

# 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 Pharmacognosy

Programme Code: 056

Programme Outcome (PO)

Programme Specific Outcome (PSO)

Programme Educational Objectives (PEO)

Course Outcomes (CO)

  
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Registrar

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Bangalore - 560 054

Approved in 23<sup>rd</sup> ACM (Resolution 23.05) held on 15<sup>th</sup> July 2021

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# Faculty of Pharmacy (FPH)

**Programme Name: M. Pharm. Pharmacognosy (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.

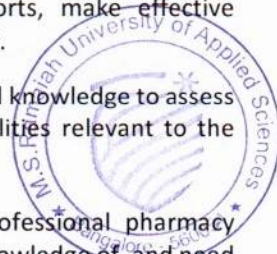
**PO-11. Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess

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

### Programme Specific Outcomes (PSOs)

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

- PSO-1. Apply the knowledge to ensure the quality of herbal drugs and pharmaceuticals by using various modern techniques to develop innovative and safe solutions to real- world problems
- PSO-2. Adapt to various advancements in herbal drug research/industries, isolation of phytoconstituents, summarize the concepts of traditional system of medicines and explicate the various aspects of biotechnology and natural products of medicinal interest
- 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 Pharmacognosy are to:

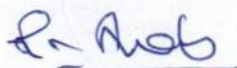
- PEO-1. Provide students with various advancements in herbal drug research to enable them to devise and deliver efficient solutions to challenging problems in Pharmacy and allied disciplines
- PEO-2. Impart analytic and cognitive skills required to develop innovative solutions for R&D, Industry, and 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: Modern Pharmaceutical Analytical Techniques (Theory) (PCF501)

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: Advanced Pharmacognosy-I (Theory) (PGC502)

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

- CO-1. Explain the advances in cultivation and production of crude drugs
- CO-2. Elaborate on the various phytochemical aspects of herbal drugs and recent advances in the field of Pharmacognosy
- CO-3. Appraise the medicinal importance of nutraceuticals and marine drugs
- CO-4. Discuss various aspects of Pharmacovigilance with respect to herbal drugs
- CO-5. Predict herb-drug, herb-herb interactions
- CO-6. Discuss recent trends and advances in cultivation, novel products of natural origin, Phytochemistry and Pharmacovigilance

## Course Outcomes (COs)

Course Title & Code: Phytochemistry (Theory) (PGC503)

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

- CO-1. Explain phytochemical aspects and biogenesis of various secondary metabolites
- CO-2. Outline the importance of drug discovery
- CO-3. Elucidate the structure of phytoconstituents
- CO-4. Apply the principles of HPTLC and LCMS/GCMS in characterization of herbal extracts
- CO-5. Analyse herbal extracts for the presence of phytoconstituents
- CO-6. Discuss recent trends and advances in the field of Phytochemistry

## Course Outcomes (COs)

Course Title & Code: Industrial Pharmacognostical Technology (Theory) (PGC504)

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

- CO-1. Outline infrastructure and quality regulations involved in herbal drug industries
- CO-2. Explain the concept of quality assurance in herbal drug industry
- CO-3. Design the monographs of herbal drugs
- CO-4. Develop skills for the quality control of herbal drugs and formulations
- CO-5. Discuss Intellectual property rights and regulatory affairs for herbal products
- CO-6. Discuss the recent trends, quality and regulatory requirements of herbal industries

## Course Outcomes (COs)

Course Title & Code: Pharmacognosy Practical - I (PGL505)

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

- CO-1. Analyze herbal extracts for the identification of phytoconstituents
- CO-2. Perform TLC and HPTLC studies of Phytoconstituents
- CO-3. Estimate phytoconstituents in herbal extracts and drugs
- CO-4. Develop skills for the quality control of herbal drugs and formulation



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CO-5. Formulate and evaluate different types of herbal dosage form

### Course Outcomes (COs)

Course Title & Code: Seminar and Assignment (PGS506)

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: Medicinal Plant Biotechnology (Theory) (PGC507)

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

- CO-1. Explain basic aspects of plant genetics and significance of transgenic
- CO-2. Outline the role of PCR in genome analysis and fermentation technology
- CO-3. Analyze the principles of different tissue culture techniques to enhance the production of secondary metabolites
- CO-4. Illustrate the applications of Recombinant DNA technology
- CO-5. Discuss the aspects of immobilization techniques and secondary metabolite production
- CO-6. Discuss the recent trends and advances in genetics, plant tissue culture and fermentation technology

### Course Outcomes (COs)

Course Title & Code: Advanced Pharmacognosy II (Theory) (PGC508)

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

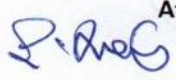
- CO-1. Explain the efficacy, validation, Pharmacodynamic & Pharmacokinetic aspects of Herbal medicine products/therapies
- CO-2. Outline the role of ethnobotany and ethnopharmacology in drug discovery and evaluation
- CO-3. Discuss the various analytical profiles for the validation of herbal drugs
- CO-4. Develop skills for the detection of adulteration and evaluation techniques
- CO-5. Apply the various phyto-pharmacological screening methods for various biological properties
- CO-6. Discuss recent trends and advancements in drug discovery related to natural products

