**GUJARAT TECHNOLOGICAL UNIVERSITY**
PHARM.D (PB)
1st Year

**Subject Name: Pharmacotherapeutics-III**
**Subject Code: 818901**

**Scope:** This course is designed to impart knowledge and skills necessary for contribution to quality use of medicines. Chapters dealt cover briefly pathophysiology and mostly therapeutics of various diseases. This will enable the student to understand the pathophysiology of common diseases and their management.

**Objectives:** At completion of this subject it is expected that students will be able to –
a. understand the pathophysiology of selected disease states and the rationale for drug therapy;
b. understand the therapeutic approach to management of these diseases;
c. understand the controversies in drug therapy;
d. understand the importance of preparation of individualised therapeutic plans based on diagnosis;
e. understand needs to identify the patient-specific parameters relevant in initiating drug therapy, and monitoring therapy (including alternatives, time-course of clinical and laboratory indices of therapeutic response and adverse effects);

| Teaching Scheme | | | | Evaluation Scheme | | | | Total Marks |
|---|---|---|---|---|---|---|---|---|
| Theory | Tutorial | Practical | Total | Theory | | Practical | | |
| | | | | External | Internal | External | Internal | |
| 3 | 1 | 3 | 7 | 70 | 30 | 70 | 30 | 200 |

| Sr. | Topic | Hr | % Weightage |
|---|---|---|---|
| **Etiopathogenesis and pharmacotherapy of diseases associated with following systems/ diseases:** | | | |
| **1.** | **Gastrointestinal system:** Peptic ulcer disease, Gastro Esophageal Reflux Disease, Inflammatory bowel disease, Liver disorders - Alcoholic liver disease, Viral hepatitis including jaundice, and Drug induced liver disorders. | **25** | **30** |
| **2.** | **Haematological system:** Anaemias, Venous thromboembolism, Drug induced blood disorders. | **15** | **15** |
| **3.** | **Nervous system:** Epilepsy, Parkinsonism, Stroke, Alzheimer's disease, | **10** | **10** |
| **4.** | **Psychiatry disorders:** Schizophrenia, Affective disorders, Anxiety disorders, Sleep disorders, Obsessive Compulsive disorders | **20** | **25** |
| **5.** | Pain management including Pain pathways, neuralgias, headaches | **10** | **10** |
| **6.** | Evidence Based Medicine | **10** | **10** |

**Practicals:** Hospital postings for a period of at least 50 hours is required to understand the principles and practice involved in ward round participation and clinical discussion on selection of drug therapy. Students are required to maintain a record of 15 cases observed in the ward and the same should be submitted at the end of the course for evaluation. Each student should present at least two medical cases they have observed and followed in the wards.

**Etiopathogenesis and pharmacotherapy of diseases associated with following systems/ diseases:**
**Title of the topic**

1 **Gastrointestinal system:** Peptic ulcer disease, Gastro Esophageal Reflux Disease, Inflammatory bowel disease, Liver disorders - Alcoholic liver disease, Viral hepatitis including jaundice, and Drug induced liver disorders.
2 **Haematological system:** Anaemias, Venous thromboembolism, Drug induced blood disorders.
3 **Nervous system:** Epilepsy, Parkinsonism, Stroke, Alzheimer's disease,
4 **Psychiatry disorders:** Schizophrenia, Affective disorders, Anxiety disorders, Sleep disorders, Obsessive Compulsive disorders
5 Pain management including Pain pathways, neuralgias, headaches.
6 Evidence Based Medicine

**Reference books :**


1. Clinical Pharmacy and Therapeutics - Roger and Walker, Churchill Livingstone publication, Latest Edition
2. Pharmacotherapy: A Pathophysiologic approach - Joseph T. Dipiro et al. Appleton & Lange, Latest Edition
3. Pathologic basis of disease - Robins SL, W.B.Saunders publication, Latest Edition
4. Pathology and therapeutics for Pharmacists: A Basis for Clinical Pharmacy Practice - Green and Harris, Chapman and Hall publication, Latest Edition
5. Clinical Pharmacy and Therapeutics - Eric T. Herfindal, Williams and Wilkins Publication, Latest Edition
6. Applied Therapeutics: The clinical Use of Drugs. Lloyd Young and Koda-Kimble MA, Latest Edition
7. Avery's Drug Treatment, Latest Edition, Adis International Limited
8. Relevant review articles from recent medical and pharmaceutical literature


