

*(Signature)*  
U.D. Kulkarni  
(Sub. I/C)

**Pharmaceutical Organic Chemistry-IV:**

Students should be able to

No.	Couse Outcomes
1	Sketch the structure with numbering & illustrate chemistry, methods of preparation & chemical reactions of five membered, six membered and fused heterocyclic rings.
2	Explain the application of combinatorial chemistry in the speedy synthesis of organic compounds and peptides.
3	Construct retro-synthesis of pharmaceutical important compounds.
4	Understand techniques and applications of microwave assisted synthesis in pharmaceutical research
5	Perform qualitative analysis of solid-liquid and liquid-liquid organic binary mixtures & synthesis of derivatives.

*(Signature)*  
Dr. R.S. Kulkarni  
(Subj. in charge)

Second Year B Pharm (2015 course) SEM-IV

**Pharmaceutical Analysis-II:**

Students should be able to

No.	Couse Outcomes
1	Understand the basic principles, instrumentation and applications of various analytical techniques mentioned below which are used in Pharmaceutical industry for quality control of chemicals, drug intermediates, APIs, excipients, Pharmaceutical formulations and cosmetic products.
2	Independently operate and calibrate various analytical instruments for the separation/isolation and assay of various chemicals, drug intermediates, APIs and formulations as per Pharmacopoeial standards.
3	Independently process, interpret the data obtained through experimentation and report the results as per regulatory requirements.
4	Take appropriate safety measures while handling instruments, chemicals and apparatus.
5	Demonstrate the required level of professional competence in the planning, conducting, evaluation and reporting of the results of investigations, including the appropriate use of literature and secondary data.
6	Understand the basic principles, instrumentation and applications of various analytical techniques mentioned below which are used in Pharmaceutical industry for quality control of chemicals, drug intermediates, APIs, excipients, Pharmaceutical formulations and cosmetic products.

*S. D. Patil*  
D. Patil  
(Subject I/c)

**Pharmaceutical Engineering:**

Students should be able to

No.	Couse Outcomes
1	Student should able to understand molecular diffusion in gases and liquids.
2	Student should able to define drying and know the mechanism, COs & factors affecting it classify & compare various dryers with respect to their applications in pharmacy.
3	Student should able to know various heat transfer techniques including their mechanism and applications in pharmacy, define crystallization and illustrate types of crystallizers, know about evaporation and describe the types of evaporator with their mechanism, instrumentation and applications.
4	Student should able to develop an understanding of pharmaceutical engineering by studying advance modules that are relevant to the changing priorities and requirements of the modern pharmaceutical industries.
5	Student should able to foster the knowledge of product manufacturing, study the principle, COs, mechanism, working and construction of equipments of different unit operations. (Filtration, centrifugation, drying, heat transfer.)
6	Student should able to study the different materials used in the pharmaceutical plant constructions, illustrate fundamentals and facts about flow of fluids. Student should able to describe types of distillation, their mechanisms with appropriate diagrams, define drying and classify different types of dryers.


*D. S. Bhanu*  
D. S. Bhanu  
Subject I/c.

Second Year B Pharm (2015 course) SEM-IV

**Pharmacognosy & Phytochemistry-II:**

Student should be able to

No.	Course Outcomes
1.	Explain underlying reason of evolutionary significance of alkaloids formation in plants & other organisms & deduce their significance as medicinal molecules.
2.	Explain & draw basic heterocyclic system present in alkaloids, define & classify alkaloids, explain source, name & draw chemical structures, identify from the structure, organize the biosynthetic sequence in formation of major group of alkaloids; describe methods of their extraction & explain underlying rationale of qualitative & quantitative analysis of alkaloids.
3.	Explain historical significance & contribution of alkaloids in modern drug discovery, & their currently marketed semisynthetic derivatives/ analogues.
4.	Explain source, name & draw chemical structures, identify from the structure, organize the biosynthetic sequence, and describe methods of extraction & underlying rationale of qualitative & quantitative analysis of terpenoids & resins.
5.	Explain historical significance & contribution of terpenoids/ resins in modern drug discovery, & their currently marketed semisynthetic derivatives/ analogues.
6.	Conduct various analytical parameters of volatile oils & judge the quality of volatile oil


  
Mr. P. B. Pawar  
(Subject I/c)

Second Year B Pharm (2015 course) SEM-IV

**Pathophysiology and Clinical Biochemistry:**

Students should be able to:

