COURSE OUTCOMES

FACULTY OF PHARMACY

Raigad College of Pharmacy

Course Outcomes-B.Pharm

Sr.No.	Name of the Program	Name of the Course	Course Outcome
1	B.Pharm1st sem	Human anatomy and Physiology-I	*Upon completion of this program the student will have fundamental knowledge in* 1. *Understand the gross morphology, structure and functions of cell, skeletal, muscular, cardiovascular system of the human body.* 2. *Knowledge about the various homeostatic mechanisms and their imbalances.* 3. *Able to identify the different types of bones in human body.* 4. *Students would be able to identify the various tissues of different systems of human body.* 5. *Students would learn about the various experimental techniques related to physiology.*
2		Pharmaceutical analysis I	*After successful completion of the course student shall be able to explain* 1. *COI: The fundamentals of pharmaceutical analysis, pharmacopoeia, volumetric analysis, sources and methods of minimizing errors, sources of impurities and methods to determine the impurities.* 2. *: CO2 The need and basic principles of Acid-Base titrations and Non-aqueous titration their applications in pharmaceutical industry.* 3. *CO3: Concepts of complexometric titration, precipitation titrations, gravimetric analysis etc and their applications.* 4. *CO4Concepts of oxidation and reduction, titrations involving them and their applications in*

			pharmaceutical industry. ***5.*** *CO5: The principle, types of electrodes, instrumentation and applications of Potentiometry, Conductometry and Polarography.*
3		Pharmaceutics-I	Upon completion of this program the student will have fundamental knowledge in Preparing conventional dosage forms
4		Pharmaceutical inorganic chemistry	1. *Understand the principles of limit tests.* 2. *Well acquainted with different classes of inorganic pharmaceuticals and their analysis* 3. *Identification of different anions, cations and different inorganic pharmaceuticals.* 4. *Knowledge about the sources of impurities and methods to determine the impurities in inorganic drugs and pharmaceuticals* 5. *Understand the medicinal and pharmaceutical importance of inorganic compounds* 6. *To have been introduced to a Variety of inorganic drug*

			classes.
5		Communication skills	*Upon completion of this course the student shall be able to* 1. *Understand the behavioral needs for a Pharmacist to function effectively in the areas of pharmaceutical operation* 2. *Communicate effectively for both (Verbal and Non-Verbal)* 3. *Manage the team effectively as a team player* 4. *Develop interview skills* 5. *Develop Leadership qualities and essentials*

		Remedial biology	Upon Completion of this course is to make aware the students about : 1. Cell biology (Basic Nature of Plant cell and Animal cell) 2. Classification System of both Plants & Animals 3. Various tissue system and organ system in plant and animals 4. Theory of evolution 5. Anatomy and Physiology of plants and animals
		Remedial mathematics	1. Apply mathematical concepts and principles to perform computations for Pharmaceutical Sciences. 2. Create, use and analyze mathematical representations and mathematical relationships 3. Communicate mathematical knowledge and understanding to help in the field of Clinical Pharmacy 4. Perform abstract mathematical reasoning

Sl. No.	Name of the Program	Name of the Course	Course Outcome
1	B.Pharm2nd sem	Human anatomy and physiology-II	1. Students would have studied about the gross morphology, structure and functions of nervous, respiratory, urinary and reproductive systems in the human body. 2. They would have studied in detailed about energy and metabolism. 3. Students would able to identify the various organs of different systems of human body. 4. They would have performed and learnt about the experiments like neurological reflex, body temperature measurement 5. They would have studied elaborate on interlinked mechanisms inthe maintenance of normal functioning of human body 6. They would have learnt and performed the experiments like Olfaction, gestation reflex and eyesight
2		Pharmaceutical organic chemistry-I	1. Write the structure, name of the organic compound 2. Knowledge about the type of isomerism 3. Write the reaction, name the reaction and orientation of reactions 4. Account for reactivity/stability of compounds, 5. Identify/confirm the unknown organic compound 6. Knowledge about the naming reactions of carbonyl compounds 7. To perform common laboratory techniques including reflux, distillation, recrystallization, Vacuum filtration, etc.