**Assignments:** Students are required to submit written assignments on the topics given to them. Topics allotted should cover recent developments in drug therapy of various diseases. A minimum of THREE assignments [1500 – 2000 words] should be submitted for evaluation.
**Format of the assignment:** 1. Minimum & Maximum number of pages 2. Reference(s) shall be included at the end. 3. Assignment can be a combined presentation at the end of the academic year 4. It shall be computer draft copy 5. Name and signature of the student 6. Time allocated for presentation may be 8+2 Min.

| **Scheme of Practical Examination : Sessionals** | **Annual** | |
|---|---|---|
| Synopsis | 05 | 15 |
| Major Experiment | 10 | 25 |
| Minor Experiment | 03 | 15 |
| Viva | 02 | 15 |
| **Max Marks** | **20** | **70** |
| **Duration** | **03hrs** | **04hrs** |

**GUJARAT TECHNOLOGICAL UNIVERSITY**
PHARM.D (PB)
1st Year

**Subject Name: Hospital Pharmacy**
**Subject Code: 818902**

**Scope:** In the changing scenario of pharmacy practice in India, for successful practice of Hospital Pharmacy, the students are required to learn various skills like drug distribution, drug dispensing, manufacturing of parenteral preparations, drug information, patient counselling, and therapeutic drug monitoring for improved patient care.

**Objectives:** At completion of this subject it is expected that students will be able to –

a. know various drug distribution methods;
b. know the professional practice management skills in hospital pharmacies;
c. provide unbiased drug information to the doctors;
d. know the manufacturing practices of various formulations in hospital set up;
e. appreciate the practice based research methods; and
f. appreciate the stores management and inventory control

**Teaching scheme and examination scheme:**

| Teaching Scheme | | | | Evaluation Scheme | | | | Total Marks |
|---|---|---|---|---|---|---|---|---|
| Theory | Tutorial | Practical | Total | Theory | | Practical | | |
| | | | | External | Internal | External | Internal | |
| 2 | 1 | 3 | 7 | 70 | 30 | 70 | 30 | 200 |

| Sr. | Topic | Hr | % Weigh tage |
|---|---|---|---|
| 1. | **Hospital - its Organisation and functions** | 3 | 5 |
| 2. | **Hospital pharmacy-Organisation and management**<br>a) Organizational structure-Staff, Infrastructure & work load statistics b) Management of materials and finance c) Roles & responsibilities of hospital pharmacist | 7 | 12 |
| 3. | **The Budget – Preparation and implementation** | 4 | 6 |
| 4. | **Hospital drug policy**<br>a) Pharmacy and Therapeutic committee (PTC) b) Hospital formulary c) Hospital committees - Infection committee - Research and ethical committee d) developing therapeutic guidelines e) Hospital pharmacy communication – Newsletter | 10 | 18 |
| 5. | **Hospital pharmacy services**<br>a) Procurement & warehousing of drugs and Pharmaceuticals b) Inventory control Definition, various methods of Inventory Control ABC, VED, EOQ, Lead time, safety stock c) Drug distribution in the hospital i) Individual prescription method ii) Floor stock method iii) Unit dose drug distribution method d) Distribution of Narcotic and other controlled substances e) Central sterile supply services – Role of pharmacist | 15 | 25 |
| 6. | **Manufacture of Pharmaceutical preparations** | 10 | 17 |

| | | | |
|---|---|---|---|
| | a) Sterile formulations – large and small volume parenterals b) Manufacture of Ointments, Liquids, and creams c) Manufacturing of Tablets, granules, capsules, and powders d) Total parenteral nutrition | | |
| **7.** | **Continuing professional development programs** Education and training | **4** | **6** |
| **8.** | **Radio Pharmaceuticals – Handling and packaging** | **4** | **6** |
| **9.** | **Professional Relations and practices of hospital pharmacist** | **3** | **5** |

