

M.S. Ramaiah University of Applied Sciences

New BEL Road, MSR Nagar, Bangalore – 560054



**RAMAIAH
UNIVERSITY**
OF APPLIED SCIENCES

PO, PSO, PEO & CO

Programme: M. Pharm. in Pharmaceutics

Programme Code: 058

Programme Outcome (PO)

Programme Specific Outcome (PSO)

Programme Educational Objectives (PEO)

Course Outcomes (CO)

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Faculty of Pharmacy
M.S. Ramaiah University of Applied Sciences
Bangalore-560054

Registrar

M.S. Ramaiah University of Applied Sciences
Bangalore - 560 054

Approved in 23rd ACM (Resolution 23.05) held on 15th July 2021

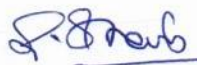
Faculty of Pharmacy (FPH)

Programme Name: M. Pharm. Pharmaceutics (Master of Pharmacy)

Programme Outcomes (POs)

M.Pharm. graduates will be able to:

- PO-1. Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.
- PO-2. Planning Abilities:** Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.
- PO-3. Problem analysis:** Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.
- PO-4. Modern tool usage:** Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.
- PO-5. Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well-being.
- PO-6. Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).
- PO-7. Pharmaceutical Ethics:** Honor 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.
- PO-8. Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.
- PO-9. The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.
- PO-10. Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- PO-11. Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.



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Programme Specific Outcomes (PSOs)

At the end of the M. Pharm program in Pharmaceutics, the graduate will be able to:

- PSO-1. Apply the knowledge of preformulation in drug development and interpret the fate of a drug in the biological system
- PSO-2. Design stable and effective drug delivery systems using appropriate equipment, methodology with optimization techniques and carry out validation
- PSO-3. Enable the leadership qualities and strive for the betterment of organization, environment and society
- PSO-4. Demonstrate an understanding of the importance of life-long learning through professional development, practical training and specialized certifications

Program Educational Objectives (PEOs)

The objectives of the M. Pharm program in Pharmaceutics are to:


- PEO-1. Provide students with various advancements in Pharmaceutics enable them to devise and deliver efficient solutions to challenging problems in Pharmacy and allied disciplines
- PEO-2. Impart analytical and cognitive skills required to develop innovative solutions for R&D, Industry, and societal requirements
- PEO-3. Provide sound knowledge of pharmacy, managerial and entrepreneurial skills to enable students to contribute to the well-being and welfare of the society
- PEO-4. Inculcate strong human values and social, interpersonal and leadership skills required for professional success in evolving global professional environments

Course Outcomes (COs)

Course Title & Code: Drug Delivery Systems (Theory) (PSC502)

After the successful completion of this course, the student will be able to:

- CO-1. Discuss the physiology of the Gastrointestinal Tract (G.I.T.) and the strategies for gastro-retentive and buccal drug delivery
- CO-2. Identify suitable polymers for specific controlled drug delivery systems
- CO-3. Select specific delivery systems for protein and peptide drugs
- CO-4. Outline the approaches for transdermal and ocular drug delivery systems
- CO-5. Develop various delivery systems for controlled/sustained release formulations
- CO-6. Discuss recent trends and advances in parenteral drug delivery and vaccine delivery systems


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Course Outcomes (COs)

Course Title & Code: Modern Pharmaceutics (Theory) (PSC503)

After the successful completion of this course, the student will be able to:

- CO-1. Explain the process of compaction and compression in solid dosage form development
- CO-2. Discuss various preformulation concepts in dosage form development
- CO-3. Apply the cGMP and Industrial management principles in dosage form development
- CO-4. Develop new dosage forms by applying the principles of optimization
- CO-5. Design validation protocol for solid and liquid dosage forms
- CO-6. Discuss recent advances in preformulation concepts, cGMP, validation, optimization, compression and compaction principles

Course Outcomes (COs)

Course Title & Code: Regulatory Affairs (Theory) (PSC504)

After the successful completion of this course, the student will be able to:

- CO-1. Discuss the concepts of innovator and generic drugs in drug development process
- CO-2. Organize the process involved in new drug application of pharmaceuticals
- CO-3. Structure the guidelines for filing and approval process in different countries
- CO-4. Analyze the post approval regulatory requirements for actives and drug products and submission of global documents in Common Technical Document / eCTD formats
- CO-5. Identify regulatory procedures involved in non-clinical and clinical drug development
- CO-6. Apply the principles of regulatory affairs in drug development process, filing and approval, non-clinical and clinical drug development in global scenario

Course Outcomes (COs)

Course Title & Code: Modern Pharmaceutical Analytical Techniques (Theory) (PSF501)

