

PHARMACY PRACTICE

M. Pharm

SEMESTER-I		
Course Code	Course Name	Credits
PP-510	Pharmacy Practice-I	1
PP-520	Clinical and Applied Therapeutics-I	3
PP-530	Clinical Pharmacy	1
PE-520	Biopharmaceutics and Pharmacokinetics	2
GE-510	Biostatistics	2
GE-511	Seminar / Presentation	1
LG-511	Clinical Placement	4
LG-512	Computer Applications	2
Total Credit		16
SEMESTER-II		
Course Code	Course Name	Credits
PP-610	Pharmacy Practice-II	1
PP-611	Pharmacy Practice-III (Community and Rural Pharmacy)	1
PP-620	Clinical and Applied Therapeutics-II	3
PP-630	Evidence Based Medicine and Critical Appraisal	2
PP-631	Clinical Biostatistics	1
GE-611	Seminar / Presentation	1
LG-611	Clinical Placement	5
Total Credit		14
SEMESTER-III [Project (22 weeks)]		
Course Code	Course Name	Credits
TH-598	Synopsis	5
TH-599	Presentation	3
Total Credit		8
SEMESTER-IV		
Course Code	Course Name	Credits
TH-698	Thesis	9
TH-699	Defence of Thesis	3
Total Credit		12

Grand Total (I to IV semesters): 50

Pharmacy Practice

SEMESTER-I

PP-510

Pharmacy Practice-I

(1 credit)

1. **Understanding terminologies and concepts:** Primary, secondary and tertiary care; Pharmacy Practice; Institutional, hospital, ward clinical and community pharmacy; Patient confidentiality, patient compliance, counseling, informed consent.
2. Pharmaceutical care and planning
3. **Hospital pharmacy:** Overview of organization and structure (comparison with community pharmacy), basic hospital pharmacy services.
4. Specialized services e.g. Drug Information Centre and service provision.
5. **Role of patients in decision-making regarding therapeutic management:** Factors affecting patients' decision to take/not to take the medication.
6. **Professional Responsibilities:** Profession of pharmacy and pharmacists as practitioners; Responsibilities of pharmacy practitioners as stated in developed countries; Relevance and scope of adopting these in India; Opportunities and legislation; Relationship with other health care professionals-doctors, nurses, paramedical staff, drug inspectors, excise officers and police officers; Ethics of practice.
7. **Skills:** Communication, counseling; Reading, writing, thinking; Factors affecting development of these skills.

Recommended books:

1. A Practical Guide to Contemporary Pharmacy Practice by Judith E. Thomson, Lippincott Williams & Wilkins
2. Introduction to Hospital and Health-System Pharmacy Practice by David A. Holdford and Thomas R. Brown
3. Communication Skills in Pharmacy Practice : A Practical Guide for Students and Practitioners, by Robert S. Beardsley, Carole Kimberlin and William N. Tindall
4. Hospital Pharmacy by Martin Stephens
5. Hospital Pharmacy, by William Hassan, Lea &Febiger

1. **Geriatrics:** Issues based on age related physiologic and pharmacokinetic/dynamic changes; Variations in management from other patient groups; Pharmaceutical care plan in view of compliance, ability to use devices for other diseases/disorders) including discharge and home care plan.
2. **Paediatrics:** Specific childhood diseases and management; Immunizations, national immunization programmes and scope for pharmacists' involvement in these; Special issues of paediatric management; Dosage adjustments based on age and physiological and pharmacokinetic/dynamic development stage; Availability of 'adequate' formulations, dosage forms; Drug administration, timing: Compliance, psychology and hormonal changes in adolescents.
3. **Cardiology:** Hypertension; Congestive heart failure
4. **Cardiology:** Angina; Myocardial Infection; Arrhythmias; Lipid disorders; Guidelines for management of patient and monitoring drug therapy, TDM for digoxin.
5. **Respiratory diseases and treatment:** Asthma; COPD; TDM of Theophyllin; Use and maintenance of different inhalers and devices, operation of oxygen cylinders; Monitoring therapy; Guidelines ; Respiratory infections (treatment in view of resistant states, isolation, monitoring therapy and duration of treatment , side effects, drug interactions)-URTIs and LRTIs; TB, pneumonia.
6. **Nephrology:** Influence and important of fluid and electrolyte balance and acid-base balance; Acute renal failure; Chronic renal failure; Renal dialysis (types and points of pharmacists' involvement).
7. **Infections and antimicrobial therapy:** Special emphasis on communicable diseases in India, introduction to related national health programmes; UTIs, GI, CNS, bone and joint infections, sexually transmitted diseases, mycotic parasitic infections; Need and relevance of antibiotic polices.
8. **Diabetes:** Type 1 and 2 (incidence, prevalence, etiology, influencing factors, genetic basis); Treatment option and guidelines; Insulin types and formulations, administration monitoring therapy, patient education; Resistant cases (causes, alternatives to treatment); Management of gestational diabetes.