**Practicals:**

1. Assessment of drug interactions in the given prescriptions
2. Manufacture of parenteral formulations, powders.
3. Drug information queries.
4. Inventory control

**Reference books :**


1. Hospital pharmacy by William .E. Hassan, Latest Edition
2. A text book of Hospital Pharmacyby S.H.Merchant & Dr. J.S. Qadry. Revised by R.K.Goyal & R.K. Parikh, Latest Edition
3. WHO consultative group report.
4. R.P.S. Vol.2. Part –B; Pharmacy Practice section.
5. Handbook of pharmacy – health care. Edt. Robin J Harman. The Pharmaceutical press. Latest Edition


**List of Assignments:**

1. Design and Management of Hospital pharmacy department for a 300 bedded hospital.
2. Pharmacy and Therapeutics committee – Organization, functions, and limitations.
3. Development of a hospital formulary for 300 bedded teaching hospital
4. Preparation of ABC analysis of drugs sold in one month from the pharmacy.
5. Different phases of clinical trials with elements to be evaluated.
6. Various sources of drug information and systematic approach to provide unbiased drug information.
7. Evaluation of prescriptions generated in hospital for drug interactions and find out the suitable management.

**Special requirements:**

1. Each college should sign MoU with nearby local hospital having minimum 300 beds for providing necessary training to the students' on hospital pharmacy activities.
2. Well equipped with various resources of drug information.

| **Scheme of Practical Examination: Sessionals** | **Annual** | |
|---|---|---|
| Synopsis | 05 | 15 |
| Major Experiment | 10 | 25 |
| Minor Experiment | 03 | 15 |
| Viva | 02 | 15 |
| **Max Marks** | **20** | **70** |
| **Duration** | **03hrs** | **04hrs** |

**GUJARAT TECHNOLOGICAL UNIVERSITY**
PHARM.D (PB)
1st Year

**Subject Name: Clinical Pharmacy**
**Subject Code: 818903**

**Scope:** The course is designed to provide necessary knowledge and skills to students that enable them to practice patient care that optimizes the use of medication and promotes health, wellness, and disease prevention

**Objectives:** At completion of this subject it is expected that students will be able to –

a. monitor drug therapy of patient through medication chart review and clinical review;
b. obtain medication history interview and counsel the patients;
c. identify and resolve drug related problems;
d. detect, assess and monitor adverse drug reaction;
e. interpret selected laboratory results (as monitoring parameters in therapeutics) of specific disease states; and retrieve, analyse, interpret and formulate drug or medicine information.

**Teaching scheme and examination scheme:**

| Teaching Scheme | | | | Evaluation Scheme | | | | Total Marks |
|---|---|---|---|---|---|---|---|---|
| Theory | Tutorial | Practical | Total | Theory | | Practical | | |
| | | | | External | Internal | External | Internal | |
| 3 | 1 | 3 | 7 | 70 | 30 | 70 | 30 | 200 |

| Sr. | Topic | Hr | % Weightage |
|---|---|---|---|
| 1. | **Definitions, development and scope of clinical pharmacy** | 3 | 3 |
| 2. | **Introduction to daily activities of a clinical pharmacist** a. Drug therapy monitoring (medication chart review, clinical review, pharmacist interventions) b. Ward round participation c. Adverse drug reaction management d. Drug information and poisons information e. Medication history f. Patient counseling g. Drug utilisation evaluation (DUE) and review (DUR) h. Quality assurance of clinical pharmacy services | 15 | 17 |
| 3. | **Patient data analysis** The patient's case history, its structure and use in evaluation of drug therapy & Understanding common medical abbreviations and terminologies used in clinical practices. | 12 | 13 |
| 4. | **Clinical laboratory tests used in the evaluation of disease states, and interpretation of test results** a. Haematological, Liver function, Renal function, thyroid function tests b. Tests associated with cardiac disorders c. Fluid and electrolyte balance d. Microbiological culture sensitivity tests e. Pulmonary Function Tests | 12 | 13 |
| 5. | **Drug & Poison information**<br>a. Introduction to drug information resources available b. Systematic approach in answering DI queries c. Critical evaluation of drug information and literature d. Preparation of written and verbal reports e. Establishing a Drug Information Centre f. Poisons information- organization & information resources | 12 | 13 |
| 6. | **Pharmacovigilance** a. Scope, definition and aims of pharmacovigilance b. Adverse drug reactions - Classification, mechanism, predisposing factors, causality assessment [different scales used] c. Reporting, evaluation, monitoring, preventing & management of ADRs d. Role of pharmacist in management of ADR | 12 | 13 |
| 7. | Communication skills, including patient counselling techniques, medication history interview, presentation of cases | 10 | 11 |
| 8. | Pharmaceutical care concepts | 5 | 6 |
| 9. | Critical evaluation of biomedical literature | 5 | 6 |
| 10. | Medication errors | 4 | 5 |

