

M.Pharmacy- PHARMACEUTICAL ANALYSIS**Program Educational Objectives (PEOs)**

- The course is designed to impart the knowledge in the field of Pharmaceutical Analysis. The various modern analytical techniques like UV-Visible, IR, NMR, Mass, GC, HPLC, different chromatographic methods are taught to enable the students to understand and apply the principle involved in the determination and of different bulk drugs and their formulations, analysis of food constituents and finished food products.
- In addition to the theoretical aspects, the basic practical knowledge relevant to the analysis is also imparted.
- The topics which are present in the Drug regulatory affairs are very much useful which increases the knowledge regarding the regulatory aspects in the pharmaceutical industries.
- The course deals with various hyphenated analytical instrumental techniques for identification, characterization and quantification of drugs. Instruments dealt are LC-MS, GC-MS, and hyphenated techniques in analytical and biological samples.
- This course 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.

Program Outcomes (POs)

- Gain appreciable knowledge about the theoretical and practical aspects of modern analytical techniques and their application in analysis of drug substances, formulations, excipients and food products and about different validation procedures according to guidelines.
- Understand the advancements in major instrumental analytical techniques used in bio-analysis, herbal and cosmetic analysis and also about QA practices
- Attain knowledge in research methodologies, biostatistical tools and article writing in Journals.
- Able to develop new analytical methods by using various instrumental techniques for application in different fields of science

Program Specific Outcomes (PSOs)

- ❖ PSO1: Understand and apply principles of various analytical techniques.
- ❖ PSO2: Understand and apply various methods of analysis of pharmaceutical food sources and probiotics.
- ❖ PSO3: Provide exposure in various techniques in equipment and premises validation and validation of analytical methods
- ❖ PSO4: Understand and apply principles of various Bio-analytical techniques and provide exposure to advanced experimental/theoretical methods of analysis biological.
- ❖ PSO5: understand the application biostatistics in project works.

Course Outcomes:

M.Pharm Sem – I (Pharmaceutical Analysis)

**(Core course–I)
ADVANCED PHARMACEUTICAL ANALYSIS**

Outcome: The quantitative determination of various organic compounds is clearly understood. The spectral analysis, dissolution parameters and microbial assays are also learned.

**(Core course–II)
Food Analysis**

Outcome:

At completion of this course student shall be able to understand various analytical techniques in the determination of

- Food constituents
- Food additives
- Finished food products
- Pesticides in food
- And also student shall have the knowledge on food regulations and legislations

**(Core course–III)
MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES**

Outcome: The appreciable knowledge will be gained by the students in the Modern Analytical Techniques and can apply the theories in the Analysis of various bulk drugs and their formulations. The students will also be in a position to apply their knowledge in developing the new methods for the determination and validate the procedures.

1. To know about basic principles and techniques of chromatography.
2. To know about detection and quantification of analytes by instrumental chromatographic techniques.
3. To determine and illustrate the samples by spectroscopic methods.
4. To know the molecular weight of the compounds and application of hyphenated techniques.
5. For structure elucidation with the help of protons and carbons present.

**(Core Elective I)
Pharmaceutical Validation**

Outcome:

Upon completion of the subject student shall be able to

- Explain the aspect of validation
- Carryout validation of manufacturing processes
- Apply the knowledge of validation to instruments and equipments
- Validate the manufacturing facilities

(Core Elective-I)
INTELLECTUAL PROPERTY RIGHTS

Outcome: The clear information about the patent laws, intellectual property rights and drug regulation in India and abroad is gained by the students.

(Open Elective I)
DRUG REGULATORY AFFAIRS

Outcome:

- Students will come to know the different competent regulatory authorities globally.
- Students be aware of technical aspects pertaining to the marketing authorization application(MAA)
- The regulatory guidelines and directions framed by the regulatory authorities will be helpful to place the drug products in market for marketing approvals.

(Open Elective I)
PHARMACOEPIDEMIOLOGY & PHARMACOECONOMICS

Outcome:

Upon completion of this course it is expected that students shall be able to:

- Understand the various epidemiological methods and their applications
- Understand the fundamental principles of Pharmacoeconomics.
- Identify and determine relevant cost and consequences associated with pharmacy products and services.
- Perform the key Pharmacoeconomics analysis methods
- Understand the Pharmacoeconomic decision analysis methods and its applications.
- Describe current Pharmacoeconomic methods and issues.
- Understand the applications of Pharmacoeconomics to various pharmacy settings.