### Course Outcomes (COs)

Course Title & Code: Indian Systems of Medicine (Theory) (PGC509)

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

- CO-1. Explain the basic principles of Indian systems of medicine

  
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- CO-2. Outline the preparation of some of the important class of formulations used in Indian system of medicines
- CO-3. Analyze the quality assurance aspects of GAP, GLP and GMP involved in Indian systems of medicine formulation industry
- CO-4. Appraise the importance of Traditional Knowledge Digital Library
- CO-5. Discuss the role, responsibilities and contributions by AYUSH, ISM, CCRAS, CCRS, CCRH, CCRU
- CO-6. Discuss the concepts of traditional systems of medicine, their development and various formulations including their manufacture, quality control and safety monitoring.

### Course Outcomes (COs)

Course Title & Code: Herbal Cosmetics (Theory) (PGC510)

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

- CO-1. Outline the economic aspects of various herbal/natural cosmetic preparations
- CO-2. Explain the regulatory provisions and the principles of various herbal/natural cosmetic preparations
- CO-3. Analyze commonly used raw materials and design of herbal cosmetic formulations.
- CO-4. Develop the skill to formulate and evaluate herbal cosmetics
- CO-5. Apply the test methods in the analysis of cosmetics, as per Drug and Cosmetics Act and also toxicity screening methods.
- CO-6. Discuss the market potential of herbal cosmetics and various aspects including its raw materials, preparations and analysis.

### Course Outcomes (COs)

Course Title & Code: Pharmacognosy Practical – II (PGL511)

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

- CO-1. Isolate and estimate DNA, RNA from different sources
- CO-2. Select sterilization techniques to sterilize explants for the initiation of callus and suspension culture
- CO-3. Formulate and evaluate herbal formulations and herbal cosmetics for its quality and purity
- CO-4. Estimate secondary metabolites from natural sources
- CO-5. Prepare and evaluate formulations of traditional system of medicine

### Course Outcomes (COs)

Course Title & Code: Seminar and Assignment (PGS512)

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



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## Course Outcomes (COs)

Course Title & Code: Research Methodology and Biostatistics (PGF613)

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

- CO-1. Identify 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. Translate pharmaceutical ethics into practice
- CO-6. Apply the principles of medical research for the development of knowledge in the field of medicine

## Course Outcomes (COs)

Course Title & Code: Journal Club (PGF614)

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

- CO-1. Select scientific articles from reputed journals
- CO-2. Make use of 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. Discuss the critically appraised article in appropriate forum

## Course Outcomes (COs)

Course Title & Code: Group Project (PGF615)

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

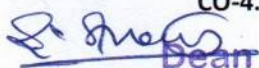
- CO-1. Demonstrate ability to work in a team and undertake a project in the area of Pharmaceutical Sciences
- CO-2. Apply concepts of pharmaceutical sciences for executing the project
- CO-3. Apply appropriate research methodology while formulating a project
- CO-4. Design, develop and evaluate the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

## Course Outcomes (COs)

Course Title & Code: Discussion / Synopsis Presentation (PGF615)

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. Defend the critically appraised research problem in appropriate forum

  
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## Course Outcomes (COs)

Course Title & Code: Research Work (PGF617)

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

- CO-1. Appraise existing literature and formulate a research problem
- CO-2. Compose and present a research proposal
- CO-3. Test the hypothesis to achieve research objectives
- CO-4. Propose new ideas/ methodologies or procedures for further improvement of the research problem
- CO-5. Compile report with the research findings
- CO-6. Defend the research findings in front of scholarly audience

## Course Outcomes (COs)

Course Title & Code: Journal Club (PGF618)

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 (PGF619)

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

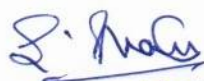
- CO-1. Identify the research problem
- CO-2. Discuss research problem with team and peers for solution
- CO-3. Develop a protocol report on the critically appraised research problem
- CO-4. Defend the critically appraised research problem in appropriate forum

## Course Outcomes (COs)

Course Title & Code: Research Work (PGF620)

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

- CO-1. Appraise existing literature and formulate a research problem
- CO-2. Compose and present a research proposal
- CO-3. Test the hypothesis to achieve research objectives
- CO-4. Propose new ideas/ methodologies or procedures for further improvement of the research problem
- CO-5. Compile report with the research findings
- CO-6. Defend the research findings in front of scholarly audience



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## Course Outcomes (COs)

Course Title & Code: Participation/ Presentation in Research Forum (PGF621)

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. Take part in a conference/research forum/workshop/symposium of the chosen research domain
- CO-3. Defend a research work in the conference/research forum of the chosen research domain

## Course Outcomes (COs)

Course Title & Code: Publication: National/ International (PGF622)

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

- CO-1. Compose a research paper based on research and journal requirements
- CO-2. Propose the research work for publication in a peer reviewed journal

## Course Outcomes (COs)

Course Title & Code: Publication: Academic/Research Award (PGF623)

- CO-1. Compile 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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