**Practicals:**

Students are expected to perform 15 practicals in the following areas covering the topics dealt in theory class.

a. Answering drug information questions (4 Nos)
b. Patient medication counselling (4 Nos)
c. Case studies related to laboratory investigations (4 Nos)
d. Patient medication history interview (3 Nos)

**Assignment:**

Students are expected to submit THREE written assignments (1500 – 2000 words) on the topics given to them covering the following areas dealt in theory class. Drug information, Patient medication history interview, Patient medication counselling, Critical appraisal of recently published articles in the biomedical literature which deals with a drug or therapeutic issue.

**Format of the assignment:**

1. Minimum & Maximum number of pages.
2. Reference(s) shall be included at the end.
3. Assignment can be a combined presentation at the end of the academic year.
4. It shall be computer draft copy.
5. Name and signature of the student.
6. Time allocated for presentation may be 8+2 Min

**Reference Books:**


1. Practice Standards and Definitions - The Society of Hospital Pharmacists of Australia, Latest Edition
2. Basic skills in interpreting laboratory data - Scott LT, American Society of Health System Pharmacists Inc, Latest Edition
3. Biopharmaceutics and Applied Pharmacokinetics - Leon Shargel, Prentice Hall publication. Latest Edition
4. A text book of Clinical Pharmacy Practice; Essential concepts and skills, Dr.G.Parthasarathi etal, Orient Orient Langram Pvt.Ltd., Latest Edition
5. Australian drug information -Procedure manual. The Society of Hospital Pharmacists of Australia, Latest Edition
6. Clinical Pharmacokinetics - Rowland and Tozer, Williams and Wilkins Publication, Latest Edition
7. Pharmaceutical statistics. Practical and clinical applications. Sanford Bolton, Marcel Dekker, Inc, Latest Edition


**Scheme of Practical Examination:**

| | **Sessionals** | **Annual** |
|---|---|---|
| Synopsis | 05 | 15 |
| Major Experiment | 10 | 25 |
| Minor Experiment | 03 | 15 |
| Viva | 02 | 15 |
| **Max Marks** | **20** | **70** |
| **Duration** | **03hrs** | **04hrs** |

Note : Total sessional marks is 30 (20 for practical sessional plus 10 marks for regularity, promptness, viva-voce and record maintenance).

**GUJARAT TECHNOLOGICAL UNIVERSITY**
PHARM.D (PB)
1st Year

**Subject Name: Biostatistics & Research Methodology**
**Subject Code: 818904**

**Scope: The course is a** comprehensive concepts-centric primer for the students to make them ready to conduct clinical and community-based research projects. The focus is on designing, executing, documenting and publishing the project,

**Objectives:**
**On successful completion of the course the student will be able to :**

1) Retrieve, read and respond to the scientific literature, including the Methods and Results sections, in public health, medicine, biological science, pharmaceutical science and related fields.
2) analyse a research question of choice, design a study to avail answer to this research question and summarize and analyse the data collected
3) understand the complex clinical trial designs
4) write a scientific report
5) use the computer technology in various hospital activities and in research

**Teaching scheme and examination scheme:**

| Teaching Scheme | | | | Evaluation Scheme | | | | Total Marks |
|---|---|---|---|---|---|---|---|---|
| Theory | Tutorial | Practical | Total | Theory | | Practical | | |
| | | | | External | Internal | External | Internal | |
| 2 | 1 | 0 | 3 | 70 | 30 | 0 | 0 | 100 |

