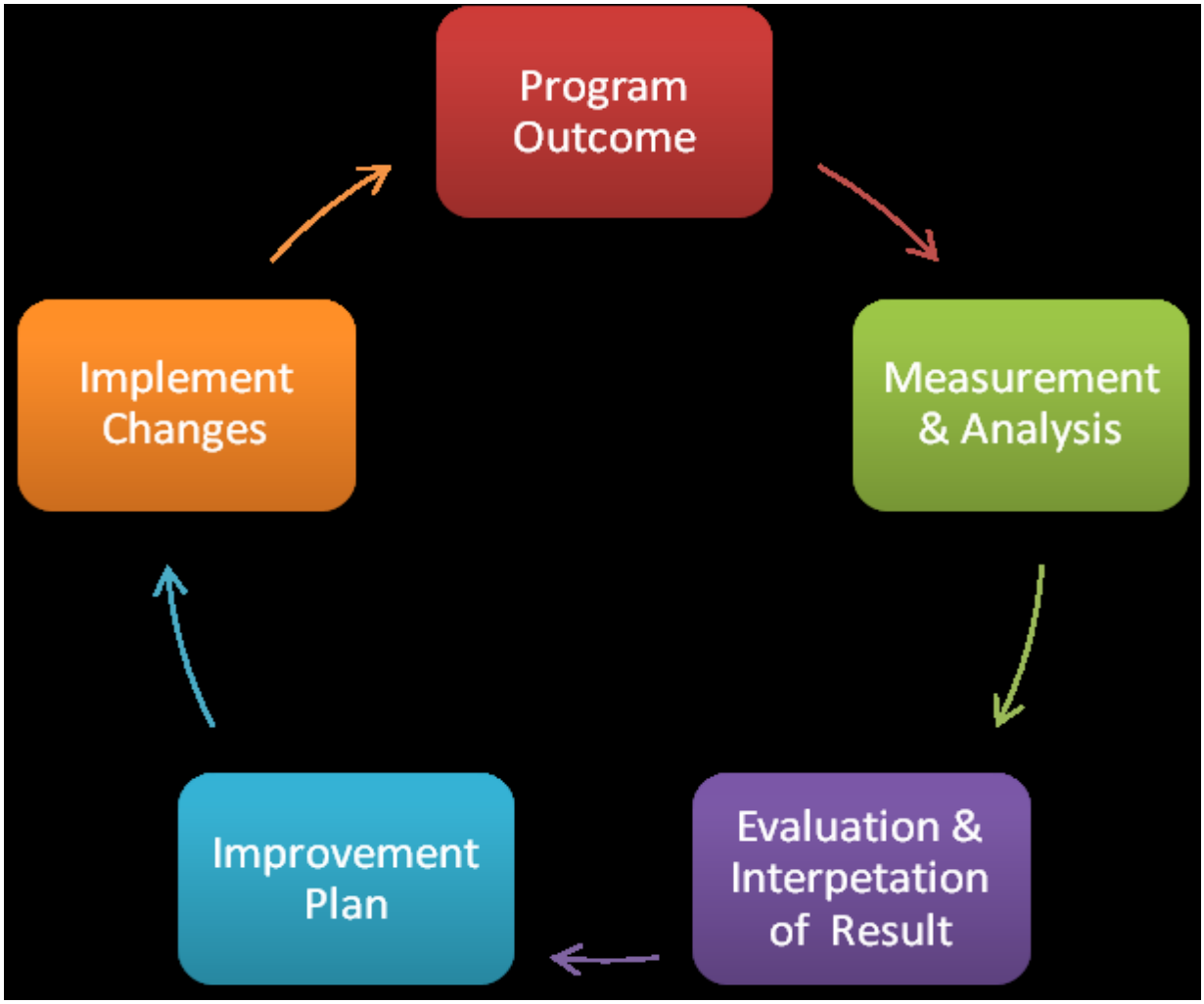
ISF College of Pharmacy (An Autonomous College)

[NAAC Accredited "A" Grade College]
GT Road, Ghal-Kalan, MOGA – 142 001 (Punjab) INDIA
Approve by AICTE, PCI & Govt. of Punjab
Affiliated to IK Gujral Punjab Technical University, Jalandhar (Pb.)

PROGRAM OUTCOMES
and
PROGRAM SPECIFIC OUTCOME

Program outcomes describe what students are expected to know and are able to do by the time of graduation. These relate to the skills, knowledge, and behaviors that students acquire as they progress through the program.