(Open Elective I)
PHARMACEUTICAL MANAGEMENT

Outcome:

- These topics are useful for the students to know how to manage a pharma industry and its various departments viz QA, QC, RA, Production etc.
- Along with this it aids the students to develop leadership qualities, communication & interpersonal skills, decisions making, motivation, organization & various managerial functions & professional skills required for a dynamic professional.
- Management helps to understand the concept of managerial control, its levels & role, importance in pharma industry

(Open Elective I)
HERBAL COSMETICS TECHNOLOGY

Outcome:

Students will learn about the raw materials used in herbal cosmetics and get exposed to various preparations of herbal cosmetics.

(Open Elective I)
PHARMACEUTICAL FORMULATION TECHNOLOGY

Outcome: Students shall explain the preformulation parameters, apply ICH guidelines and evaluate drug, drug excipients compatibility. Students also explain about formulation and development, use of excipients in tablets, powders, capsules, micro-encapsules and coating techniques. They also learn and apply the statistical design in different formulations.

I Year – II Sem M.Pharm (PHARMACEUTICAL ANALYSIS)

(Core course IV)
ADVANCED INSTRUMENTAL ANALYSIS

Outcome: By the completion of topics the students will come out with the thorough knowledge of various spectral aspects of X-Ray, IR, SEM, ORD etc which help them in further projects works and also industrial opportunities.

(Core course V)

QUALITY CONTROL AND QUALITY ASSURANCE

Outcome: The study of this subject builds the confidence in the minds on the students to develop and formulate high quality pharmaceutical products.

(Core course VI)

MODERN BIO-ANALYTICAL TECHNIQUES

Outcomes:

Upon completion of the course, the student shall be able to understand

1. Extraction of drugs from biological samples
2. Separation of drugs from biological samples using different techniques
3. Guidelines for BA/BE studies

(Core Elective –II)

BIOSTATISTICS AND RESEARCH METHODOLOGY

Outcome: The student will be known the Biostatistics arrangement, presentation and formation of tables and charts. They also know the correlation and regression & application of different methods, analysis of data and also learn how to write dissertation, thesis and Research paper.

(Core Elective II)

SPECTRAL ANALYSIS

Outcome: By the completion of topics the students will come out with the thorough knowledge of various spectral aspects of X-Ray, IR, SEM, ORD etc which help them in further projects works and also industrial opportunities.

(Open Elective- II)

SCREENING METHODS AND CLINICAL RESEARCH

Outcome: - The expected outcomes are student will know how to handle animals and know about various techniques for screening drugs for different pharmacological activities and guidelines and regulations for screening new drug molecules on animals and human volunteers.

(Open Elective- II)

STABILITY OF DRUGS AND DOSAGE FORMS

Outcome: The students should describe the evaluation of stability of solutions, solids and formulations against adverse conditions. The students should be able to suggest the measures to retain stability and storage conditions for retaining the efficacy of the products.

(Open Elective- II)

ENTREPRENEURSHIP MANAGEMENT

Outcome: On completion of this course it is expected that students will be able to understand,

- The Role of enterprise in national and global economy
- Dynamics of motivation and concepts of entrepreneurship
- Demands and challenges of Growth Strategies And Networking

(OpenElective–II)

NANO BASED DRUG DELIVERY SYSTEMS

Outcomes – The students should be able to select the right kind of materials, able to develop nano formulations with appropriate technologies, evaluate the product related test and for identified diseases

(Open Elective- II)
HERBAL AND COSMETIC ANALYSIS

Outcomes

At completion of this course student shall be able to understand

- Determination of herbal remedies and regulations
- Analysis of natural products and monographs
- Determination of Herbal drug-drug interaction
- Principles of performance evaluation of cosmetic products.