**Detailed syllabus:**

| Sr. | Topic | Hr | % Weightage |
|---|---|---|---|
| | **Research Methodology** | | |
| **1.** | a) Types of clinical study designs: Case studies, observational studies, interventional studies, b) Designing the methodology c) Sample size determination and Power of a study Determination of sample size for simple comparative experiments, determination of sample size to obtain a confidence interval of specified width, power of a study d) Report writing and presentation of data | **10** | **16** |
| | **Biostatistics** | | |
| **2.** | a) Introduction b) Types of data distribution c) Measures describing the central tendency distributions- average, median, mode d) Measurement of the spread of data-range, variation of mean, standard deviation, variance, coefficient of variation, standard error of mean | **5** | **10** |
| **3.** | **Data graphics** Construction and labeling of graphs, histogram, piecharts, scatter plots, semilogarthimic plots | **5** | **8** |
| **4.** | **Basics of testing hypothesis** | **15** | **24** |

| | | | |
|---|---|---|---|
| | a) Null hypothesis, level of significance, power of test, P value, statistical estimation of confidence intervals. b) Level of significance (Parametric data)- students t test (paired and unpaired), chi Square test, Analysis of Variance (one-way and two-way) c) Level of significance (Non-parametric data)- Sign test, Wilcoxan's signed rank test, Wilcoxan rank sum test, Mann Whitney U test, Kruskal-Wall is test (one way ANOVA) d) Linear regression and correlation- Introduction, Pearsonn's and Spearmann's correlation and correlation co-efficient. e) Introduction to statistical software: SPSS, Epi Info, SAS | | |
| **5.** | **Statistical methods in epidemiology**<br>Incidence and prevalence, relative risk, attributable risk | **7** | **12** |
| **6.** | **Computer applications in pharmacy**<br>Computer System in Hospital Pharmacy: Patterns of Computer use in Hospital Pharmacy – Patient record database management, Medication order entry – Drug labels and list – Intravenous solution and admixture, patient medication profiles, Inventory control, Management report & Statistics.<br>Computer In Community Pharmacy Computerizing the Prescription Dispensing process Use of Computers for Pharmaceutical Care in community pharmacy Accounting and General ledger system Drug Information Retrieval & Storage : Introduction – Advantages of Computerized Literature Retrieval<br>Use of Computerized Retrieval | **18** | **30** |

**Reference Books:**


1. Pharmaceutical statistics- practical and clinical applications, Sanford Bolton latest edition, publisher Marcel Dekker Inc. NewYork
2. Drug Information- A Guide for Pharmacists, Patrick M Malone, Karen L Kier, John E Stanovich , latest edition, McGraw Hill Publications latest edition
3. Khanal AB. Mahajan's methods in biostatistics for medical students and research workers. Jaypee Brothers, latest edition

**GUJARAT TECHNOLOGICAL UNIVERSITY**
PHARM.D (PB)
1st Year

**Subject Name: Biopharmaceutics & Pharmacokinetics**
**Subject Code: 818905**

**Scope:** The course will provide students with necessary information related to different factors affecting the performance of various drug dosage forms *in vitro* and *in vivo*, deliver specialized knowledge that is essential to understand the concept of bioavailability and bioequivalence and explore the kinetics of the drug in human body in relation to the in vivo performance and determination of drug dose and regimen for therapy individualization

**Objectives: At the successful completion of the course the student will be able to:**

1) define the basic concepts in biopharmaceutics and pharmacokinetics
2) **s**elect the correct pharmacokinetic model based on plasma level or urinary excretion data that best describes the process of drug absorption, distribution, metabolism and elimination (ADME)
3) determine the effect of Pharmacokinetic (ADME) parameters on the biological effects of the drug
4) **c**arry out biopharmaceutical studies and use data so obtained in the development of new drugs or dosage forms
5) **c**alculate various pharmacokinetic parameters from plasma and urinary excretion data applying compartment modeling and model independent methods
6) design dosage regimens for patients based on calculated pharmacokinetic parameters
7) **d**esign Bioavailability and Bioequivalence studies of new drugs or dosage forms
8) **e**valuate drug-protein binding as a tool to predict pharmacokinetics of drugs

