

# **Program- M.Pharm**

## **Pharmacognosy**

### **MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES**

#### **Course Outcomes**

After undergoing this course students will be able to:

1. Recognize the importance of modern instruments in the pharmaceutical analysis
2. Discuss the fundamental principles and applications of UV-visible, IR, flame emission, atomic absorption, NMR and Mass spectroscopy
3. Document the principles and applications of chromatographic, and electrophoretic separation techniques
4. Appraise X-ray crystallographic methods and radioimmunological assays
5. Summarize the instrumentation of the modern analytical techniques
6. Assess appropriate techniques for the analysis of various drugs and formulations

### **ADVANCED PHARMACOGNOSY I**

#### **Course Outcomes**

After undergoing this course students will be able to:

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

### **PHARMACOGNOSY PRACTICALS – I**

#### **Course Outcomes**

After undergoing this course students will be able to:

1. Analyse herbal extracts for the identification of phytoconstituents
2. Perform TLC and HPTLC studies of Phytoconstituents
3. Estimate phytoconstituents in herbal extracts and drugs
4. Develop skills for the quality control of herbal drugs and formulation
5. Formulate and evaluate different types of herbal dosage forms

### **PHYTOCHEMISTRY**

#### **Course Outcomes**

After undergoing this course students will be able to:

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

### **INDUSTRIAL PHARMACOGNOSTICAL TECHNOLOGY**

#### **Course Outcomes**

After undergoing this course students will be able to:

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

### **MEDICINAL PLANT BIOTECHNOLOGY**

#### **Course Outcomes**

After undergoing this course students will be able to:

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

### **ADVANCED PHARMACOGNOSY II**

#### **Course Outcomes**

After undergoing this course students will be able to:

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

### **INDIAN SYSTEMS OF MEDICINE**

#### **Course Outcomes**

After undergoing this course students will be able to:

1. Explain the basic principles of Indian systems of medicine

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

## **HERBAL COSMETICS**

### **Course Outcomes**

After undergoing this course students will be able to:

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

## **PHARMACOGNOSY PRACTICAL - II**

### **Course Outcomes**

After undergoing this course students will be able to:

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

## **RESEARCH METHODOLOGY & BIOSTATISTICS**

### **Course Outcomes**

After undergoing this course students will be able to:

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

## **DISCUSSION / SYNOPSIS PRESENTATION**

### **Course Outcomes**

After undergoing this course students will be able to:

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

## **GROUP PROJECT**

### **Course Outcomes**

After undergoing this course students will be able to:

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

### **JOURNAL CLUB**

#### **Course Outcomes**

After undergoing this course students will be able to:

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

### **RESEARCH METHODOLOGY AND BIostatISTICS**

#### **Course Outcomes**

After undergoing this course students will be able to:

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

### **DISCUSSION / COLLOQUIUM PRESENTATION**

#### **Course Outcomes**

After undergoing this course students will be able to:

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

### **RESEARCH WORK**

#### **Course Outcomes**

After undergoing this course students will be able to:

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