3		Biochemistry	*To understand the* ***1.*** *Co 1 Explain classify and give biological significance of biomolecules and bioenergetics.* ***2.*** *Co 2 Understand the metabolism of nutrients molecule of carbohydrates in physiological and pathological condition* ***3.*** *Co 3 Understand the metabolism of nutrients molecule of lipids in physiological and pathological condition* ***4.*** *Co 4Understand the genetic organisation of mammalian genomes and function of DNA in the synthesis of RNA and proteins* **5.** *Co 5 Understand the catalytic role of enzyme importance of enzyme inhibitors in design of new drug therapeutic and Diagnostic application of enzym*es.
4		Pathophysiology	1. Describe the etiology and pathogenesis of the selected disease states 2. Knowledge of signs and symptoms of the diseases 3. Identify the complications of the diseases. 4. Know most commonly encountered pathophysiological state(s) and/or disease mechanism(s),as well as any clinical testing requirements
5		Computer applications in pharmacy	On completion of this course, the students will be able to: 1. Apply the knowledge of mathematics and computing fundamentals to pharmaceutical applications for any given requirement 2. Design and develop solutions to analyze

			pharmaceuticalproblems using computers. 3. Integrate and apply efficiently the contemporary IT tools to all Pharmaceutical related activities 4. 4. Solve and work with a professional context pertaining to ethics, social, cultural and regulations with regardto Pharmacy .
6		Environmental sciences	*This program shall create awareness about environmental problems, develop an attitude towards of protection for the environment.*

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1	B.Pharm3rdsem	Pharmaceutical organic chemistry-II	1. *To understand the benzene & its derivatives, reactions of benzene,effect of substituents on reactivity and orientation of mono substituted benzene compounds towards electrophilic substitution reaction* 2. *CO2 To understand the Phenol, Acidity of phenols, effect of substituents on acidity Aromatic Amines, Basicity of amines, effect of substituents on basicity, Aromatic Acids, Acidity, effect of substituents on acidity and important reactions of benzoic acid.* 3. *CO3 To understand the reactions of fatty acid such as hydrolysis, hydrogenation etc* 4. *CO4 To understand the polynuclear hydrocarbons, synthesis and reactions of Naphthalene, Phenanthrene etc* 5. *CO5. To understand the cyclo alkanes, reactions of cyclopropane and cyclobutane*

2		Physical pharmaceutics-I	Upon successful completion of the course, students will be able to: 1. *State the physicochemical properties of drug molecules, pH, and solubility.* 2. *Explain the role of surfactants, interfacial phenomenon & thermodynamics.* 3. *Describe the flow behaviour of fluids & concept of complexation.* 4. *Understand the physical properties of solutions, buffers isotonicity, disperse systems & rheology.* 5. *Have basic knowledge of pharmaceutical suspensions & colloids* Principles such as lyophilization, aerosols, condensed systems, and phase diagram. pharmaceutical applications

4		Microbiology	1. *Students will be able to acquire, articulate, retain and apply specialized language and knowledge relevant to microbiology.* 2. *Students will acquire and demonstrate competency in laboratory safety and in routine and specialized microbiological laboratory skills applicable to microbiological research or clinical methods, including accurately reporting observations and analysis.* 3. *Students will communicate scientific concepts, experimental results and analytical arguments clearly and concisely, both verbally and in writing.* 4. *Students will demonstrate isolation of and identification of microbes.* 5. *Students can able to design microbiology laboratory considering all the aspects of safety. Students will acquire knowledge about validating the microbiological equipment and Reporting the observations*
4			

		Pharmaceutical engineering	1. *To know various unit operations used in Pharmaceutical industries.* 2. *To understand the material handling techniques.* 3. *To perform various processes Involved in pharmaceutical manufacturing process.* 4. *To appreciate and comprehend significance of plant lay out design for optimum use of resources.* 5. *To appreciate the various preventive methods used for corrosion control in Pharmaceutical industries.*
5		Pharmaceutical jurisprudence	1. Understand the Pharmaceutical legislations and their implications in the development and marketing 2. Know various Indian pharmaceutical Acts, Laws and schedule 3. Know the regulatory authorities and agencies governing the manufacture and sale of pharmaceuticals 4. Know code of ethics during the pharmaceutical practice