The following outcomes reflect the terminal skills that all **B. Pharmacy graduates** should be able to demonstrate upon program completion:

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 inquiry, 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 to reason 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 assesses and uses feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Program specific outcome for B. Pharmacy course

PSO.1 Graduates will demonstrate knowledge of Pharmaceutical science and Life Sciences.

PSO.2 Graduates will demonstrate an ability to identify, formulate and solve Pharmaceutical industry, community & hospital pharmacy problems.

PSO.3 The graduate will demonstrate an ability to conduct, analyze and interpret data of pharmaceutical experiments in production, Quality control & Quality assurance.

PSO.4 Graduates will demonstrate an ability to design the formulation & Synthetic process as per needs and specifications in Pharmaceutical Industries & Marketing.

PSO.5 Graduates will demonstrate an ability to understand the mechanism of drug action, its dynamics and kinetics, visualize and work on laboratory techniques and improvements.

PSO.6 The graduate will demonstrate skills to use modern Pharmaceutical tools, software and equipment to analyze & solve problems.

PSO.7 Graduates will demonstrate knowledge of professional and ethical responsibilities as per Pharmaceutical jurisprudence.

PSO.8 The graduate will be able to communicate effectively in both verbal and written form.

PSO.9 The graduate will show the understanding of the impact of Pharmaceutical sciences on society and also will be aware of modern issues.

PSO.10 The graduate will develop confidence for self-education and the ability for life-long learning.

PSO.11 Graduates will demonstrate knowledge in Research & development in all disciplines of pharmaceutical sciences and can participate and succeed in competitive examinations.

Program outcomes for Diploma

PO.1 An ability to **apply knowledge** of pharmaceutical Science**.**

PO.2 An ability to **communicate** effectively with health professionals.

PO.3 An ability to communicate with another **multidisciplinary background**.

PO.4 An understanding of professional and ethical **responsibility.**

PO.5 An ability to **design and plan** experiments of pharmaceutical sciences.

PO.6 An ability to build up **professional identity**.

PO.7 The education necessary to understand the **role of pharmacists** towards the community and society as a whole.

PO.8 An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, **environmental, sustainability** social, ethical, health and safety, and manufacturability for humans.

PO.9 An ability to use the technical skills and **modern tools** necessary to practice Pharmacy.

PO.10 An ability to understand the knowledge of **contemporary issues**.

PO.11 Recognition of the need for, and an ability to engage in **lifelong learning**.

Program specific outcomes for Diploma

PSO.1 Know different aspects of pharmaceutics which include different dosage form and their classification, manufacturing process and uses.

PSO.2 Able to understand about various dosage forms, their uses, different ayurvedic formulations, immunological products.

PSO.3 Ability to identify, formulate and solve Pharmaceutical industry, community & hospital pharmacy problems.

PSO.4 Knowledge of professional and ethical responsibilities as per Pharmaceutical jurisprudence.

PSO.5 Able to explain the role of natural products as the source of many drugs and pharmaceutical ingredients, their common adulterations and quality control parameters.

PSO.6 Ability to work with clinicians, to determine the role of the laboratory in specific situations to optimize patient safety.

PSO.7 Develop a vocabulary of appropriate terminology to effectively communicate information related to anatomy and physiology. It also provides a better understanding of the fact to recognize the anatomical structures and explain the physiological functions of body systems.

PSO.8 Understand the basic principles of diagnosis and management of several communicable and noncommunicable diseases and serve society.

PSO.9 Ability to speak and write about the pharmacological property of medicinal drugs.

PSO.10 Able to understand pharmaceutical legislation in India; students may get deep knowledge about professional and pharmaceutical code and ethics.

PSO.11 Able to understand the various function of hospital and hospital pharmacy, various in-patient and out-patient services, manufacturing within the hospital

Program outcome for Pharm D:

The following outcomes reflect the terminal skills that all **Pharm D graduates** should be able to demonstrate upon program completion:

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

Program specific Outcomes for Pharm D Students

To achieve the mission of our Pharm D program, students must develop the knowledge, skills, and attitudes that enable them to competently perform the following functions:

PSO.1 Patient/Pharmaceutical Care

- Provide high quality, evidence-based, patient-centered care in cooperation with patients, prescribers and members of the interprofessional health care team.
- Promote health and wellness and disease prevention
- Provide pharmaceutical care including, but not limited to, Medication Therapy Management (MTM), vaccinations and drug therapy monitoring in all practice areas (e.g., inpatient, ambulatory and community practice)
- Provide culturally competent pharmaceutical care and demonstrate cultural competence in all interactions
- Appropriately address patient-specific and population-specific needs

PSO.2 Medical and Science Foundations

- Demonstrate mastery and application of core knowledge and skills in relation to the evolving biomedical, clinical, epidemiological and social-behavioral sciences. This includes competency in areas supporting high quality pharmacy practice (e.g., pharmaceutics, medicinal chemistry, pharmacokinetics, pharmacodynamics, pharmacology, pathophysiology, pharmacotherapeutics, and pharmaceutical care).
- Demonstrate the ability to use critical analysis and problem solving skills for the provision of high quality, evidence-based pharmacy services and patient care.