**Teaching scheme and examination scheme:**

| Teaching Scheme | | | | Evaluation Scheme | | | | Total Marks |
|---|---|---|---|---|---|---|---|---|
| Theory | Tutorial | Practical | Total | Theory | | Practical | | |
| | | | | External | Internal | External | Internal | |
| 3 | 1 | 3 | 7 | 70 | 30 | 70 | 30 | 200 |

**Detailed syllabus:**

| Sr. | Topic | Hr | % Weightage |
|---|---|---|---|
| | **Biopharmaceutics** | | |
| **1.** | Introduction to Biopharmaceutics a. Absorption of drugs from gastrointestinal tract. b. Drug Distribution. c. Drug Elimination. | **7** | **8** |
| | **Pharmacokinetics** | | |
| **2.** | Introduction to Pharmacokinetics. a. Mathematical model b. Drug levels in blood. c. Pharmacokinetic model d. Compartment models e. Pharmacokinetic study. | **8** | **10** |
| **3.** | One compartment open model. a. Intravenous Injection (Bolus) b. Intravenous infusion. | **5** | **6** |
| **4.** | Multicompartment models. a. Two compartment open model. b. IV bolus, IV infusion and oral administration | **10** | **12** |
| **5.** | Multiple – Dosage Regimens. a. Repititive Intravenous injections – One Compartment Open Model b. Repititive Extravascular dosing – One Compartment Open model c. Multiple Dose Regimen – Two Compartment Open Model | **15** | **16** |
| **6.** | Nonlinear Pharmacokinetics. a. Introduction b. Factors causing Non-linearity. c. Michaelis-menton method of estimating parameters | **15** | **16** |
| **7.** | Noncompartmental Pharmacokinetics. a. Statistical Moment Theory. b. MRT for various compartment models. c. Physiological Pharmacokinetic model. | **15** | **16** |

| | | | |
|---|---|---|---|
| **8.** | Bioavailability and Bioequivalence. a. Introduction. b. Bioavailability study protocol. c. Methods of Assessment of Bioavailability | **15** | **16** |

**Practical : 3 Hrs./Week**

1. Improvement of dissolution characteristics of slightly soluble drugs by some methods.
2. Comparison of dissolution studies of two different marketed products of same drug.
3. Influence of polymorphism on solubility and dissolution.
4. Protein binding studies of a highly protein bound drug and poorly protein bound drug.
5. Extent of plasma-protein binding studies on the same drug (i.e. highly and poorly protein bound drug) at different concentrations in respect of constant time.
6. Bioavailability studies of some commonly used drugs on animal/human model.
7. Calculation of Ka, Ke, t1/2, Cmax, AUC, AUMC, MRT etc. from blood profile data.
8. Calculation of bioavailability from urinary excretion data for two drugs.
9. Calculation of AUC and bioequivalence from the given data for two drugs.
10. In vitro absorption studies.
11. Bioequivalency studies on the different drugs marketed.(eg) Tetracycline, Sulphamethoxzole, Trimethoprim, Aspirin etc., on animals and human volunteers.
12. Absorption studies in animal inverted intestine using various drugs.
13. Effect on contact time on the plasma protein binding of drugs.
14. Studying metabolic pathways for different drugs based on elimination kinetics data.
15. Calculation of elimination half-life for different drugs by using urinary elimination data and blood level data.
16. Determination of renal clearance.

**Reference Books:**


1. Biopharmaceutics and Clinical Pharmacokinetics by, Milo Gibaldi latest edition
2. Remington's Pharmaceutical Sciences, By Mack Publishing Company, Pennsylvnia.
3. Pharmacokinetics: By Milo Glbaldi Donald, R. Mercel Dekker Inc. latest edition
4. Hand Book of Clinical Pharmacokinetics, By Milo Gibaldi and Laurie Prescott by ADIS Health Science Press. latest edition
5. Biopharmaceutics and Pharmacokinetics; By Robert F Notari latest edition
6. Biopharmaceutics; By Swarbrick g. Bio pharmaceutics and Pharmacokinetics-A Treatise, By D. M. Brahmankar and Sunil B.Jaiswal, Vallabh Prakashan Pitampura, Delhi latest edition
7. Cilincal Pharmacokinetics, Concepts and Applications: By Malcolm Rowland and Thomas, N. Tozen, Lea and Febrger, Philadelphia, latest edition
8. Dissolution, Bioavailability and Bioequivalence, By Abdou H.M, Mack, Publishing Company, Pennsylvania latest edition
9. Biopharmaceutics and Clinical Pharmacokinetics-An introduction 4th edition Revised and expanded by Rebort F Notari Marcel Dekker Inn, New York and Basel, latest edition
10. Encyclopedia of Pharmaceutical Technology, Vol 13, James Swarbrick, James, C. Roylan, Marcel Dekker Inc, New York latest edition