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1	B.Pharm4thsem	Pharmaceutical organic chemistry III	1. To acquire the knowledge and understanding of the basic experimental principles of heterocyclic chemistry. 2. To draw the structures and synthesizesimplepharmaceutically active organic compounds having fiveandsixmemberedheterocyclic compounds. 3. Todescribedetailedmechanismsfor common naming reactions. 4. To be able to run experimental techniques, procedures and safe laboratory practices. 5. Stereo-chemicalfeaturesincluding conformationandstereoelectronic effects; Geometrical isomers
2		Medicinal chemistry-I	1. Helps in correlating between pharmacology of a disease and its mitigation or cure. 2. To understand the drug metabolic pathways, adverse effect and therapeutic value of drugs 3. To know the structural activity relationship of different class of drugs. 4. Well acquainted with the synthesis of some important class of drugs. 5. Knowledge about the mechanism Pathways of different class of medicinal compounds.

			6.Tounderstandthechemistryof drugs with respect to their pharmacologicalactivity.
3		Physical pharmaceutics-II	Upon successful completion of the course, students will be able to: 1. *Understand various physicochemical properties of drug molecules in the designing the dosage forms.* 2. *Understand rheological properties, various equations and related concepts to it.* 3. *Understand basic knowledge of pharmaceutical colloids, suspensions and emulsions including their stability and rheological properties.* 4. *Know the micromeritics in pharmaceuticals.* 5. *Know the principles of chemical kinetics and to use them in assigning expiry date for formulation.*
4		Pharmacology-I	1. Students would have understoodthe pharmacological actions of different categories of drugs 2. They would have studied in detailed about mechanism of drug action at organ system/sub cellular/ macromolecular levels. 3. They would have understood the application of basic pharmacological knowledge in the prevention and treatment of various diseases. 4. They would have observed theeffect of drugs on animals by simulated experiments 5. They would got an idea about correlation of pharmacology with other bio medical sciences. 6. Theywouldhaveunderstoodthesignal transduction mechanism of various receptors

5		PharmacognosyI	This course is one of the most advanced introductions in Herbal Medicines that is offered. Will learn and get experience about: 1. Herbs, and their Science. 2. Classification of Medicinal Plants, Phytochemistry, Carbohydrates, Lipids, 3. Terpenes, Polyphenols, Alkaloids, Pharmacology, Toxicity, Formulations and Preparations of Herbal Medicines. 4. How herbs influence our physiology and can be helpful against several disorders. 5. Relations between Phyto-therapy and the Elderly, Phytotherapy and Children, Understanding Herbal Action, and Understanding the Materia Medica. The recognition of medicinal plants, identification of adulteration and Contamination. Ethnobotany& Ethnopharmacology in drug discovery process. DNA Finger printing.

Sl. No.	Nameofthe Program	Nameofthe Course	CourseOutcome
1	B.Pharm 5th sem	Medicinal chemistryII	1. *Understand the chemistry of drug with respect to their pharmacological activity.* 2. *Understand the drug metabolic pathways , adverse effect and therapeutic value of drugs.* 3. *Design and modify the structural activity relationship of different class of drugs* 4. *Study the chemical synthesis of selected drugs.* 5. *Classify drugs according to their mechanism of action and category.*
2		Industrial pharmacy-I	1. Know the objectives and applications of *preformulation studies in the development and stability of dosage forms.* 2. *Know the formulation, manufacturing, coating and quality control tests of tablets and liquid orals.* 3. *Illustrate the pharmaceutical aspects of capsules and pellets.* 4. *Know essential requirement, production procedure, aseptic processing, quality control & packaging requirements for parenteral and ophthalmic preparations.* 5. *Understand formulation, manufacturing and evaluation of cosmetic preparations, pharmaceutical aerosols and appraise the science of packaging materials.*
3		Pharmacology-II	1. Students would have understood the mechanism of drug action and its