PSO.3 Practice Based Learning and Improvement

- Evaluate practice and care, and promote continuous improvement in one's own patient care and pharmacy services.
- Demonstrate self-calibration skills and a commitment to the lifelong learning needed to provide high quality care.
- Locate, appraise and assimilate evidence from scientific studies to enhance the quality of care and services.
- Effectively utilize information, informatics and technology to optimize learning and patient care.

PSO.4 Interpersonal and Communication Skills

- Demonstrate effective interpersonal written and verbal skills, adapt to socioeconomic and cultural factors as well as situational applications.
- Effectively educate families, patients, caregivers and other Health Care Professionals.
- Function effectively in a team.
- Act in a consultative position for other members of the health care team, regulatory agencies and policy makers.

PSO.5 Professionalism

- Demonstrate exemplary professional, ethical and legal behaviors, complying with all federal, state and local laws and regulations related to pharmacy practice.
- Contribute to the training of pharmacy students, future colleagues, and the growth and success of the profession.

- Demonstrate the respect for patient privacy and autonomy, as well as sensitivity and responsiveness to diverse patient populations.
- Demonstrate a high degree of integrity, truthfulness and fairness.
- Demonstrate initiative, reliability and follow-through in fulfilling commitments

PSO.6 Systems Based Practice and Management

- Demonstrate awareness and responsiveness to the system of health care, effectively utilizing systems of care to provide cost-effective, optimal care.
- Incorporate cost awareness and risk-benefit analysis in patient and/or population-based care; this includes applying pharmacoeconomic principles to health outcomes and patient care.
- Effectively manage medication use systems.
- Prioritize patient safety and public health.
- Advocate for quality patient care and optimal health care.
- Work on interprofessional teams to enhance quality and safety.
- Participate in identifying system errors

Program outcomes of Postgraduate students

PO.1 Postgraduates will acquire adequate scientific information regarding basic principles of Pharmaceutical and Medicinal chemistry, Pharmaceutics including Cosmetology, Pharmacology and Pharmacognosy. They will also have hands on training of practical aspects of Synthesis of APIs and its intermediates along with Formulation and Development, Analysis and Quality assurance of various pharmaceutical dosage forms including those of herbal origin as per standards of official books, WHO, and other regulatory agencies.

PO.2 Postgraduates will develop an ability to plan, visualize and work on multidisciplinary tasks. They will be able to demonstrate necessary skills (eg. working independently, time management and organizational skills).They will demonstrate an adaptable, flexible and effective approach towards organizational development.

PO.3 Postgraduates will be able to think logically and solve the problems, will develop an ability to conduct, analyze and interpret data of pharmaceutical experiments in various departments (Eg: Drug discovery, Formulation & Development, Production, Quality control & Quality assurance etc) as per the needs of pharmaceutical industries.

PO.4 Postgraduates will master the key concepts in the discipline of their interest in pharmaceutical sciences. They will demonstrate these skills to use modern pharmaceutical tools, software, and equipments to analyze & solve problems.

PO.5 Postgraduates will develop leadership and interpersonal skills such as influencing others, negotiating and working with others, conflict management and leading others through the problem-solving process. They will be able to lead and function both individually and as a member of a team.

PO.6 Postgraduates will apply theoretical and practical skills developed through classroom, laboratories and team project experiences and thus will develop confidence and will be able to i) do specialized research in the core and applied areas of pharmaceutical sciences. ii) manufacture, analyse and assure the drug based formulations. iii) promote and market the pharmaceuticals and iv) train the budding pharmacist to become self-reliant pharmacist and a health care professional.

PO.7 Postgraduates will demonstrate knowledge of professional and ethical responsibilities as per pharmaceutical jurisprudence. The graduates will swear by a code of ethics of Pharmacy Council of India in relation to community and shall act as integral part of a health care system. They will demonstrate honesty, integrity, ethical understanding, and

respect for others and will carry out their professional responsibilities by adhering to high ethical standards.