No.	Couse Outcomes
1	Understand the biochemical mechanisms and pathophysiological processes responsible for common biochemical disorders
2	Understand the role of clinical biochemistry in clinical diagnosis
3	Understand basic principles of pathophysiology of different organ Systems
4	Handle and know the correct use of the instrument /equipment like colorimeter, UV-spectrophotometer, centrifuge, microscope, flame photometer & various instruments used in pathology laboratory
5	Perform qualitative tests for determination of abnormal constituents, liver function test, cardiac Profile Tests as well as kidney function test for given samples
6	Distinguish the colours while performing various chemical tests like urine analysis

  
P.B. Udavant  
Subject I/C

Third Year B. Pharm (2015 Pattern) SEM-V

**Industrial Pharmacy-I:**

Student should be able to

No.	Course Outcomes
1	Understand the concepts of solid dosage form design & formulation strategies, To Explain tablets as a dosage form, physico-chemical principles guiding tablet formulation, various tablet additives, manufacture & evaluation, equipments, defects in tableting & remedies.
2	Learn the concept, types, Pharmacopoeial specifications, techniques & equipment's used in tablet coating and to describe capsules, types, additives, size selection, manufacturing & evaluation, equipment, & defects.
3	Understand the correct use of various equipment in Pharmaceutics laboratory relevant to tablets, capsules & coating and Explain formulation, evaluation and labelling of tablets & capsules.
4	Perform pharmaceutical calculations to determine evaluation parameters like Hausner ratio, Heckel plot & Kawakita plot of preparations and to understand rational behind use of formulation ingredients
5	Learn the equipment and apparatus needed for the preparation as per SOP.
6	Select the suitable packaging material (container-closure) for the preparation.

*IAI*  
Dr. Animesh P.  
Sub H/c

**Pharmaceutical Analysis -III:**

Students should be able to:

No.	Couse Outcomes
1	Learn the different types of instrumental analytical techniques available for quality control of APIs & Pharmaceutical dosage forms.
2	Learn various sampling techniques employed in analysis of solid, semisolid and liquids dosage forms
3	Understand principles, instrumentation and applications of UV-VIS, Flourimetry, Atomic absorption, atomic emission, Spectroscopies, Flame photometry, Phosphorimetry and Nepheloturbidimetry.
4	Learn to independently operate, calibrate various analytical instruments for the assay of various APIs and formulations as per Pharmacopoeial standards.
5	Learn to independently process, interpret the data obtained through experimentation and report the results as per regulatory requirements.
6	Learn safety measures while handling instruments, chemicals and apparatus.

Subject Incharge  
*PW*  
Patil S.D.



**Bhujbal Knowledge City MET's Institute of Pharmacy, Nashik**  
**Third Year B. Pharm (2015 Pattern) SEM-V**

**Medicinal Chemistry-I:**

Student should be able to

No.	Course Outcomes
1	Understand significance and establish relevance of Medicinal Chemistry in Pharmaceutical Sciences.
2	Establish correlation of physicochemical properties affecting drug action and pharmacokinetics.
3	explain general aspects of the design & development of drugs including classification, nomenclature, structure activity relationship, mechanism of action, adverse effects, therapeutic uses and recent developments in drugs acting on cardiovascular and autonomic nervous system.
4	learn salt formation of NCEs/drugs
5	learn reactions like condensation, benzylation
6	learn purification techniques like recrystallization

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*Sub - Incharge*

**Pharmacology-II:**

Student should be able to

Course	Course Outcomes
1	Explain the Neurotransmitters involved in the autonomic nervous system, their synthesis, metabolism, various adrenoreceptors and cholinceptor, their subtypes and the clinical spectrum of their general and selective agonist and antagonist.
2	Explain the agents that stimulate cholinergic and adrenergic agonists and antagonists, also essential pharmacotherapy and pharmacological features of common and important drugs used in cardiovascular diseases respiratory and renal disorders.
3	Explain commonly used instruments in experimental pharmacology. Care and handling of common laboratory animals, animal welfare and introduction of CPCSEA and its guidelines.
4	Explain animal physiology, various routes of drug administration, anesthetics employed for animals and techniques of Euthenasia, physiological salt solutions, drug solution and use of molar and various methods for collection of blood, body fluids and urine from experimental animals.
5	Perform isolated experiments using various isolated preparation and the effects of different drugs on the concentration response curves.
6	Explain computer simulations of following experiments using suitable computerized simulated software effect of various drugs on heart rate, blood pressure in heart, effect of various drugs on rabbit eye.