**Scheme of Practical Examination:**

| | **Sessionals** | **Annual** |
|---|---|---|
| Synopsis | 05 | 15 |
| Major Experiment | 10 | 25 |
| Minor Experiment | 03 | 15 |
| Viva | 02 | 15 |
| **Max Marks** | **20** | **70** |
| **Duration** | **03hrs** | **04hrs** |

Note : Total sessional marks is 30 (20 for practical sessional plus 10 marks for regularity, promptness, viva-voce and record maintenance).

**GUJARAT TECHNOLOGICAL UNIVERSITY**
PHARM.D (PB)
1st Year

**Subject Name: CLINICAL TOXICOLOGY**
**Subject Code: 818906**

**Scope:** The course is designed to give students a background in the medical and toxicological principles of toxicants commonly encountered in poison control centers and emergency departments. The course enables the student to lend support in poison control centers, hospitals and emergency departments.

**Objectives:**

After the course the students shall have the necessary knowledge and understanding of

1) basic toxicology (including toxicokinetics) relevant for drugs,
2) principles for toxicological testing of new drugs
3) toxicological follow-up of drugs already in the market.
4) toxic drugs and chemicals, poisoning symptoms, treatments and antidotes.
5) Toxicity of substance of abuse

**Teaching scheme and examination scheme:**

| Teaching Scheme | | | | Evaluation Scheme | | | | Total Marks |
|---|---|---|---|---|---|---|---|---|
| Theory | Tutorial | Practical | Total | Theory | | Practical | | |
| | | | | External | Internal | External | Internal | |
| 2 | 1 | 0 | 3 | 70 | 30 | 0 | 0 | 100 |

**Detailed syllabus:**

| Sr. | Topic | Hr | % Weightage |
|---|---|---|---|
| **1.** | General principles involved in the management of poisoning | **3** | **5** |
| **2.** | Antidotes and the clinical applications | **3** | **5** |
| **3.** | Supportive care in clinical Toxicology | **4** | **6** |
| **4.** | Gut Decontamination. | **3** | **5** |
| **5.** | Elimination Enhancement | **3** | **5** |
| **6.** | Toxicokinetics | **7** | **12** |
| **7.** | Clinical symptoms and management of acute poisoning with the following agents – a) Pesticide poisoning: organophosphorous compounds, carbamates, organochlorines, pyrethroids. b) Opiates overdose. c) Antidepressants d) Barbiturates and benzodiazepines. e) Alcohol: ethanol, methanol. f) Paracetamol and salicylates. g) Non-steroidal anti-inflammatory drugs. h) Hydrocarbons: Petroleum products and PEG. i) Caustics: inorganic acids and alkali. j) Radiation poisoning | **10** | **16** |
| **8.** | Clinical symptoms and management of chronic poisoning with the following agents – Heavy metals: Arsenic, lead, mercury, iron, copper | **5** | **8** |
| **9.** | Venomous snake bites: Families of venomous snakes, clinical effects of venoms, general management as first aid, early manifestations, complications and snake bite injuries. | **5** | **8** |
| **10.** | Plants poisoning. Mushrooms, Mycotoxins | **3** | **5** |

| | | | |
|---|---|---|---|
| **11.** | Food poisonings | **3** | **5** |
| **12.** | Envenomations – Arthropod bites and stings. | **3** | **5** |
| **13.** | **Substance abuse:** Signs and symptoms of substance abuse and treatment of dependence a) CNS stimulants :amphetamine b) Opioids c) CNS depressants d) Hallucinogens: LSD e) Cannabis group f) Tobacco | **8** | **15** |