Note: Applicable to all practice based subjects/topics

- a) Teaching of individual drugs should not be included: Only specific practical as against theoretical issues of drugs commonly used in practice should be discussed along with the recent advances in drugs, formulations and dosage forms.

- b) Teaching should be practice and primary literature based with emphasis on issues in therapy, advances and guidelines with case studies throughout the course.
- c) In all areas, primary literature review and individual appraisal (as can be assessed in practice) of recent developments is encouraged.

Recommended books:

1. Koda-Kimble and Young's Applied Therapeutics: The Clinical use of Drugs by Brian K. Alldredge, Robin L. Corelli, Michael E. Ernst, and B. Joseph Guglielmo
2. Pharmacotherapy: A Pathophysiologic Approach by Joseph DiPiro, Robert L. Talbert, Gary Yee and Gary Matzke
3. Clinical Pharmacy and Therapeutics by Eric T. Herfindal and Joseph L. Hirschman Clinical Pharmacy and Therapeutics, by Robert Walker and Cate Whittlesea
4. Goodman and Gillman's Manual of Pharmacology and Therapeutics by Laurence Brunton, Donald Blumenthal, Iain Buxton and Keith Parker
5. Goodman and Gillman's The Pharmacological Basis of Therapeutics, by Laurence Brunton, Bruce Chabner and Bjorn Knollman

PP-530

Clinical Pharmacy

(1 credit)

1. Evolution of Clinical Pharmacy and current scenario (ward and clinical pharmacy services responding to symptoms)
2. **Modified release doses forms:** Advantages and limitations of modified release dosage forms for patient treatment.
3. Update on advances in biotechnology and gene therapy
4. **Biochemical and other laboratory data interpretation (in association with clinical information and limitations of laboratory results):** Case studies (Workshops) of renal, hepatic, cardiac, respiratory, diabetic (including dose adjustment of insulin with glucose monitoring), epileptic (including DIs, TDM) and elderly osteoporotic patients; Inclusion of issues around hypo/hyperthyroid/thyrotoxicosis and anticoagulation therapy within these cases.
5. Therapeutic drug monitoring of digoxin, theophylline, phenytoin phenobarbitone, carbamazepine and gentamicin
6. **Understanding audit:** Audit cycle, identifying key issues, setting standards; Audit process; Results and re-audit
7. **Clinical trials and pharmacists' involvement:** Legal and ethical requirements of trials
8. **Research Methods:** Designing, planning and carrying out a research project; Research methodologies (quantitative, qualitative) – uses, adequacy and limitations; Choice of

methods for a particular project; Process, analysis and interpretation of data; Project itself in process, written report and defence.

Recommended books:

1. Tietz Fundamentals of Clinical Chemistry, Edited by Carl A Burtis & Edward R Ashwood
2. Oxford American Handbook of Clinical Pharmacy (Oxford American Handbook of Medicine by Michelle McCarthy and Denise R. Kockler.
3. Laboratory Tests and Diagnostics Procedures by Cynthia C Chernecky, Barbara J Berger
4. Research Methods by Patrick Mc Neill & Steve Chapman
5. Schedule Y of the Drugs and Cosmetics Act, Govt. of India, current version.