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*AL. Dalhok*  
*(SI)*

Third Year B. Pharm (2015 Pattern) SEM-V

**Analytical Pharmacognosy & Extraction Technology:**

Students should be able to:

No.	Couse Outcomes
1	Comprehend & explain principle of extraction, effect of various factors, specific care in herbal material & various approaches in extraction processes, methodological steps & applications & qualitative chemical tests & report yield.
2	Understand & explain principle & applications of chromatographic & nonchromatographic separation methods.
3	Apply theoretical knowledge of various quality control parameters studied in theory; explain significance of use of various chemicals and conditions; undertake various estimations; infer from results obtained & report evaluation results.
4	Generate micrometric data & identify the crude drugs.
5	Able to handle various equipments as per SOPs & learn various demonstrations (of experiments). Understand meaning & significance of 'Good Laboratory Practices' learn in theory & demonstrate through laboratory behavior.
6	Listen carefully, raise logical query, draw information, understand rationale during field visits & prepare brief report for evaluation.

SKJ  
Dr. S.N. Sune  
sub Ilc

**Pharmaceutical Business & Disaster Management:**

Students should be able to:

No.	Couse Outcomes
1	Nature and purpose of planning, Important steps in planning, types of planning, Planning process, advantages and limitations, Types of objectives, importance of objective
2	Management by objectives, advantages and limitations, Organizational structure, basic principles of organization, departmentalization, delegation, Decentralization, staffing, line & staff organization with respect to production and QC/QA department.
3	Types of decision, Definition and Importance of decision making, Decision making process (explain giving example from pharma industry, Introduction to drug store, Introduction to Hospital.
4	Role of drug store and hospitals related to patient care management, Difference between marketing and selling
5	Channels of distribution, wholesale, retail, departmental, Medical Reps.
6	Disaster Management


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Dr. S.N. Sune  
sub Ilc

Third Year B. Pharm (2015 Pattern) SEM-V

**Active Pharmaceutical Ingredients Technology:**

Students should be able to:

No.	Course Outcomes
1	Know overview of Active Pharmaceutical Ingredients (API) and fine chemical industry.
2	Understand basics of chemical process kinetics, some classes of reactions with examples of API for each unit process.
3	Understand process of synthetic routes and optimization of reactions, raw material & reagent selection, scale up techniques for APIs, Quality control aspects, material safety data sheet.
4	Explain principle, industrial process, scale up techniques, Industrial manufacturing process, flow charts of some important APIs.
5	Explain Chirality in API industry with some examples.
6	Know Quality assurance and quality control of APIs and GMP Guidelines in API manufacturing like ICH Q7, Q7A and Q11

  
Dr. R. S. Kulkarni  
(subject in charge)

**Bhujbal Knowledge City MET's Institute of Pharmacy, Nashik**  
**Third Year B. Pharm (2015 Pattern) SEM-VI**

**Industrial Pharmacy-II:**

Students should be able to:

No.	Course Outcomes
1	Explain disperse systems, its classification, theories of disperse systems, thermodynamic v/s kinetic stability considerations, to Explain suspensions, types, formulation development, manufacturing, excipients used, evaluation of suspensions etc.
2	Describe emulsions, their physico-chemical properties, theory of emulsification, HLB value & phase inversion temperature, Kraft point, cloud point, excipients, formulation & evaluation of emulsions; cracking, coalescence, stability & stress testing and Explain semi-solids, anatomy & physiology of skin, selection of bases; penetration enhancers, formulation development, Percutaneous absorption, flux measurement & evaluation.
3	Describe layout for manufacturing of suspensions, emulsions & semi-solids as per schedule M and State the correct use of various equipment in Pharmaceutics laboratory relevant to suspensions, emulsions & semi-solids, prepare BMR.
4	Explain & carry out formulation of Suspensions like Calamine lotion, Milk of Magnesia, Paracetamol Suspension, Antacid Suspension & carry out Evaluation. To Formulate emulsions: Liquid paraffin oral Emulsion, Turpentine Liniment, Formulation of Emulsion with HLB Consideration & evaluation
5	Describe use of ingredients in formulation and category of formulation and Prepare semisolids: Pain balm, Antifungal ointment/cream, Medicated Gel, Antiacne preparation, Non staining Iodine ointment with Methyl Salicylate & evaluation.
6	Prepare the labels so as to suit the regulatory requirements.