			relevance in the treatment of different diseases 2. They would be trained with isolation of different organs/tissues from the laboratory animals by simulated experiments 3. They would have observed the various receptor actions using isolated tissue preparation 4. Students would appreciate the correlation of pharmacology with related medical sciences 5. They would have understood the cell communication mechanism 6. They would appreciate the newer targets of several disease conditions for treatment.
4		Pharmacognosy-II	This course is one of the most advanced introductions in Herbal Medicines that is offered. Will learn and get experience about 1. Herbs, and their Science. 2. Classification of Medicinal Plants, Phytochemistry, Carbohydrates, Lipids, 3. Terpenes, Polyphenols, Alkaloids, Pharmacology, Toxicity, Formulations and Preparations of Herbal Medicines. 4. How herbs influence our physiology and can be helpful against several disorders. 5. Relations between Phyto-therapy and the Elderly, Phytotherapy and Children, Understanding Herbal Action, and Understanding the MateriaMedica. 6. The recognition of medicinal plants, identification of adulteration and Contamination. 7. Ethno botany& Ethno-pharmacology in drug discovery process. 8. DNA Finger printing.
5		Pharmaceutical biotechnology	1. 1 .Students will understand the various techniques used in modern biotechnology. 2. Students can design research strategy with step-by-step instructions to address are search problem Students can able to provide examples of current applications of biotechnology and advances in the different areas like medical, microbial, environmental, bioremediation, agricultural, plant, animal, and forensic

			4. Students can explain the concept and application of monoclonal antibody technology 5. Students can demonstrate and Provide examples on how to use microbes and mammalian cells for the production of pharmaceutical products 6. Students able to explain the general principles of generating transgenic plants, animals and microbes

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1	B.Pharm 6th sem	Medicinal chemistry III	1. To develop an understanding of the physico-chemical properties of drugs. 2. To understand how current drugs were developed by using pharmacophore modeling and docking technique. 3. To acquire knowledge in the chemotherapy for cancer and microbial diseases and different anti-viral agents. 4. To acquire knowledge about the mechanism pathways of different class of medicinal compounds. 5. To have been introduced to a variety of drug classes and some pharmacological properties.
2		Pharmacology-III	1. Students would have studied elaborately on mechanism of drug action and its relevance in the treatment of different infectious diseases 2. They comprehended the principles of toxicology and treatment of various poisonings and 3. They came across the methods of toxicity studies 4. They studied about symptoms of several poisonings 5. They studied about treatment of several poisonings 6. Students understood the toxicity profile of each drugs

3		Herbal drug technology	1. The aim of the degree course is to provide graduates with a good knowledge of the basic and applied know-how and professional skills in Herbal drug Science and Technology and the necessary training for admission to the postgraduate courses in this field. 2. They will acquire operative know-how and be able to carry out technical and 3. management tasks and professional activities in the areas of transformation of 4. medicinal herbs, management of the quality of the processes, marketing of 5. medicinal plants and derivatives for use in herbal, food and cosmetic products, 6. Guaranteeing conformity with the national and EU laws in force. 7. At the end of the course, the graduate will have acquired the following know-how and skills: • The recognition, collection and preservation of medicinal plants. • Analyses and dosage of active ingredients. • The biological effects of medicinal plants. • The toxicological aspects of active ingredients and finished products. • The study, design, management, control and conduction of the processing systems of medicinal plants and Derivatives. • Management of quality of medicinal plant products and derivatives. • The possible application of medicinal plants and derivatives as health Products, including the food