PE-520

Biopharmaceutics and Pharmacokinetics

(2 credits)

1. **Introduction:** Definitions, ADME, concentration time profile, plotting the data, different fluid compartments and blood flow rate compartment models, biological half-life, elimination rate constant. Biopharmaceutics and pharmacokinetics in drug research.

2. **GIT Absorption of drugs:** Mechanism, physico-chemical, biological and pharmaceutical factors affecting drug absorption through GIT. Techniques for the GIT absorption assessment.

3. **Drug disposition:** Total body clearance, renal clearance, mechanism of clearance, clearance ratio, factors affecting renal clearance, hepatic clearance, volume of distribution and its significance.

4. **Protein and tissue binding:** Factors affecting protein binding, kinetics of protein binding, determination of rate constant and different plots (direct, scatchard and reciprocal), Implication of protein binding on pharmacokinetic parameters.

5. **Bioavailability and bioequivalence:** Definitions, federal requirements, methods of determination of bioavailability using blood and urinary excretion data. Protocol design for bioavailability assessment. Methods for bioequivalence determination.

6. **Pharmacokinetic characterization of drugs:** Pharmacokinetics of drugs following one/two compartment open models with first order elimination kinetics as applied to rapid intravenous injection, Intravenous transfusion and oral administration. Determination of absorption rate constant using Wagner-Nelson, Loo Riegelman methods. Flip-flop models, method of residual. Urinary excretion data and its application in pharmacokinetic characterization of drugs. Pharmacokinetics of multiple dosing.

7. **Dosage regimen:** Dosage regimen adjustment in patients with renal and hepatic diseases. Drug dosage in elderly, children and obese patients.

8. **Non Linear Pharmacokinetics:** Various causes of non-linearity, Michaelis-Menten kinetics, In-vivo estimation of K_m and V_m . Case studies.

9. **Physiologic pharmacokinetics models:** Mean Residence Time; Statistical Moment Theory; Application and limitations of physiologic pharmacokinetic models.

10. **Miscellaneous Topics:** Chronopharmacokinetics, Drug toxicity and forensic pharmacokinetics, kinetics of maternal-fetal drug transfer, pharmacokinetics v/s pharmacological/ clinical response, metabolic kinetics

Recommended books:

1. Applied Biopharmaceutics & Pharmacokinetics, by Shargel, L., S. Wu-Pong
2. Biopharmaceutics and Pharmacokinetics: An Introduction by Notari, R. E.
3. Introduction to Biopharmaceutics, by Gibaldi, M.
4. Biopharmaceutics and Relevant Pharmacokinetics, by Wagner, J. G.
5. Textbook of Biopharmaceutics and Clinical Pharmacokinetics by Niazi, S.K.
6. Handbook of Bioequivalence Testing, by Niazi, S. K.
7. Modeling in Biopharmaceutics, Pharmacokinetics, and Pharmacodynamics: Homogeneous and Heterogeneous Approaches, by Macheras, P. and A. Iliadis
8. Comparative Pharmacokinetics: Principles, Techniques and Applications, by Riviere, J. E
9. Foundations of Pharmacokinetics, by Rescigno, A.
10. Clinical Pharmacokinetics and Pharmacodynamics: Concepts and Applications, by Rowland, M. and T. N. Tozer

GE-510

Biostatistics

(2 credits)

1. **Statistics:** Introduction, its role and uses. Collection; Organization; Graphics and pictorial representation of data; Measures of central tendencies and dispersion. Coefficient of variation.
2. **Probability:** Basic concepts; Common probability distributions and probability distributions related to normal distribution.
3. **Sampling:** Simple random and other sampling procedures. Distribution of sample mean and proportion.
4. **Estimation and Hypothesis testing:** Point and interval estimation including fiducial limits. Concepts of hypothesis testing and types of errors. Student-t and Chi square tests. Sample size and power.