M.Pharmacy -PHARMACEUTICS

Program Educational Objectives (PEOs)

- The course is designed to impart specialized knowledge on the properties of drugs and dosage forms during manufacture storage and shelf life and to train the students on scale up, technology transfer process and industrial safety issues.
- In addition to the theoretical aspects, the basic practical knowledge relevant to the pharmaceuticals is added.
- The course deals bioavailability, bioequivalence and factor affecting bioavailability. They also learn the pharmacokinetic parameter like drug disposition, absorption, non-linear and time dependant pharmacokinetics. They also understand about the drug interactions & problems, practice associated in pharmacokinetic parameters calculations.
- The topics which are present in the Drug regulatory affairs are very much useful which increases the knowledge regarding the regulatory aspects in the pharmaceutical industries.
- The students shall apply the pharmacokinetic and pharmacodynamic principles in the design of CDDS. They also apply the design, evaluation and applications related to oral, parenteral, transdermal, implants, bioadhesives and targeted drug delivery systems.

Program Outcomes (POs)

- Gain appreciable knowledge about the theoretical and practical aspects of conventional and novel drug delivery systems and their application in analysis of drug substances, formulations, excipients and food products and about different validation procedures according to guidelines.
- Understand the advancements in major dosage forms in designing the safe and effective formulations.
- Attain knowledge in research methodologies, biostatistical tools and article writing in Journals.

Program Specific Outcomes: (PSO's):

- ❖ PSO1: Exposure to the basic concepts of various dosage forms
- ❖ PSO2: Understand various biopharmaceutical and pharmacokinetic approaches
- ❖ PSO3: Exposure to Industrial applications of various unit operations

- ❖ PSO4: Formulation of Novel drug delivery systems for various active pharmaceutical agents
- ❖ PSO5: Understand the application biostatistics in project works

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I Year – I Sem M.Pharm (Pharmaceutics/Pharmaceutical Technology) (Core course I) ADVANCED PHYSICAL PHARMACEUTICS

Outcome: The students will learn particle size analysis method, solid dispersion, physics of tablets, polymer classification and its applications, student will also practice the stability calculations, shelf life calculations and accelerated stability studies. They also understand the rheology, absorption related to liquids and semi-solid dosage forms with advances. They also know the factors affecting the dissolution and solubility in related to invitro/invivo correlations.

(Core course II)

MODERN PHARMACEUTICS -I

Outcome: Students shall explain the preformulation parameters, apply ICH guidelines and evaluate drug, drug excipients compatibility. Students also explain about formulation and development, use of excipients in tablets, powders, capsules, micro-encapsules and coating techniques. They also learn and apply the statistical design in different formulations.

1. Students shall explain the pre-formulation parameters.
2. Students will gain a good knowledge on various excipients used in tablet formulation.
3. Students also explain about formulation and development, use of excipients in tablets, powders, capsules, micro-encapsules and coating techniques.

4. A good knowledge on stability on various solid dosage forms.
5. They also learn and apply the statistical design in different formulations.

(Core course III)
APPLIED BIOPHARMACEUTICS AND PHARMACOKINETICS

Outcome: students will be able to express factors affecting the bioavailability and stability of dosage form; they also learn the bioequivalence studies and protocols for bioequivalent studies. They also evaluate the parameters for the disposition, absorption and Michaelis-Menton constants for non-linear kinetics.

1. Students will be able to express factors affecting the bioavailability.
2. Students gains knowledge on bioequivalence protocols for bioequivalent studies.
3. They also evaluate the parameters for the various drug disposition process and compartment modelling.
4. Michaelis-Menton constants for non-linear kinetics.

They will learn about Chrono-pharmacokinetics principles and drug interactions

(Core Elective I)
MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES

Outcome: The appreciable knowledge will be gained by the students in the Modern Analytical Techniques and can apply the theories in the Analysis of various bulk drugs and their formulations. The students will also be in a position to apply their knowledge in developing the new methods for the determination and validate the procedures

(Core Elective I)
INTELLECTUAL PROPERTY RIGHTS

Outcome: The clear information about the patent laws, intellectual property rights and drug regulation in India and abroad is gained by the students

(Open Elective-I)
PHARMACOEPIDEMIOLOGY & PHARMACOECONOMICS

Outcome:

Upon completion of this course it is expected that students shall be able to:

- Understand the various epidemiological methods and their applications
- Understand the fundamental principles of Pharmacoeconomics.
- Identify and determine relevant cost and consequences associated with pharmacy products and services.
- Perform the key Pharmacoeconomics analysis methods
- Understand the Pharmacoeconomic decision analysis methods and its applications.
- Describe current Pharmacoeconomic methods and issues.
- Understand the applications of Pharmacoeconomics to various pharmacy settings.