*Dr. Animesh S.P.*  
*(Sub 214)*

**Pharmaceutical Analysis-IV:**

Students should be able to:

No.	Course Outcomes
1	Understand principles, instrumentation and applications of various chromatographic, thermal, X ray Diffraction and radio chemical techniques employed for the analysis of APIs and formulations.
2	Learn validation of analytical instruments & methods as per ICH/USP guidelines.
3	Learn to independently operate and calibrate various analytical instruments for the assay of various APIs and formulations as per Pharmacopoeial standards.
4	Learn to independently process, interpret the data obtained through experimentation and report the results as per regulatory requirements.
5	Learn to independently validate UV-VIS Spectrophotometric assay method as per ICH guidelines.
6	Take appropriate safety measures while handling instruments, chemicals and apparatus.

*Subject Incharge*  
*Pall*  
*Pall S.D.*

Third Year B. Pharm (2015 Pattern) SEM-VI

**Medicinal Chemistry-II:**

Student should be able to

No.	Course Outcomes
1	learn generalised aspects of the design and development of few classes of drugs; Local anesthetics and drugs acting on Central nervous system.
2	learn classification, nomenclature, SAR and MOA few classes of drugs; Local anesthetics and drugs acting on Central nervous system.
3	learn detail fate of drugs and xenobiotics metabolism, particularly toxic metabolites or bioactivation (prodrugs) and significance in drug discovery.
4	learn planning and synthesis of compounds via few reaction like; Schotten-Bowman Reaction, oxidation, Esterification reaction, Benzillic acid rearrangement, Diazotization.
5	learn purification of synthesized compounds which is one of the important aspect of synthesis.
6	Know that different solvents may contain impurities and or stabilizer; hence solvents is therefore necessary to be purified for synthetic as well analytical purposes.

*Handwritten:* JVS (SSC) sub-Incharge

**Pharmacology-III:**

Students should be able to:

No.	Course Outcomes
1	Explain pharmacology of drug for following diseases/ disorders: Central nervous system, opioid agonist and antagonist, Non-steroidal anti-inflammatory drugs, Rheumatoid Arthritis, Osteoarthritis, Gout and Gastrointestinal tract disorders
2	Record Matching bioassay, Bracketing bioassay, Interpolation bioassay method of Acetylcholine and Histamine using suitable isolated tissue preparations
3	Demonstrate analgesic activity of drugs using Eddy's hot plate analgesiometer, locomotor activity of drug using actophotometer and muscle relaxant property using rotarod using suitable computerized simulated software programme.

*Handwritten:* H.L. Polkhat (SE)

Third Year B. Pharm (2015 Pattern) SEM-VI

**Natural Product Chemistry:**

Students should be able to:

No.	Course Outcomes
1	Understand & explain tools & techniques used in study of biosynthetic pathways in plants; role of natural products in drug discovery
2	Explain source, chemistry and applications of drugs from marine origin, compare and contrast marine & terrestrial sources of medicinal materials.
3	Explain source, extraction, processing, chemistry and applications of natural products used in pharmaceutical and allied industry such as coloring, sweetening agents and natural polymers
4	Explain source, extraction, processing, chemistry & applications of natural products used in pharmaceutical & allied industry such as bioavailability & skin permeation agents; wound healing agents, biofuels, dietary supplements and natural pesticides
5	Extract & subsequently conduct experiments to derive various physical constants required in characterization of natural products, Charge, elute & gather pure material using column chromatography.
6	Perform the evaluation of isolated phytoconstituents by chemical, chromatographic and spectral means.

*SM*  
Dr. S.N. Sune  
sub #1c

**Pharmaceutical Biotechnology:**

Students should be able to:

No.	Course Outcomes
1	Learn the basic functions of the elements of molecular biotechnology and pharmaceutical applications.
2	Explore scientific and biotechnological methods to create and develop innovative drugs.
3	Know the method of genetic engineering for production of rDNA products including monoclonal antibodies.
4	Know the information about the application of genetic engineering in animals.
5	Have a knowledge of enzymes and their uses by immobilization.
6	Illustrate use of Fermenter for production of fermentation products and information

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Dr. R.S. Kulkarni

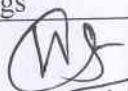
( Subject Incharge )

Final Year B Pharm (2015 course) SEM-VII

**Sterile Products:**

Students should be able to:


No.	Course Outcomes
1	Learn preformulation, general requirements, packaging materials used, types, choice of containers, devices for administration, official quality control tests and methods of evaluation for sterile products.
2	Describe the GMP-Design of Parenteral Production Facility including layout of Production Facility, environmental control zones, heating ventilation air conditioning (HVAC), HEPA
3	Explain classification, formulation principle, processing, manufacturing and Quality control of SVP, types and selection of excipients, special types of SVPs and Pilot plant scale up.
4	Explain classification, formulation principle, processing, manufacturing and Quality control of LVP, types and selection of excipients, special types of LVPs such as Parenteral Nutrition, intravenous admixture, Peritoneal dialysis fluid and Pilot plant scale up.
5	Describe classification, general requirements, formulation, and evaluation of ophthalmic product along with contact lens and lens care products
6	Understand the basic concept of Blood Products and Surgical Dressings

  
Dr. N. A. Thambore  
Subject I/C

**Pharmaceutical Analysis -V:**

Students should be able to:

No.	Course Outcomes
1	Understand principle, instrumentation of IR (including FTIR, NIR and Raman spectroscopy) with their applications
2	Understand the principle, instrumentation of chromatographic techniques like, gas chromatography, high performance liquid chromatography (HPLC), UPLC and to learn various applications.
3	Learn the principle, instrumentation and applications of scanning electron microscopy (SEM) and transmission electron microscopy (TEM)
4	Record and interpret the IR spectra for compounds containing different functional groups.
5	Acquire skill for quantification of two drugs in formulations by simultaneous equation method and Q-method.
6	Understand and learn appropriate safety measures while handling instruments, chemicals and apparatus.

  
Dr. S. S. Sonawane  
(Subject I/C)

Final Year B Pharm (2015 course) SEM-VII

**Medicinal Chemistry – III:**

Students should be able to

No.	Course Outcomes
1	Know the general aspects of design of the drugs, history, classification, nomenclature, structure activity relationship (SAR), mechanism of action, therapeutic uses, adverse effects and recent developments in the antibiotics.
2	Know the general aspects of design of the drugs, history, classification, nomenclature, structure activity relationship (SAR), mechanism of action, therapeutic uses, adverse effects and recent developments in the anti-infective agents
3	Know the general aspects of design of the drugs, history, classification, nomenclature, structure activity relationship (SAR), mechanism of action, therapeutic uses, adverse effects and recent developments in the antineoplastic agents
4	Make correct use of various equipments and take safety measures while working in Medicinal Chemistry Laboratory.
5	Synthesize medicinally important compounds and purify them using column Chromatography and Characterize the synthesized compounds using IR and NMR spectra
6	Purify the solvents using fractional and vacuum distillation and Explain reaction mechanisms involved in synthesis of medicinally important compounds.

*Dr. D. D. Rizhpetkale*  
(Subject IIC)

**Natural Drug Technology:**

Students should be able to

No.	Course Outcomes
1	Comprehend & explain various factors affecting on level of secondary metabolites; post harvesting manipulations, and changes during storage; guidelines issued by WHO in relation with cultivation, collection, storage etc
2	Understand & explain concept of health & pathogenesis, philosophical basis, diagnosis & treatment aspects of Ayurveda, Unani, Siddha & Homoeopathic system of medicine; Understand & explain method of preparation of Ayurvedic dosage forms
3	Significance of novel drug delivery of natural products;; herbs used in cosmetic preparation & methods of their formulations
4	Understand & explain various physical, chemical, spectroscopic means and methods used in structural elucidation of natural products, interpret data generated from above techniques.
5	Perform Preparation of herbal formulations and evaluation of it and marketed preparations, in-vitro assays and preformulation studies
6	Handle various equipments as per SOPs & learn various demonstrations

*Dr. S. N. Sune*  
Sub IIC



**Bhujbal Knowledge City MET's Institute of Pharmacy, Nashik**  
**Final Year B Pharm (2015 course) SEM-VII**

**Pharmacology-IV:**

Students should be able to

No.	Course Outcomes
1	Get in-depth knowledge about pharmacology and pharmacotherapy of drugs used in infectious diseases and Cancer.
2	Understand Knowledge of Various endocrine hormones, its types, receptors involved and mechanisms involved; understanding the Pharmacology of drugs acting on Endocrine System.
3	Understand Biosynthesis, Secretion, Mechanism of action, Pharmacology of insulin and glucagon and Pharmacotherapy of Diabetes Mellitus.
4	Understand the Use of isolated tissue preparations for bioassay methods.
5	Analyze the rational and irrational fixed dose combinations based on various parameters.
6	Understand the prescription pattern and rational use of drugs by performing case study or doing hospital visit.