5. **Experimental design and analysis of variance:** Completely randomized, randomized blocks. Latin square and factorial designs. Post-hoc procedures.
6. **Correlation and regression:** Graphical presentation of two continuous variables; Pearson's product moment correlation coefficient, its statistical significance. Multiple and partial correlations. Linear regression; Regression line, coefficient of determination, interval estimation and hypothesis testing for population slope. Introduction to multiple linear regression model. Probit and logit transformations.
7. **Non-parametric tests:** Sign; Mann-Whitney U; Wilcoxon matched pair; Kruskal wallis and Friedman twoway anova tests. Spearman rank correlation.
8. **Statistical techniques in pharmaceuticals:** Experimental design in clinical trials; Parallel and crossover designs. Statistical test for bioequivalence. Dose response studies; Statistical quality control.

Recommended books:

1. Fundamentals of Biostatistics by Bernard Rosner
2. Pharmaceutical Statistics: Practical and Clinical Applications by Bolton and Bon
3. Statistical Misconceptions by Huck GE-520 Fundamentals of Intellectual Property (IP) and Technology

GE-511

Seminar

(1 credit)

1. Introduction, Information retrieval systems.
2. Writing term papers and reports.
3. Organization of scientific material, thesis, dissertation and refernces.
4. Reading research papers
5. Skills in oral presentation.

Each student has to present a seminar before end of the semester.

LG-511

Clinical Placement

(3 credits)

1. **Choice of patients for case studies:** Relevance to Pharmacists involvement.
2. Patient profiles (Three)

3. Case presentations (Two)
4. Group Discussions for 'real' patient issues (6 per semester).
5. Ability to pick the right cases/problems/issues, which should be relevant to pharmaceutical care.
6. **Communication skills with staff, patients and care givers/relatives (level of improvement):** Gathering additional information e.g. drug history, allergies, previous medical history, self-medication, use of OTC preparations and knowledge about these and other information relevant to therapy; Counseling ability in view of patients' wish to be so counseled.

LG-512

Computer Applications

(2 credits)

1. **Separation Techniques (30 hours):**
2. **Computer and application in Pharmaceutical Sciences (100 hours):** Introduction to computer, basic unit and function, H/W and S/W, operating systems, word processing, spread sheet, graphic programs, dBase, windows, statistical S/W programs and packages. Steps involved in S/W development, computer languages with emphasis to FORTRAN language and programming, hands on experience in pharmaceutical software systems. Use of computers in information retrieval systems.
3. **Pharmacy practice specialization practical (50 hours):** Handling of databases on medicines, medicine management and retrieval of information as required in medicine information activity; and handling EBM software are parts of the pharmacy practices specialization practical.

SEMESTER-II

PP-610

Pharmacy Practice-II

(1 credit)

1. **Healthcare measures and evaluation methods:** Approaches to healthcare measurement and evaluation: QoL factors affecting it, QoL measurement; QALY; Outcome

measurement and instrument of measurement; Applications of general health survey; Rational drug use; healthcare policy/policy making and implementation.

2. **Health and pharmacoconomics:** Health economic theory and relevance to pharmacy practice, priority setting, economic evaluation; concepts of economics (cost benefit, cost effectiveness, cost minimization); cost analysis; Aiming towards prescribing on these principles.
3. **Medicine management:** Its policies and implementation; Formulary preparation and implementation; Requirements to ensure compliance with agreed guidelines.
4. **Pharmacoepidemiology:** Population approaches and their application in health care and drug use; Types of epidemiological studies, advantages, disadvantages and applications in drug use research.
5. **Medication errors, ADR and prescription event-monitoring:** Medication errors, types and sources of medication errors, methods of studying medication errors and methodological issues; Risk and its measurement.
6. **Defining adverse drug reaction:** Role of pharmacists in ADR reporting, WHO ADR reporting program in India.
7. **Prescription event monitoring (PEM) with respect to prescribed medicines:** Method of monitoring safety of marketed drugs; Methods of monitoring safety and effectiveness profile of drugs recently introduced/marketed in India.