PO.8 Postgraduates will acquire excellent interpersonal oral communication and writing skills. They will be able to demonstrate knowledge and proficiency with current audio-visual presentation technologies and develop an ability to communicate scientific knowledge in non-expert/lay term by adopting various modes of scientific communications (e.g., abstract, manuscripts, project reports, oral and poster presentations etc). This will allow effective exchange of professional information.

PO.9 Postgraduates will demonstrate the impact of pharmacy knowledge on the society and also will be aware of modern issues. They will create awareness of healthcare issues through interactions with others and will gain a sense of self-respect towards community and citizenship.

PO.10 Postgraduates will be able to demonstrate a high-level of understanding of the key stages in drug discovery, development, and commercialization. This will lead to the manufacturing of drugs and pharmaceuticals considering its impact on the environment and surrounding.

PO.11 Postgraduates will be able to demonstrate knowledge and skills in all disciplines of Pharmaceutical sciences and develop a sound pharmaceutical care plan to manage medication-related problems. They will retrieve, evaluate, and apply current drug information in the delivery of pharmaceutical care and assure safe and accurate preparation and dispensing of medications.

Program Specific Outcomes - M. Pharmacy (Pharmaceutical Analysis)

PSO.1 Deal with various advanced instrumental techniques for identification, characterization, and quantification of drugs.

PSO.2 Know the science of detection of impurities, impurities in pharmaceutical formulations, impurity profiling, stability testing of phytopharmceuticals, and their protocol development.

PSO.3 Understand validation and its application in industry, their methodologies and application in manufacturing processes.

PSO.4 Knowledge on analysis of food constituents and finished food products, food additives, the pesticides and the regulations of food and legislations of food products.

PSO.5 Know the Pharmacopieal assays by spectroscopical methods, calibration techniques, determination of preservatives, vitamin contents in drugs and foods.

PSO.6 Knowledge with various hyphenated analytical instrumental techniques for identification, characterization, and quantification of drugs.

PSO.7 Knowledge about extraction, separation of drugs from biological samples using different techniques and guidelines for analytical methods.

PSO.8 Know about quality assurance aspects of pharmaceutical industries such as CGMP, Documentations, certifications, GLP, and other regulatory affairs.

PSO.9 A talent pool would be created by involving students in research projects and to make students undertake research projects under faculty guidance for publication.

PSO.10 Promote ambitious desire to undertake higher studies and career growth.

Program Specific Outcomes - M. Pharmacy (Pharmaceutical Chemistry)

PSO.1 Deals with various advanced analytical instrumental techniques for identification, characterization and quantification of drugs.

PSO.2 In-depth knowledge about advances in organic chemistry, different techniques of organic synthesis and their applications to process chemistry as well as drug discovery.

PSO.3 Knowledge about recent advances in the field of medicinal chemistry at the molecular level including different techniques for the rational drug design.

PSO.4 Detail knowledge about chemistry of medicinal compounds from natural origin and general methods of structural elucidation of such compounds.

PSO.5 Ability of isolation, purification and characterization of medicinal compounds from natural origin.

PSO.6 Knowledge on the current state of the art techniques involved in computer assisted drug design.

PSO.7 Develop synthetic routes that are safe, cost-effective, environmentally friendly, and efficient.

PSO.8 Knowledge with various hyphenated analytical instrumental techniques for identification, characterization, and quantification of drugs.

PSO.9 A talent pool would be created by involving students in research projects and to make students undertake research projects under faculty guidance for publication.

PSO.10 Promote ambitious desire to undertake higher studies and career growth.

Program Specific Outcomes - M. Pharmacy (Pharmaceutics)

PSO.1 Impart knowledge on the novel drug delivery systems, approaches, criteria for selection of polymers and drugs and their formulation and evaluation.

PSO.2 Know various preformulation elements, industrial management and GMP considerations, Pilot Plant Scale Up Techniques, Stability testing, sterilization and packaging of dosage forms.

PSO.3 Impart knowledge and skills in generic drug development, various regulatory filings the approval process, and concept of generics across the globe.

PSO.4 Impart knowledge and skills for dose calculations, dose adjustments and apply biopharmaceutics theories in practical problem solving. The pharmacokinetic models, bioequivalence and potential clinical pharmacokinetic problem analysis.

PSO.5 Skill development in Pharmaceutical research, Pharmacoinformatics, in drug development in Computational modeling, Preclinical development, clinical development, Artificial Intelligence and Robotics, and Computational fluid dynamics.