(Open Elective-I)
DRUG REGULATORY AFFAIRS

Outcome:

- Students will come to know the different competent regulatory authorities globally.
- Students be aware of technical aspects pertaining to the marketing authorization application(MAA)

- The regulatory guidelines and directions framed by the regulatory authorities will be helpful to place the drug products in market for marketing approvals.

(Open Elective-I)

HERBAL COSMETICS TECHNOLOGY

Outcome:

Students will learn about the raw materials used in herbal cosmetics and get exposed to various preparations of herbal cosmetics.

(Open Elective-I)

PHARMACEUTICAL VALIDATION

Outcome:

Upon completion of the subject student shall be able to

- Explain the aspect of validation
- Carryout validation of manufacturing processes
- Apply the knowledge of validation to instruments and equipments
- Validate the manufacturing facilities

(Open Elective-I)

PHARMACEUTICAL MANAGEMENT

Outcome:

- These topics are useful for the students to know how to manage a pharma industry and its various departments viz QA, QC, RA, Production etc.
- Along with this it aids the students to develop leadership qualities, communication & interpersonal skills, decisions making, motivation, organization & various managerial functions & professional skills required for a dynamic professional.
- Management helps to understand the concept of managerial control, its levels & role, importance in pharma industry..

I Year –II Sem M.Pharm (Pharmaceutics/Pharm Tech)

(Core course IV)

ADVANCED DRUG DELIVERY SYSTEMS

- **Outcomes:** Students will select the drugs for CDDS design of the formulation fabrication of systems of above drug delivery systems with relevant applications.

(Core course V)

INDUSTRIAL PHARMACY

Outcome: The students will explain the machinery involved in milling, mixing, filtration, drying and packing material constructions used in the production of pharmaceutical materials. They also learn salient features of GMP, TQM applicable in industry. They also understand the effluent treatments and prevent the pollution. They also should evaluate the validation of analytical methods and processes

(Core course VI)

MODERN PHARMACEUTICS-II

Outcomes: students will understand the planning of pilot plant techniques used for all pharmaceutical dosage forms such as tablets, capsules, parenterals, aerosols, cosmetics and neutraceuticals.

(Core Elective- II)

BIOSTATISTICS AND RESEARCH METHODOLOGY

Outcome: The student will be known the Biostatistics arrangement, presentation and formation of tables and charts. They also know the correlation and regression & application of different methods, analysis of data and also learn how to write dissertation, thesis and Research paper.

(Core Elective- II)

STABILITY OF DRUGS AND DOSAGE FORMS

Outcome: The students should describe the evaluation of stability of solutions, solids and formulations against adverse conditions. The students should be able to suggest the measures to retain stability and storage conditions for retaining the efficacy of the products.

(Open Elective- II)

SCREENING METHODS IN PHARMACOLOGY

Outcome:

The expected outcomes are students will know how to handle animals and know about various techniques for screening of drugs for different pharmacological activities, guidelines and regulations for screening new drug molecules on animals.

(Open Elective- II)

NANO BASED DRUG DELIVERY SYSTEMS

Outcomes – The students should be able to select the right kind of materials, able to develop nano formulations with appropriate technologies, evaluate the product related test and for identified diseases

(Open Elective- II)

NUTRACEUTICALS

Outcome: Helps the student to understand the importance of Nutraceuticals in various common problems with the concept of free radicals

(Open Elective- II)

ENTREPRENEURSHIP MANAGEMENT

Outcome: On completion of this course it is expected that students will be able to understand,

- The Role of enterprise in national and global economy
- Dynamics of motivation and concepts of entrepreneurship
- Demands and challenges of Growth Strategies And Networking

(Open Elective II)

CLINICAL RESEARCH AND PHARMACOVIGILANCE

Outcome:

- Upon completion of the course, the student shall be able to,
- Explain the regulatory requirements for conducting clinical trial
- Demonstrate the types of clinical trial designs
- Explain the responsibilities of key players involved in clinical trials
- Execute safety monitoring, reporting and close-out activities
- Explain the principles of Pharmacovigilance
- Detect new adverse drug reactions and their assessment
- Perform the adverse drug reaction reporting systems and communication in pharmacovigilance