			And cosmetics sectors. • Technical-scientific consulting in the specialized press for the herbal sector, the promotion of information In the medicinal plants and derivatives sector.
4		Biopharmaceutics and pharmacokinetics	After successful completion of the course student will be able to: 1. Understand the concept of ADME of drug in human body. 2. Determine the various pharmacokinetic parameters from either plasma concentration or urinary excretion data for drug 3. Apply the various regulations related to developing BA-BE Study protocol for the new drug molecule. 4. Ability to design and perform *in-vitro* dissolution studies for various drugs as per the standards of official monographs 5. Basic understanding about the concepts of *in-vitro* - *in-vivo* correlations (IVIVC)
5		Pharmaceutical quality assurance	1. The students understand the importance of quality in pharmaceutical products. 2. The students are explored into importance of Good practices such as GMP, GLPect. 3. The factors affecting the quality of pharmaceutical are explored. 4. He understands the regulatory aspects of pharmaceutical taught to the student. 5. The process involved in manufacturing of pharmaceuticals different section/department and activity is learnt. 6. The various documentation processes is highlighted to the student.

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			of marine antineoplastic agents, marine toxins, and other pharmaceutically relevant marine natural products from various marine organisms. 9. Introduction to Herbal cosmetics and Nutrients.
4		Formulative and Industrial pharmacy	1. know the various pharmaceutical dosage forms and their manufacturing techniques. 2. Know various considerations in development of pharmaceutical dosage forms 3. Formulate solid, liquid and semisolid dosage forms and evaluate them for their quality.
5		Instrumental method of analysis	The student will learn to 1. Understand the basic theoretical knowledge of the instrumentation techniques available. 2. Theoretically understand the aspects of separation for multi components analysis. 3. Provide Practical skills for the analysis of drugs and solutions using various instrumentation techniques. 4. To make accurate analysis and report the results in defined formats. 5. Understand the professional and safety responsibilities for working in the analysis laboratory.

6		Pharmacy practice-II	1. Students will demonstrate knowledge of and ability to use principles of therapeutics, quality improvement, communication, economics, Health behavior, social and administrative aspects,
			health policy and legal issues in the practice of pharmacy. 2. Students will use knowledge of drug distribution methods in hospital and apply it in the practice of pharmacy. 3. Students will effectively apply principles of drug store management and inventory control to medication use. 4. Students will provide patient-centered care to diverse patients using the best available evidence and monitor drug therapy of patient through medication chart review, obtain medication history interview and counsel the patients, identify drug related problems. 5. Students will engage in innovative activities by making use of the knowledge of clinical trials 6. Students will exhibit professional ethics by producing safe and appropriate medication use throughout society

4.3		Pharmacy Practice	1. Monitor drug therapy of patient throughmedicationchartreview and clinical review; 2. Obtainmedicationhistoryinterview and counsel the patients; 3. Identifyandresolvedrugrelated problems; 4. Detect,assessandmonitoradverse drug reaction; 5. Interpretselectedlaboratoryresults (as monitoring parameters in therapeutics) of specific disease states; and 6. Retrieve,analyze,interpretand formulate drug or medicine information.
4.4		Biostatistics &Research Methodology	1. Know the various statistical methodstosolvedifferenttypesof problems 2. Operatevariousstatisticalsoftware packages 3. Appreciatetheimportanceof Computer in hospital and Community Pharmacy 4. Appreciatethestatisticaltechnique insolvingthepharmaceutical problems
		Social and Preventive Pharmacy	1. KnowVariousDrugDistribution Methods; 2. KnowTheProfessionalPractice Management Skills In Hospital Pharmacies; 3. ProvideUnbiasedDrugInformation To The Doctors; 4. Know The Manufacturing Practices OfVariousFormulationsInHospital Set Up; 5. AppreciateThePracticeBased Research Methods; And 6. Appreciatethestoresmanagement and inventory control.

4.6		Pharmacovigilance	1. Developing general working knowledge of the principles and practice of clinical toxicology 2. Demonstrating and understanding of the health implications of toxic exposures and commonly involved chemicals for toxicity 3. Demonstrating and applying an understanding of general toxicology principles and clinical management practice 4. Demonstrating and applying an understanding of the history, assessment, and therapy considerations associated with the management of a toxic exposure 5. Demonstrating and apply an understanding of the characteristics of and treatment guidelines for specific toxic substances 6. Proposing several preventive approaches to reduce unintentional poisonings