Recommended books:

1. Quality of life: The Assessment, Analysis and Interpretation of Patient-Reported Outcomes by Peter Fayers and David Machin
2. Quality of Life Outcomes in Clinical Trials and Health-Care Evaluation: A Practical Guide to analysis and Interpretation (Statistics in Practice) by Stephen John Walters (Nov 17, 2009) Wiley, Editors-Stephen Senn, Vic Barnett
3. Essentials of Pharmacoconomics, Karen Rascati (Author), Lippincott Williams and Wilkins, Editor-Barrett Koger
4. Understanding Health Outcomes and Pharmacoconomics by George E. Mackinnon III
5. Principles of Pharmacoconomics, edited by J. Lyle Bootman, Raymond J., Townsend, William F. McGhan.
6. Pharmacoepidemiology, edited by Brian L. Strom, Stephen E Kimmel, Sean Hennessy, Wiley Blackwell
7. Introduction to Epidemiology by Ray M. Merrill, Jones and Bartlett
8. An Introduction to Pharmacovigilance by Patrick Waller
9. Cobert's Manual of Drug Safety and Pharmacovigilance by Barton L. Cobert
10. Pharmacovigilance from A to Z: Adverse Drug Event Surveillance by Barton L. Cobert.

PP-611**Pharmacy Practice-III (Community and Rural Pharmacy)**

(1 credit)

- 1. Community Pharmacy:** Overview of organization, administration, computerization and functioning (supply and control, stock control, suppliers, control on price and purchase, receipt/return of goods, financial management); Need for a pharmacist within the pharmacy; Dispensing {prescription of drugs and presentation of dispensed medicines, prescription for non-drugs, OTC products (and self medication), drugs other than actual OTC products dispensed without prescription in India: legislation, prescription for/supply of alternative medicines, dispensing of medicinal gases), counseling, records; Home Care; Health Education.
- 2. Rural Pharmacy:** Need; Provision of pharmacy services in rural areas (issues around accessibility, availability, adequacy, efficiency, equality): where, how what services, how long, through whom/what (e.g. through the community pharmacy, clinics, camps, home visits by pharmacists), how often; Economic issues; Need for a set number of pharmacies (with a certain number of pharmacists covering the pharmacy and area) within a specified area covering a particular part (number) of the population of rural India; Health education; Pharmacists' responding to symptoms (mnemonics e.g., WHAM, AS METHOD), counseling, referral to a medicinal practitioner.

Recommended books:

1. Community Pharmacy Practice Case Studies by Jean-Venable R. Goode, Lynne M. Roman and Kristin W. weitzel
2. Community Pharmacy Handbook by Jon Waterfield
3. Pharmaceutical Practice by-A.J Winfield, R.M.E Richards. Churchill Livingstone
4. Pharmacy Practice by- Patricia Stone, Stephen J Curtis

PP-620**Clinical and Applied Therapeutics-II**

(3 credits)

- 1. Psychiatry:** Pharmacists' contribution in the management of schizophrenic patients, anxiety and mood disorders (monitoring therapy, dosing, initiation and withdrawal of therapy, need to exclude administration of specific drugs post withdrawal of these drugs used in these disorders, effectiveness, compliance, counseling, discharge planning).
- 2. Parkinson's disease:** Differentiation between Parkinson's disease and drug induced Parkinson like syndrome and drug induced extrapyramidal side effects; therapeutic

options and drawbacks, issues around levodopa combinations; alternative therapies, recent additions to drug treatment options.

3. **Rheumatology and inflammatory disease:** Rheumatoid arthritis; Systemic Lupus Erythematosus; Ankylosing spondylitis; Osteoarthritis: Osteoporosis and Osteomalacia; Gout and Hyperuricemia (treatments, monitoring and modifications in therapy as and when required, home care plan, provision of adequate devices to aid rheumatic patients).
4. **Oncology:** Principles of therapy; consequences of regimens in use in India as against in developed countries; incidence; cytotoxic reconstitution; patient and treatment monitoring (acute leukaemias, lung cancer, breast cancer, malignant lymphomas, head and neck cancers, prostate cancer)
5. **Liver disorders:** Viral Hepatitis (types, antiviral treatment, other treatment options; Cost constraints and availability of different vaccines and treatment; Recent advances in therapy; Prophylaxis and prevention; Drug induced Hepatitis; Cirrhosis (Management of Cirrhosis and its complications; FHF and its management)
6. **Gastroenterology:** Peptic Ulcer disease; Inflammatory Bowel disease; Gastro esophageal Reflux Disorder; Diarrhea and Constipation.
7. **Pharmaceutical care in a surgical patient:** Surgical prophylaxis; Pain control; Sedation; Antiemesis; Implications for prescribing in 'Nil by Mouth' Patients.
8. **Neurology:** Epilepsy types, incidence and prevalence in different age groups, toxic effects, DIs; Choice of drugs (mono-or poly-therapy); Initiating, adjusting and monitoring AED treatment, withdrawal of drugs; TDM; Newer AEDs-advantages and drawbacks; Drug induced seizures and management; Pregnancy and epilepsy.

