SNDT Women's University

C. U. Shah College of Pharmacy

Name of Programme: M. Pharm.

SPECIALIZATION: PHYTOPHARMACY AND PHYTOMEDICINE

Program Outcomes

1) To emphasize on modern analytical techniques like UV & IR spectrophotometry, spectroflurometry, NMR, Mass Spectrometry, HPLC, X-ray diffraction analysis and spectral analysis and understand herbal product development and packaging designed to teach current trends in formulation of herbal pharmaceuticals and newer herbal drug delivery systems.
2) To thrust on good manufacturing practices, quality audits, documentation and validation Regulatory affairs, New Drug Application and patenting procedures for herbal products with a view to create total quality consciousness in herbal drug industry
3) To develop professionally competent and motivated individuals who can contribute effectively and ethically in academia, pharmaceutical industry and can also pursue higher education

Program Specific Outcomes

After successful completion of the program, the learner will be able to

1) Have a complete understanding of important research areas of herbal crude drugs.
2) Have end to end knowledge of important aspects of herbal drug technology.
3) Build expertise in various disciplines of herbal medicines, which can be applied in the herbal industry in various departments like manufacturing, research and development, formulation development, drug discovery, quality control, regulatory affairs, intellectual property rights, scientific/medical writing, pharmacovigilance study, sales and marketing.

Course Outcomes

Semester-I

Course Code	Course Name	Course Outcomes
S1-[P&P]-1	Modern Analytical Techniques-I [Theory]	The learners will be able to 1. Learn basic concepts, principles and advanced analytical instrumental techniques such as UV, IR, Spectroflorimetry, X-ray diffraction, Atomic absorption and emission spectroscopy and electrophoresis, for identification, characterization and quantification of drugs. 2. Be competent for the basic quality control requirements or needs of the industries.
S1-[P&P]-1	Modern Analytical Techniques-I	The learners will be able to 1. Develop skills in selecting the suitable techniques for analysis

	[Practical]	of drugs and pharmaceuticals products. 2. To apply the knowledge learnt in developing new analytical procedures of the research work.
S1-[P&P]-2	Advanced Pharmacognosy and Phytochemistry-I [Theory]	The learners will be able to 1. Apply standardized quality control parameters to test quality of crude drugs from natural origin. 2. Determine the adulterations found in herbal crude drugs, 3. Follow Pharmacopoeial standards and monographs using various herbal pharmacopoeias. 4. Understand WHO guidelines required for cultivation, collection and quality control of herbal drugs.
S1-[P&P]-2	Advanced Pharmacognosy and Phytochemistry-I [Practical]	The learners will be able to 1. Identify medicinal plants using various macroscopic and microscopic parameters. 2. Know different conventional and novel methods of extraction of crude drugs. 3. Apply Pharmacovigilance study for herbal drugs. 4. Develop knowledge and skills of selecting suitable techniques for separation and isolation of bioactive phytoconstituents using various chromatographic techniques and spectral analysis.
S1-[P&P]-3	TQM, Patent Regulation and Validation [Theory]	The learners will be able to 1. Understand the importance of quality in pharmaceutical products. 2. Know total quality management and concepts of GMP, GLP and GCP. 3. Understand the preparation, applications and importance of documentation in herbal industry. 4. Know quality audits, ICH guidelines and statistical analysis. 5. Apply based knowledge of validation processes, Regulatory aspects and Intellectual property rights for herbal products.
S1-[P&P]-4	Herbal Product Development-I (Theory)	The learners will be able to 1. Understand pre-formulation study design, different methods to identify drug-excipient interactions and herbal drug stability in Herbal product development. 2. Gain application based knowledge to formulate solid dosage f orms such as tablets and coating technology. 3. Prepare and standardize of herbal formulation. 4. Study Pharmaceutical polymers for novel drug delivery system [NDDS]. 5. Understand drug dissolution and diffusion studies, pharmacokinetic modeling of the herbal products
Semester-II		