**Reference Books:**


1. Matthew J Ellenhorn. Ellenhorns Medical Toxicology – Diagnosis and treatment of poisoning. Williams and Willkins publication, London Latesat edition

2. V V Pillay. Handbook of Forensic Medicine and Toxicology. Latest edition Paras Publication, Hyderabad

3. Marcus SM. Medical Toxicology: Antidotes and Anecdotes. Springer; latest edition.

**GUJARAT TECHNOLOGICAL UNIVERSITY**
**Pharm.D. (PB)**
**1st year**

**Subject Name:** Pharmacotherapeutics I & II
**Subject Code:** 818907

| Teaching Scheme (Hours) | | | | Evaluation Scheme (Marks) | | | | Total marks |
|---|---|---|---|---|---|---|---|---|
| Theory | Tutorial | Practical | Total | Theory | | Practical | | |
| | | | | External | Internal | External | Internal | |
| 3 | 0 | 3 | 6 | 70 | 30 | 70 | 30 | 200 |

| Sr. No. | Course Contents | Hours |
|---|---|---|
| **1** | Cardiovascular system: Hypertension, Congestive cardiac failure, Angina Pectoris, Myocardial infarction, , Hyperlipidaemias , Electrophysiology of heart and Arrhythmias | 13 |
| **2** | Respiratory syste m : Introduction to Pulmonary function test, Asthma, Chronic obstructive airways disease, Drug induced pulmonary diseases | 6 |
| **3** | Endoc rine syste m : Diabetes, Thyroid diseases, Oral contraceptives, Hormone replacement therapy, Osteoporosis | 8 |
| **4** | Gene ral pre sc ribing guide lines for a. Paediatric patients b. Geriatric patients c. Pregnancy and breast feeding | 4 |
| **5** | Ophthalmology: Glaucoma, Conjunctivitis-viral & bacterial | 3 |
| **6** | Introduction to rational drug use Definition, Role of pharmacist Essential drug concept Rational drug formulations | **2** |
| **7** | Infectious disease: Guidelines for the rational use of antibiotics and surgical Prophylaxis, Tuberculosis, Meningitis, Respiratory tract infections, Gastroenteritis, Endocarditis, Septicemia, Urinary tract infections, Protozoal infection-Malaria, HIV & Opportunistic infections, Fungal infections, Viral infections, Gonarrhoea and Syphillis | **18** |
| **8** | Musc uloske letal disorde rs Rheumatoid arthritis, Osteoarthritis, Gout, Spondylitis, Systemic lupus erythematosus. | **6** |
| **9** | Renal system Acute Renal Failure, Chronic Renal Failure, Renal Dialysis, Drug induced renal disorders | **6** |
| **10** | Oncology: Basic principles of Cancer therapy, General introduction to cancer chemotherapeutic agents, Chemotherapy of breast cancer, leukemia. Management of chemotherapy nausea and emesis | **6** |
| **11** | Dermatology: Psoriasis, Scabies, Eczema, Impetigo | **4** |

## PHARMACOTHERAPEUTICS –I & II (PRACTICAL)

Practicals: Hospital postings in various departments designed to complement the lectures by providing practical clinical discussion; attending ward rounds; follow up the progress and changes made in drug therapy in allotted patients; case presentation upon discharge. Students are required to maintain a record of cases presented and the same should be submitted at the end of the course for evaluation. A minimum of 20 cases should be presented and recorded covering most common diseases.

Assignments: Students are required to submit written assignments on the topics given to them. Topics allotted should cover recent developments in drug therapy of various diseases. A minimum of THREE assignments [1500 –2000 words] should be submitted for evaluation

**Scheme of Practical Examination**

| | **Internal/ Sessional** | **External** |
|---|---|---|
| Synopsis | 05 | 15 |
| Major Experiment | 10 | 25 |
| Minor Experiment | 03 | 15 |
| Viva | 02 | 15 |
| **Max. marks** | **20** | **70** |
| **Duration** | **3 hours** | **4 hours** |

Note: Total sessional marks is 30 (20 for practical sessional plus 10 marks for regularity, promptness, viva-voce and record maintenance)