PSO.6 Knowledge and skills necessary for cosmetics and cosmeceuticals, their safety and efficacy and current technologies in cosmetic industry.

PSO.7 Knowledge in use of advanced instrumentation, formulation and evaluation of controlled release formulations, floating drug delivery systems, transdermal drug delivery systems, micromeritics, and mathematical simulations.

PSO.8 Expertise in technical skill and knowledge in computer simulations, population modelings, in vitro and in vivo studies.

PSO.9 A talent pool would be created by involving students in research projects and to make students undertake research projects under faculty guidance for publication.

PSO.10 Promote ambitious desire to undertake higher studies and career growth.

Program Specific Outcomes - M. Pharmacy (Pharmaceutical Quality Assurance)

PSO.1 Deal with various advanced instrumental techniques for identification, characterization and quantification of drugs.

PSO.2 Fundamental knowledge and concepts about various quality management principles and systems utilized in the manufacturing industry.

PSO.3 Deals with the various aspects of quality control and quality assurance aspects of pharmaceutical industries. It covers the important aspects like cGMP, QC tests, documentation, quality certifications, GLP and regulatory affairs.

PSO.4 Deal with technology transfer covers the activities associated with Drug Substance, Drug Product and analytical tests and methods.

PSO.5 Knowledge necessary to understand issues related to different kinds of pharmaceutical industrial hazard and their management.

PSO.6 Understand about validation and how it can be applied to industry and thus improve the quality of the products.

PSO.7 Deals with the understanding and process for auditing in pharmaceutical industries.

PSO.8 Knowledge and skills necessary with the industrial activities during Pharmaceutical Manufacturing.

PSO.9 A talent pool would be created by involving students in research projects and to make students undertake research projects under faculty guidance for publication.

PSO.10 Promote ambitious desire to undertake higher studies and career growth.

Program Specific Outcomes - M. Pharmacy (Pharmacology)

PSO.1 Deal with various advanced instrumental techniques for identification, characterization and quantification of drugs.

PSO.2 Demonstrate basic knowledge in the field of pharmacology and to impart recent advances in the drugs used for the treatment of various diseases. In addition, pharmacologist will understand the concepts of drug action and mechanisms involved.

PSO.3 Knowledge on preclinical evaluation of drugs and recent experimental techniques in the drug discovery and development.

PSO.4 Pharmacologist will appraise the regulations and ethical requirement for the usage of experimental animals.

PSO.5 Pharmacologist will have fundamental knowledge on the structure and functions of cellular components and interaction of these components with drugs. This information will further help the student to apply the knowledge in drug discovery process.

PSO.6 Pharmacologist will easily demonstrate the adverse effects, contraindications and clinical uses of drugs used in treatment of diseases to the society.

PSO.7 Impart knowledge on the preclinical safety and toxicological evaluation of drug & new chemical entity.

PSO.8 Pharmacologist will make the student competent in drug discovery process.

PSO.9 A talent pool would be created by involving students in research projects and to make students undertake research projects under faculty guidance for publication.

PSO.10 Promote ambitious desire to undertake higher studies and career growth.

Program Specific Outcomes - M. Pharmacy (Pharmacognosy)

PSO.1 Deals with various advanced analytical instrumental techniques for identification, characterization and quantification of drugs.

PSO.2 Understand the advances in the field of cultivation and isolation of drugs of natural origin, various phytopharmaceuticals, nutraceuticals and their medicinal use and health benefits.

PSO.3 Equipped with the knowledge of natural product drug discovery and will be able to isolate, identify and extract and the phytoconstituents.

PSO.4 Understand the Industrial and commercial potential of drugs of natural origin, integrate traditional Indian systems of medicine with modern medicine and also will know regulatory and quality policy for the trade of herbals and drugs of natural origin.

PSO.5 Knowledge of biotechnology and its application in the improvement of quality of medicinal plants.

PSO.6 Understand the Adulteration and Deterioration that occurs in herbal/natural drugs and methods of detection of the same. Also they will know about herbal remedies and their validations, including methods of screening.

PSO.7 Understand thoroughly the principles, preparations of medicines of various Indian systems of medicine like Ayurveda, Siddha, Homeopathy and Unani and clinical research of traditional medicines, quality assurance and challenges in monitoring the safety of herbal medicines.

PSO.8 Vast knowledge about preparation and standardization of herbal/natural cosmetics.

PSO.9 A talent pool would be created by involving students in research projects and to make students undertake research projects under faculty guidance for publication.

PSO.10 Promote ambitious desire to undertake higher studies and career growth.