Recommended books:

1. Koda-Kimble and Young's Applied Therapeutics: The Clinical use of Drugs by Brian K. Alldredge, Robin L. Corelli, Michael E. Ernst, and B. Joseph Guglielmo
2. Pharmacotherapy: A Pathophysiologic Approach by Joseph DiPiro, Robert L. Talbert, Gary Yee and Gary Matzke
3. Clinical Pharmacy and Therapeutics by Eric T. Herfindal and Joseph L. Hirschman Clinical Pharmacy and Therapeutics, by Robert Walker and Cate Whittlesea
4. Goodman and Gillman's Manual of Pharmacology and Therapeutics by Laurence Brunton, Donald Blumenthal, Iain Buxton and Keith Parker
5. Goodman and Gillman's The Pharmacological Basis of Therapeutics, by Laurence Brunton, Bruce Chabner and Bjorn Knollman

1. **Explain:** Evidence based medicine what it is and what it is not?
2. **Literature search and analysis:** Searching and finding the current best evidence. Keeping up to date and improving the clinical and other skills and run a better, more efficient pharmacy practice.
3. **Reading the medical literature:** “Significant” relations and their pitfalls; Different types of data and different statistical tests; Assessing methodological quality of published papers; Identifying the authenticity of the published article, evaluating and assessing the type of clinical studies in medical sciences.
4. **Evaluation of literature:** Explaining the role of, key features to examine in, and possible indicators of biases in the primary literature. Data evaluation, tables, graphs, internal validity, per protocol analysis and intention to treat (ITT) analysis of a study. Casual and non-casual relationships. Population size, cause, strength, randomization, and generalizability play in determining the importance of a study.
5. **Understanding terminologies and concepts:** Absolute risk reduction, bias, confounding, confidence interval, odds ratio, predictive value, prognostic factor, relative risk, likelihood ratio, sensitivity, specificity, p value, confidence interval; Number needed to treat; Number needed to harm; Patient expected event rate, survival curve, Kalpan-Meier product limit theorem, Kappa statistic; Clinical significance and systematic review. Measuring the accuracy of diagnostic procedures.
Experience in advanced statistical programs (Like SAS, SPSS etc. for decision analysis)

Recommended books:

1. Evidence Based Medicine (3rd Edition) by Sharon E. Straus, W. Scott Richardson, Paul Glasziou and R. Brian Haynes
2. Evidence-Based Medicine: How to Practice and Teach it, (Straus, Evidence-Based Medicine) by Sharon E. Straus MD, Paul Glasziou, W. Scott Richardson MD and R. Brian Haynes
3. How to read a paper: The Basics of Evidence-Based Medicine by Trisha Greenhalgh
4. Essential Evidence-Based Medicine (Essential Medical Texts for students and trainees) by Dan Mayer
5. Pharmacists Guide to Evidence-Based Medicine for Clinical Decision Making by Dr. Patrick J. Bryant and Heather A. Pace
6. Introduction to Meta-Analysis (Statistics in Practice) by Michael Borenstein, Larry V. Hedges, Julian P.T. Higgins and Hannah R. Rothstein
7. Research Synthesis and Meta-Analysis: A Step by Step Approach (Applied Social Research Methods) by Harris M. Cooper