After the successful completion of this course, the student will be able to:

- CO-1. Summarize the fundamental principles, theory, and applications of UV-visible and IR spectroscopy, fluorimetric analysis, flame emission and atomic absorption spectroscopy
- CO-2. Theory, instrumentation and applications of NMR and Mass spectroscopy,
- CO-3. Explain the principles and applications of chromatographic, and electrophoretic separation techniques
- CO-4. Elaborate the principle and applications of potentiometric methods, X-ray crystallographic methods and thermo-analytical methods
- CO-5. Discuss the instrumentation of the various modern analytical techniques

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Course Outcomes (COs)

Course Title & Code: Pharmaceutics Practical-I (PSL505)

After the successful completion of this course, the student will be able to:

- CO-1. Examine efficacy of therapeutic agents by various instrumental analytical techniques
- CO-2. Demonstrate preformulation studies for development of various dosage forms



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- CO-3. Formulate types of controlled oral, transdermal and mucosal drug delivery systems
- CO-4. Evaluate various developed drug delivery systems using suitable methods
- CO-5. Compose pharmaceutical factors affecting drug release kinetics

Course Outcomes (COs)

Course Title & Code: Seminar/Assignment (PSS506)

After the successful completion of this course, the student will be able to:

- CO-1. Develop critical thinking, analytical thinking and problem-solving skills
- CO-2. Demonstrate the ability to synthesize the report
- CO-3. Develop academic report with appropriate citation and referencing style
- CO-4. Communicate the contents of the report to the panel
- CO-5. Defend the contents of the report in the panel

Course Outcomes (COs)

Course Title & Code: Molecular Pharmaceutics (Nano technology & Targeted DDS) (Theory) (PSC507)

After the successful completion of this course, the student will be able to:

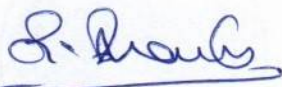
- CO-1. Discuss the various approaches for development of novel drug delivery systems
- CO-2. Explain the need for drug targeting in terms of site and target specificity
- CO-3. Identify suitable polymers/excipients for formulation design
- CO-4. Design and develop various delivery systems for a specific drug target
- CO-5. Evaluate targeted drug delivery systems
- CO-6. Recommend formulation approaches for site specific drug delivery

Course Outcomes (COs)

Course Title & Code: Advanced Biopharmaceutics and Pharmacokinetics (PSC508)

After the successful completion of this course, the student will be able to:

- CO-1. Analyze the factors affecting drug absorption from GI tract methods for determining drug permeability
- CO-2. Apply knowledge of biopharmaceutic factors in drug product design and outline in vitro Methods for determining drug product performance
- CO-3. Determine pharmacokinetic parameters from raw data using pharmacokinetic models and predict the effect of nonlinearity on drug pharmacokinetics
- CO-4. Measure bioavailability using suitable methods and summarize importance of bioequivalence studies
- CO-5. Appraise the applications of biopharmaceutics and pharmacokinetics in the development of biopharmaceuticals and pharmaceuticals



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Course Outcomes (COs)

Course Title & Code: Computer Aided Drug Delivery System (PSC509)

After the successful completion of this course, the student will be able to:

- CO-1. Explain the history of software applications in pharmaceutical research and development
- CO-2. Understand and interpret computational modeling of drug disposition
- CO-3. Examine software applications in preclinical and formulation development
- CO-4. Evaluate the role of software in biopharmaceutical analysis and clinical data management
- CO-5. Discuss the applications of artificial intelligence and machine learning in pharmaceutical field

Course Outcomes (COs)

Course Title & Code: Cosmetics and Cosmeceuticals (PSC510)

After the successful completion of this course, the student will be able to:

- CO-1. Explain regulatory requirements for cosmetics
- CO-2. Interpret biological aspects of human system with suitable cosmetic applications
- CO-3. Identify suitable excipients for cosmetical preparations
- CO-4. Discuss recent trends and advances in cosmetics and cosmeceuticals
- CO-5. Formulate and evaluate various cosmetic products
- CO-6. Recommend suitable cosmetic and cosmeceutical applications for herbal extracts

Course Outcomes (COs)

Course Title & Code: Pharmaceutics Practical - II (PSL511)

After the successful completion of this course, the student will be able to:

- CO-1. Compare the dissolution efficiency of various marketed pharmaceutical products
- CO-2. Formulate and evaluate various cosmetic products
- CO-3. Design experiments based on QbD for optimization of drug delivery
- CO-4. Analyze and predict pharmacokinetic parameters using software
- CO-5. Evaluate computational modeling of drug disposition
- CO-6. Formulate and evaluate various targeted drug delivery systems