M.Pharm PHARMACOGNOSY

Program Educational Objectives (PEOs)

1. The subjects of the course is framed to help the students to get exposed to natural product drug discovery and to perform quantitative and qualitative evaluation of herbal extracts and to understand the chemistry of important phytoconstituents of different categories.
2. To provide an opportunity for the students to understand the cultivation and utilization aspects of drugs falling under this chapter. Helps the students to get exposed to various techniques of plant tissue culture and explore marine origin natural products.
3. To understand the Industrial and commercial potential of drugs of natural origin, integrate traditional Indian systems of medicine with modern medicine and also to know regulatory and quality policy for the trade of herbals and drugs of natural origin.
4. The students get exposure to principles and concepts of alternative systems of medicine like Ayurveda, Siddha, Homeopathy and Unani medicine and they acquire knowledge on the methods of preparation and use of formulations of various systems of medicines.
5. Some of the topics are designed to help the students to get exposed to various techniques of plant tissue culture. Use the biotechnological techniques for obtaining and improving the quality of natural products/medicinal plants

Program Outcomes (POs)

1. The students will gain applicable knowledge about various types of phytoconstituents present in the plants and the traditional plants and marine source which helps them to work upon them for proving their use scientifically.
2. The student shall be able to know the, standardization and evaluation techniques for the herbal drugs and to understand the organization and research of natural products in herbal drugs industries.
3. The course helps the students in understanding the influence of various alternative systems of medicine in the development of herbal drugs.
4. Students will learn about the raw materials used in herbal cosmetics and get exposed to various preparations of herbal cosmetics.
5. Students will gain the knowledge about various strategies of plant tissue culture and students will gain knowledge about various secondary metabolites produced by plant tissue culture and also the students will know how to handle animals and know about various techniques for screening of drugs for different pharmacological activities, guidelines and regulations for screening new drug molecules on animals.

Program Specific Outcomes: (PSO's):

- ❖ PSO1: Applies various approaches of Natural Product drug discovery.
- ❖ PSO2: Understands the chemistry of important Phytoconstituents.
- ❖ PSO3: Provides exposure to trade and regulatory aspects of herbals
- ❖ PSO4: Understand and apply principles of various analytical techniques and provide exposure to advanced experimental/theoretical methods of analysis.
- ❖ PSO5: Exposure to concepts of alternative systems of medicines

I Year – I Sem M.Pharm (Pharmacognosy)

(Core Course I)

ADVANCED PHARMACOGNOSY-I

Outcomes:

1. Gains knowledge on the cultivation and utilization aspects of medicinal and aromatic plants.
2. Acquires contemporary information on Phytochemical and Pharmacological aspects and uses of medicinal plants.
3. An exposure to marine source which helps them to work upon them for proving their use scientifically.
4. Students acquire knowledge about the importance of nutraceuticals for various ailments

(Core Course II)

PHYTOCHEMISTRY

Outcomes : On the basis of chemistry data of phytoconstituents students will acquire knowledge on various types of phytoconstituents present in the plants.

1. Students will study the biogenetic investigation techniques, understands the basic metabolic pathways in plants
2. Brief outline towards various approaches, strategies of the natural product drug discovery.
3. Students will acquire knowledge on the basis of chemistry data of phytoconstituents in the plants.
4. An exposure to both simple and sophisticated extraction techniques.
5. Students will gain knowledge on colouring principles and flavouring principles of plants used in pharmaceutical preparations.

(Core Course III)

INDUSTRIAL PHARMACOGNOSTICAL TECHNOLOGY

Outcomes:

1. By the end of the unit I the student shall be able to know the requirements for setting up the herbal/natural drug industry.
2. Students gain knowledge on regulatory and quality policy for the trade of drugs of natural origin.
3. Students will be aware of herbal companies and their formulations and also learn about how to document the herbal medicine for future reference

(Core Elective I)

MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES

Outcome: The appreciable knowledge will be gained by the students in the Modern Analytical Techniques and can apply the theories in the Analysis of various bulk drugs and their formulations. The students will also be in a position to apply their knowledge in developing the new methods for the determination and validate the procedures.