*P.B. Udavault*  
 Subject I/c

**Biopharmaceutics & Pharmacokinetics:**

Students should be able to

No.	Course Outcomes
1	Gain knowledge on New designs of drug dosage forms based on pharmacokinetics and pharmacodynamic behavior of drug can be planned.
2	Design of dosage regimen based on the concept of individualization to avoid adverse effects in renal and hepatic failure.
3	Understand Modifications in the pharmacokinetic profile, drug targeting and time and conditions based release predictions could be helpful to avoid adverse effects and to achieve maximum beneficial effects of drug.
4	Know Clinical significance of bioavailability and bioequivalence, Bio waivers, bio-similar can be drawn.
5	Understand Technical knowledge on Dissolution profile comparison, dissolution method development, kinetic release patterns and predictions of drug and dosage form behaviour.
6	Explain Mathematical and theoretical predictions of drug behaviour in body based on calculations applied.


*Dr. Deokae G.S*  
 Subject I/c.

**Bhujbal Knowledge City MET's Institute of Pharmacy, Nashik**  
**Final Year B Pharm (2015 course) SEM-VII**

**Pharmaceutical Jurisprudence**

Students should be able to

No.	Course outcomes
1	Understand the Basic principles, purpose and dimensions of the laws, understand the significance and relevance of Pharmaceutical laws in India
2	Know the Important rules and regulations and procedures made to execute the laws; discuss the purpose of the Board and To explain the definitions in the Act;
3	Understand the Learner knowledge about Patents, procedure for patent application and IPR.; understand the regulatory system for safety and effectiveness of medicine and quality of product
4	Describe the qualifications for membership and the make-up of the Board ; explain the rule-making authority of the Board;
5	Discuss the responsibilities of the Board and discuss inspections by the Board or its representative;
6	Learn the various laws governing the manufacturing, sale, research & usage of drugs; understand significance of Schedule M and Schedule Y related Manufacturing & clinical trials; know the Identify potential fraud and abuse legal issues of narcotic & psychotropic substance; study quality & prices of essential medicine

  
Subject I/c  
Dr. Anirao S.P.

Final Year B Pharm (2015 course) SEM-VIII

**Advanced Drug Delivery System:**

Students will be able to

No.	Course Outcomes
1	Express fundamental concept of Modified drug release with various approaches and classification.
2	Describe classification, types including environment responsive polymers, parameters affecting selection of polymers, application and examples.
3	Explain, merits, demerits, and application of fundamental concept of Novel Drug Delivery Systems.
4	Understand concept of microencapsulation, merits, demerits, types, preparation method and application.
5	Perform formulation and processing of therapeutic aerosols including recent advances, fundamentals, formulation design and stability, manufacturing techniques, product evaluation will be understood by the students.
6	Understand basic concepts and apply optimization techniques in pharmaceuticals and perform optimization of formulations.

NA Thawbore  
(Subject I/c)

**Cosmetic Science:**

Students should be able to

No.	Couse Outcomes
1	Understand the concepts of cosmetics, anatomy of skin v/s hair, general excipients used in cosmetics, Explain formulation of cosmetics for skin, manufacturing, equipments & evaluation of creams like cold cream, vanishing cream etc. & powder cosmetics.
2	Explain formulation of cosmetics for hair, manufacturing & evaluation of hair shampoos, tonics etc., Describe formulation of cosmetics for eyes, manufacturing & evaluation of eye mascara, shadow etc.
3	Understand formulation of manicure products like nail lacquer, remover etc., Learn formulation, manufacture & evaluation of baby cosmetics like baby oils, powders etc, Explain the concept of cosmeceuticals, history, difference between cosmetics & cosmeceuticals & cosmeceutical agents.
4	State the correct use of various equipments in Pharmaceutics laboratory relevant to cosmetics, Perform formulation, evaluation and labelling of cosmetics like moisturising cream, vanishing cream etc.
5	Perform formulation, evaluation of eye cosmetics, nail lacquer & shampoo, Perform formulation, evaluation & labelling of shaving cream, after shave & baby products.
6	Describe use of ingredients in formulation and category of formulation.