S2-[P&P]-1	Modern Analytical Techniques- II [Theory]	The learners will be able to 1. Learn principles and techniques of various types of planar chromatography such as PC, TLC and HPTLC, 2. Understand principles and techniques of various types of column chromatography such as HPLC, GC etc. 3. Elucidate structures of pure isolated phytoconstituents - Theory and Problem solving, using spectral analysis such as UV, IR, Mass spectroscopy, NMR etc. which can be used for characterization of bioactive phytoconstituents from herbal sources.
S2-[P&P]-1	Modern Analytical Techniques-I [Practical]	The learners will be able to 1. Apply PC, TLC, HPTLC, HPLC and GC which can be applied for identification and analysis of herbal crude drugs and products and for separation, isolation and analysis of marker compounds, extracts and herbal formulations. 2. Elucidate structures of pure isolated phytoconstituents - Theory and Problem solving, using spectral analysis (UV,IR,Mass, NMR etc.) which can be used for characterization of bioactive phytoconstituents from herbal sources.
S2-[P&P] -2	Advanced Pharmacognosy & Phytochemistry-I [Theory]	The learners will be able to 1. Apply standardization of herbal drugs, qualitative and quantitative phytochemical evaluation of herbal extracts using various analytical techniques. 2. Understand drug discovery and development of novel phytoconstituents from natural sources such as Taxol, Artemisin etc. 3. Handle regulatory requirements/documentation required for herbal products.
S2 – [P&P] -2	Advanced Pharmacognosy & Phytochemistry-I [Practical]	The learners will be able to 1. Apply knowledge about recent trends and advances in the field of phytochemistry. 2. Gain expertise in isolation of various important phytoconstituents from the crude drugs. 3. Understand in-depth bioactivity guided fractionations, phytochemical fingerprinting and structure elucidation of phytoconstituents. 4. Apply standardized quality control parameters to test quality of herbal formulations.
S2-[P&P]-3	Herbal Product Development-II (Theory)	The learners will be able to 1. Learn concepts of rate controlled and site specific drug delivery systems and particulate carrier systems. 2. Understand the need, concept, design and evaluation of various site specific drug delivery such as ocular and transdermal drug delivery system and advances in Oral, Mucosal, Intrauterine &

		Parenteral drug delivery system with respect to herbal drug delivery systems to safely achieve desired therapeutic effect of the herbal drugs with suitable drug delivery system. 3. Know packaging materials and product-package compatibility for herbal dosage forms.
S2-[P&P] - 4	Ayurveda And Allied Plant Based Therapies (Theory)	The learners will be able to 1. Understand primary concepts and principle of various traditional system of medicines such as Ayurveda, Unani, Homeopathy and Siddha. 2. Gain knowledge of preparation and standardization of various formulations used in alternative systems of medicines. 3. Use monographs of medicinal plants in various pharmacopoeias for studies, salient features of the techniques of preparation of some of the important class of formulations as per Ayurveda, Siddha, Homeopathy and Unani Pharmacopoeia and other texts. 4. Understand standardization, shelf life and stability studies of different Indian systems of medicines.
Semester-III		
S3-[P&P]-1	Industrial Training	The learners will be able to 1. Understand industrial application of the theory and practical based research knowledge on various research areas of medicinal plants that the students gain through different subjects studied in the three semesters.
S3-[P&P] - 2	Biological Evaluation (Theory)	The learners will be able to 1. Understand pre-clinical drug evaluations and recent experimental techniques in the drug discovery and development. 2. Know maintenance of laboratory animals as per the guidelines. 3. Gain in-depth knowledge of various in-vitro and in-vivo preclinical evaluation processes and the regulations and ethical requirement for the usage of experimental animals.
S3-[P&P]-3	Computing & Statistics [Theory]	The learners will be able to 1. Apply computers in pharmaceutical sciences, stores management, inventory control, drug information systems and hospital information systems. 2. Know the statistical techniques in solving the problems. 3. Introduce to computer-aided drug design (CADD), QSAR various soft wares and molecular modeling in CADD. 4. Understand concepts of Statistics Probability, internet & application of soft wares in data interpretation. 5. Understand the statistical data analysis & application of spreadsheet to pharmacy.

S3-[P&P]-4	Research Methodology	The learners will be able to 1. Understand various aspects and ethics associated with research methodology. 2. Identify research problem, its implementation and evaluation. 3. Apply to various research funding agencies which provide grants for the research projects. 4. Define research problem and building hypothesis which will be helpful in industrial R&D projects. 5. Know risk assessment and uncertainty associated with experimental modeling can be applied in industrial projects. 6. Understand research deliverables in form of various publications, thesis writing and presentations and principles on ethical consideration involving research and issues related to plagiarism will help the candidate to design and work on an innovative and ethical research work.
S3-[P&P]-5	Research Seminar	The learners will be able to 1. Carry out literature survey on the given research topic, interpret and compile the data into a scientific presentation. 2. Efficiently prepare more focused and professional power point presentation. 3. Develop good communication skills 4. Develop confidence to present information clearly and effectively.
S3-[P&P]-6	Minor Research Project	The learners will be able to 1. Able to do literature search, build a rationale, collect, analyze, interpret and evaluate the information that is related to the specific area of research. 2. Able to efficiently plan a research project. 3. Apply the concept of research methodologies, methods and analytical techniques. 4. Do research work independently in the laboratory. 5. Efficiently solve the research problems. 6. Able to compile, present and defend the research report.
Semester-IV		
S4-[P&P]-1	Research Project	The learners will be able to 1. Review scholarly literature collected from various scientific sources critically for the project and formulates a research rationale in the research area of medicinal plants. 2. Efficiently conduct research to achieve the objectives. 3. Propose new ideas/ methodologies or procedures in the research area of medicinal plants. 4. Able to compile the findings into a research thesis. 5. Able to prepare and present the research work. 6. Able to defend research findings in front of scholarly audience.