(Core Elective –I)
INTELLECTUAL PROPERTY RIGHTS

Outcome: The clear information about the patent laws, intellectual property rights and drug regulation in India and abroad is gained by the students.

(Open Elective I)
DRUG REGULATORY AFFAIRS

Outcome:

- Students will come to know the different competent regulatory authorities globally.
- Students be aware of technical aspects pertaining to the marketing authorization application(MAA)
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(Open Elective I)
PHARMACOEPIDEMIOLOGY & PHARMACOECONOMICS

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- Describe current Pharmacoeconomic methods and issues.
- Understand the applications of Pharmacoeconomics to various pharmacy settings.

(Open Elective I)
PHARMACEUTICAL MANAGEMENT

Outcome:

- These topics are useful for the students to know how to manage a pharma industry and its various departments viz QA, QC, RA, Production etc.
- Along with this it aids the students to develop leadership qualities, communication & interpersonal skills, decisions making, motivation, organization & various managerial functions & professional skills required for a dynamic professional.
- Management helps to understand the concept of managerial control, its levels & role, importance in pharma industry

(Open Elective I)
HERBAL COSMETICS TECHNOLOGY

Outcome:

Students will learn about the raw materials used in herbal cosmetics and get exposed to various preparations of herbal cosmetics.

(Open Elective I)
PHARMACEUTICAL FORMULATION TECHNOLOGY

Outcome: Students shall explain the preformulation parameters, apply ICH guidelines and evaluate drug, drug excipients compatibility. Students also explain about formulation and development, use of excipients in tablets, powders, capsules, micro-encapsules and coating techniques. They also learn and apply the statistical design in different formulations

I Year – II Sem M.Pharm (Pharmacognosy)

(Core Course – IV)
ADVANCED PHARMACOGNOSY-II

Outcome: Helps the students to know about common bitters, laxatives and the analytical profiles of some herbal drugs and herbal cosmetics used in everyday life.

(Core Course – V)

INDIGENOUS SYSTEMS OF MEDICINE

Outcome: Helps the students in understanding the influence of various alternative systems of medicine in the development of herbal drugs.

(Core Course – IV)

HERBAL DRUG TECHNOLOGY

Out comes: Helps the students to understand the organization and research of natural products in herbal drugs industries

(Core Elective- II)

BIostatISTICS AND RESEARCH METHODOLOGY

Outcome: The student will be known the Biostatistics arrangement, presentation and formation of tables and charts. They also know the correlation and regression & application of different methods, analysis of data and also learn how to write dissertation, thesis and Research paper.

(Core Elective –II)

Medicinal plant biotechnology

Outcome: Students will gain the knowledge about various strategies of plant tissue culture and students will gain knowledge about various secondary metabolites produced by plant tissue culture.

(Open Elective- II)

STABILITY OF DRUGS AND DOSAGE FORMS

Outcome: The students should describe the evaluation of stability of solutions, solids and formulations against adverse conditions. The students should be able to suggest the measures to retain stability and storage conditions for retaining the efficacy of the products.

(Open Elective- II)

NANO BASED DRUG DELIVERY SYSTEMS

Outcomes – The students should be able to select the right kind of materials, able to develop nano formulations with appropriate technologies, evaluate the product related test and for identified diseases

(Open Elective- II)

ENTREPRENEURSHIP MANAGEMENT

Outcome: On completion of this course it is expected that students will be able to understand,

- The Role of enterprise in national and global economy
- Dynamics of motivation and concepts of entrepreneurship
- Demands and challenges of Growth Strategies And Networking

(Open Elective II)

CLINICAL RESEARCH AND PHARMACOVIGILANCE

Outcome:

- Upon completion of the course, the student shall be able to,
- Explain the regulatory requirements for conducting clinical trial
- Demonstrate the types of clinical trial designs
- Explain the responsibilities of key players involved in clinical trials
- Execute safety monitoring, reporting and close-out activities
- Explain the principles of Pharmacovigilance

- Detect new adverse drug reactions and their assessment
- Perform the adverse drug reaction reporting systems and communication in pharmacovigilance

(Open Elective – II)

SCREENING METHODS AND CLINICAL RESEARCH

Outcome: - The expected outcomes are student will know how to handle animals and know about various techniques for screening drugs for different pharmacological activities and guidelines and regulations for screening new drug molecules on animals and human volunteers.