Bhanu 12.8.  
subject I/c.

Final Year B Pharm (2015 course) SEM-VIII

**Pharmaceutical Analysis-VI:**

Students should be able to


No.	Course Outcomes
1	Learn the basic principle and theory of nuclear magnetic resonance with instrumentation and their applications with respect to $^1\text{H}$ and $^{13}\text{C}$ NMR
2	Learn the principle, instrumentation and applications of electron spin resonance (ESR) spectroscopy and mass spectrometry
3	Understand the principle, instrumentation and applications of ion exchange chromatography, flash chromatography and supercritical fluid chromatography
4	Learn the analytical method validation using HPLC and UV-vis spectrophotometry as per ICH guidelines and USP
5	Study and learn the system suitability test as per IP/BP/USP protocol and to learn the quantitation techniques in HPLC (% area/ area normalization, internal standard and external standard)
6	Learn and understand the interpretation of UV, IR, NMR, MS spectra of simple organic compounds for their structure elucidation

  
Dr. S. S. Sonavane  
(Subject IIC)

**Medicinal Chemistry-IV:**

Students should be able to


No.	Course Outcomes
1	Know the general aspects of design of the drugs, history, classification, nomenclature, SAR, mechanism of action, therapeutic uses, adverse effects and recent developments in the Antihistaminics, proton pump inhibitors
2	Know the general aspects of design of the drugs, history, classification, nomenclature, SAR, mechanism of action, therapeutic uses, adverse effects and recent developments in the Serotonergic agents, Autacoids.
3	Know the general aspects of design of the drugs, history, classification, nomenclature, SAR, mechanism of action, therapeutic uses, adverse effects and recent developments in the NSAIDs, analgesics & antipyretics, Narcotic agents, Steroidal Drugs, Hormones.
4	Know the general aspects of design of the drugs, history, classification, nomenclature, SAR, mechanism of action, therapeutic uses, adverse effects and recent developments in the Insulin & Oral Anti-hyperglycemic drugs and Diagnostic agents.
5	Make correct use of various equipments and take safety measures while working in Medicinal Chemistry Laboratory
6	Synthesize medicinally important compounds and purify them, Characterize the synthesized compounds using IR and NMR spectra and Explain reaction mechanisms involved in synthesis of medicinally important compounds

  
Dr. D. D. Rishipethale  
(Subject IIC)

Final Year B Pharm (2015 course) SEM-VIII

**Pharmacology-V:**


No.	Course Outcomes
1	Understand various drug-drug interaction, mechanism involved and its predisposing factors.
2	Understand the mechanism of adverse drug reactions, risk factors and Pharmacovigilance.
3	Know Functioning and role of hospital pharmacy and practice of rational drug therapy and methods of assessment of patient compliance and non-compliance
4	Know the details of Clinical trials, ethics and practice of Good Clinical Practice involved in clinical trials.
5	Use of software for the study of preclinical experiments.
6	Know Brief idea about statistics, its applications and how to solve problems using various statistical tests.

  
P.B. Wavant  
Subject IC

**Quality Assurance Techniques:**

Students should be able to

No.	Course Outcomes
1	Learn the significance of quality in Pharmaceutical manufacturing.
2	Understand Role of Regulatory Agencies in deciding Quality Standards.
3	Understand significance of validation in Quality Assurance.
4	Understand significance of following cGMP, GLP and GDP while working in Pharmaceutical industry.
5	Know Significance of the concept of QbD.
6	Understand the importance of calibration and qualifications to maintain the quality standards.


  
Dr. Deepak G.  
sub incharge.

Final Year B Pharm (2015 course) SEM-VIII

**Natural Products: Commerce, Industry & Regulations:**

Student should be able to

No.	Course Outcomes
1.	Explain the significance of natural products in daily life. He/she should be able to classify different segments in market, demand & supply position; export & import potential; position of Indian herbal drug industry in global contest; government organizations & policies for promotion; their regulation in India & other countries, various regulatory guidelines, ethical issues etc.
2.	Realize the market potential of natural products & explore entrepreneurship skills to grab these opportunities.
3.	Explain safe use of natural products, possible toxicities & interaction
4.	Explain need & significance of pharmacovigilance systems; WHO guidelines in this regard.
5.	Explain Regulation & Patenting aspects of Herbal drugs

  
Mr. P. B. Pawar  
(Subject IIC)