Course Outcomes (COs)

Course Title & Code: Research Methodology and Biostatistics (PSF613)

After the successful completion of this course, the student will be able to:

- CO-1. Recognize the value, scope, objective and requirements of research
- CO-2. Discuss the basic concept and importance of statistical analysis
- CO-3. Outline the basic principles of medical research
- CO-4. Summarize the guidelines for the maintenance of laboratory animals
- CO-5. Perform the profession of Pharmacy with code of conduct and ethics
- CO-6. Apply the principles of medical research for the development of knowledge in the field of medicine



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Course Outcomes (COs)

Course Title & Code: Journal Club (PSF614)

After the successful completion of this course, the student will be able to:

- CO-1. Select scientific articles from reputed journals
- CO-2. Use search engines to select scientific articles
- CO-3. Critically appraise scientific articles and assess the quality
- CO-4. Develop a report on the critically appraised article
- CO-5. Present the critically appraised article in appropriate forum

Course Outcomes (COs)

Course Title & Code: Group Project (PSF615)

After the successful completion of this course, the student will be able to:

- CO-1. Work in a team and undertake a project in the area of Pharmaceutical Sciences
- CO-2. Apply concepts of pharmaceutical sciences for executing the project
- CO-3. Apply appropriate research methodology while formulating a project
- CO-4. Generate specifications, synthesize, analyse, develop and evaluate a project
- CO-5. Defend the project, exhibit, make a presentation and document the work

Course Outcomes (COs)

Course Title & Code: Discussion / Synopsis Presentation (PSF616)

After the successful completion of this course, the student will be able to:

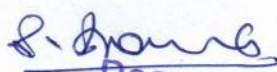
- CO-1. Identify Research problem
- CO-2. Discuss research problem with team and peers for solution
- CO-3. Develop a protocol report on the critically appraised research problem
- CO-4. Present the critically appraised research problem in appropriate forum

Course Outcomes (COs)

Course Title & Code: Research Work (PSF617)

After the successful completion of this course, the student will be able to:

- CO-1. Review scholarly literature collected from various sources critically for the project and formulate a research problem
- CO-2. Prepare and present a research proposal
- CO-3. Conduct research to achieve research objectives
- CO-4. Propose new ideas/methodologies or procedures for further improvement of the research problem
- CO-5. Create research document of the findings
- CO-6. Defend the research findings in front of scholarly audience


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Course Outcomes (COs)

Course Title & Code: Journal Club PSF618)

After the successful completion of this course, the student will be able to:

- CO-1. Select scientific articles from reputed journals
- CO-2. Use search engines to select scientific articles
- CO-3. Critically appraise scientific articles and assess the quality
- CO-4. Develop a report on the critically appraised article
- CO-5. Present the critically appraised article in appropriate forum

Course Outcomes (COs)

Course Title & Code: Discussion / Presentation (PSF619)

After the successful completion of this course, the student will be able to:

- CO-1. Identify the research problem
- CO-2. Discuss research problem with team and peers for solution
- CO-3. Develop a protocol report on the critically appraised research problem
- CO-4. Present the critically appraised research problem in appropriate forum

Course Outcomes (COs)

Course Title & Code: Research Work (PSF620)

After the successful completion of this course, the student will be able to:

- CO-1. Review scholarly literature collected from various sources critically for the project and formulate a research problem
- CO-2. Prepare and present a research proposal
- CO-3. Conduct research to achieve research objectives
- CO-4. Propose new ideas/methodologies or procedures for further improvement of the research problem
- CO-5. Create research document of the findings
- CO-6. Defend the research findings in front of scholarly audience

Course Outcomes (COs)

Course Title & Code: Participation/ Presentation in Research Forum (PSF621)

After the successful completion of this course, the student will be able to:

- CO-1. Identify a suitable conference /research forum/workshop/symposium for participation/presentation
- CO-2. Participation in a conference/research forum/workshop/symposium of the chosen research domain
- CO-3. Present a research work in the conference/research forum of the chosen research domain



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Course Outcomes (COs)

Course Title & Code: Publication: National/ International (PSF622)

After the successful completion of this course, the student will be able to:

- CO-1. Write a research paper based on research and journal requirements
- CO-2. Publish the research work manuscript in a reputed journal

Course Outcomes (COs)

Course Title & Code: Academic/Research Award (PSF623)

- CO-1. Synthesize the academic accomplishments /research findings in the form of report
- CO-2. Identify an appropriate award granting agency to submit the report
- CO-3. Develop required documents applicable to submit the academic accomplishment / research report



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