8. Systematic Reviews and Meta-Analysis by Julia H. Littell, Jacqueline Corcoran and Vijayan Pillai
9. Systematic Reviews in Health Care: Meta-Analysis in Context by Matthias Egger, George Davey Smith and Douglas Altman

PP-631

Clinical Biostatistics

(1 credit)

1. Statistical methods for multiple variables.
2. Assessing the quality of clinical trials.
3. Design and interpretation of clinical trials.
4. Per protocol and intention to treat analysis.
5. Missing values and outliers.
6. Type of comparison of clinical trials.
7. Analyze survival data.
8. Relationships among variables.
9. Bias and Confounders.
10. Pooling data in Meta-analysis.
11. Advantages and disadvantages of different survey methods.
12. Measuring the accuracy of diagnostic procedures.
13. Experience in advanced statistical programs (Like SAS, SPSS, etc. for decision analysis)

Recommended books:

1. Epidemiology and Biostatistics: An Introduction to Clinical Research by Bryan Kestenbaum.
2. Biostatistics and Epidemiology: A primer for Health and Biomedical Professionals by Sylvia Wassertheil-Smoller
3. Basic & Clinical Biostatistics (LANGE Basic Science) by Beth Dawson and Robert Trapp.
4. Clinical Trial Methodology (Chapman & Hall/CRC Biostatistics Series) by Karl E. Peace and Ding-Geng (Din) Chen.

GE-611

Seminar

(1 credit)

Students are required to submit written record and present details of the project to be pursued in semester-III & IV. This should include the purpose and basis of the project, stating aims, objectives and probable outcomes, be able to supplement these with necessary information, literature review towards it and process for the project itself.

LG-611

Clinical Placement

(5 credits)

1. Prescription and patient monitoring for treatment effect, drug interactions, adverse drug reactions.
2. **Self-study and time management:** Time spent on a case and ability to gather relevant information in relation to time.
3. Patient profiles (Two)
4. Case presentations (Two)
5. Group Discussion for 'real' patient issues (6 per semester).
6. Contribution during pharmacist and medical rounds: In relation to patient and/or drug information, recent advances, relevance in practice.
7. Practice with ethics in view and without interfering with the work of the other professionals but proving to be an aid to the overall care.

PhD Pharmacy Practice

Semester-I		
Course Code	Course Name	Credits
PP-701	Research Methods-I	2
Semester-II		
PP-801	Research Methods-II	2

SEMESTER-I

PP-701

Research Methods-I

(2 credits)

1. **Introduction to research methodology:** Meaning and objective of research; Types of research; Approaches to research; Research methods versus methodology; Research Process; Criteria of good research; Common problems encountered in research; Quantitative and qualitative research methods.
2. **Defining the research problems:** Selecting a problem; Necessity of defining the problem. Research design; Meaning and features of research design; Concepts related to research design; Basic Principles of experimental designs; Developing a research plan;
3. **Methods of data collection:** Primary data collection methods; use of questionnaires; Secondary data collection; Selection of appropriate method of data collection; Interviewing and principles of good interview.
4. **Processing & analysis of data:** Processing operations; Elements of analysis; Measures of asymmetry; relationships, associations, Summary chart concerning analysis data collection.
5. **Fundamentals of sampling:** Need for sampling; Sampling distribution, central limit theorem; Sampling theory; Sandler's A-test; Estimating population proportion; Sample size and its distribution; Determination of sample size based on various basis.
6. **Interpretation of results:** Meaning of interpretation; Techniques of interpretation; Scientific writing and report preparation; Fundamentals of scientific writing; Steps in report preparation; Layout of reports; Types of reports; Precautions in writing research report.
7. **Questionnaire and survey techniques:** Analysis of qualitative data; Interview and focus groups.
8. Principles of validity and reliability.
9. Ethics committees.
10. Patients consent and confidentiality.

SEMESTER-II

PP-801

Research Methods-II

(2 credits)

1. Theoretical perspectives and models in survey research
2. **Qualitative interview:** Focus groups.
3. **Triangulation:** Comparing methods.
4. **Evaluation of pharmaceutical services:** Objectives, design, framework, methods and measures.
5. National surveys pertaining to healthcare assessment.
