

SRI BALAJI VIDYAPEETH

(Deemed - to be - University u/s 3 of UGC Act, 1956)

Pillaiyarkuppam, Puducherry - 607 402

Mahatma Gandhi Medical College and Research Institute
Shri Sathya Sai Medical College and Research Institute



COMPETENCY BASED POSTGRADUATE MEDICAL CURRICULUM

M.D. PHARMACOLOGY

(2020 Onwards)

(As approved at the 30th Academic Council Meeting held on 28th September 2020)

Preface

Following the promulgation of the much awaited CompetencyBased Medical Education (CBME) for post graduate by the Medical Council of India (MCI)(superseded by the Board of Governors), adoption of CBME for implementing post-graduate programs is a welcome move. Sri Balaji Vidyapeeth (SBV), Puducherry, Deemedtobe University, declared u/s 3 of the UGC Act. and accredited by the NAAC with A grade, takes immense privilege in preparing such an unique document in a comprehensive mannerand most importantly the onus is on the Indian setting for the first time,with regard to the competency based medical education for post graduate programs that are being offered in the broad specialty departments. SBV is committed to making cardinal contributions that would be realised by exploring newer vistas.Thus, post graduate medical education in the country could be made to scale greater heights and SBV is poised to show the way in this direction.

Prof. Subhash Chandra Parija,
MBBS, MD, PhD, DSc, FRCPath,FAMS, FICPath,
FABMS,
FICAI, FISCd, FIAVP,FIATP and FIMSA.
Vice-Chancellor
Sri Balaji Vidyapeeth, Puducherry.

Preface

Following roll out of much awaited Competency-Based Medical Education (CBME) for undergraduate by the Medical Council of India (MCI)(superseded by the Board of Governors) , adoption of CBME for post-graduate by it is welcome move.

The MCI has laid down the syllabus course wise, listing competency to some extent, teaching learning methods and the assessment methods as well. The MCI describes competencies in three domains (knowledge, skill, and attitude). However, the most significant problem in competency-based training is the development of appropriate assessment tools.

The salient feature of this document is defining the program educational objectives (PEO) for its postgraduate program as a whole, defining program outcomes (PO) based on the competencies to be practiced by the specialist, course outcomes (CO) and program specific sub-competencies and their progression in the form of milestones. The compilation of the milestone description leads to the formation of the required syllabus. This allows the mentors to monitor the progress in sub-competency milestone levels. It also defines milestone in five levels, for each sub-competency. Although MCI has described three domains of competencies, the domain 'Attitude' is elaborated into 4 more competencies for ease of assessment. The six competency model (ACGME) for residency education: Medical Knowledge, Patient Care, Practice Based Learning and Improvement, Systems Based Practice, Professionalism, Inter personal and Communication Skills gives better clarity and in-depth explanation. The sub-competency and their milestone levels are mapped into the entrustable professional activities (EPA) that are specific to the individual postgraduate program. To make the program more relevant, PEO, PO, CO and EPAs are mapped with each other. EPA's which are activity based are used for formative assessment and graded. EPA assessment is based on workplace based assessment (WPBA), multisource feedback (MSF) and e-portfolio. A great emphasis is given on monitoring the progress in acquisition of knowledge, skill and attitude through various appraisal forms including e-portfolios during three years of residency period.



Prof. M .Ravishankar
MBBS,MD(Anaesthesia),
FRCP. Dean, MGMCRI
Puducherry. 607402



Dr. Sukumaran Annamalai
MBBS,M.D.,(GM),D.H.H.M.,
Dean,SSSMCRIKancheepuram
District Tamil Nadu 603108

Foreword

The ability to use drugs safely and effectively is a defining characteristic of a good medical pharmacologist. This ability is predicated upon an up-to-date knowledge of the ever expanding information of drugs.

The extensive change made to our curriculum of MD Pharmacology reflects enormous progress and profusion of new knowledge regarding drugs across a wide range of therapeutic areas.

Although the content has been revised and refreshed our objective always is to provide a comprehensive emphasis on the principles of clinical pharmacology, prescribing skills, the way the drugs are used in clinical practice, an updated and succinct understanding of the major pathogenic mechanisms in context with the action of drugs and the consequences of their therapeutic uses.

Our curriculum offers a structured approach to the principles of disease management, outlining core principles of drug choices and planning a therapeutic regimen for many common diseases.

It is our intention that our MD Pharmacology curriculum will encourage students to develop a deeper understanding of the principles of drug usage that will help them to become a safe and effective pharmacologist and to carry out basic clinical research and teach. As medical science advances, these principles should underpin the lifelong learning essential for the maintenance of these skills of clinical pharmacologist.

With an MD in Pharmacology, you can teach or conduct research in higher educational institutions, work in the pharmaceutical industry, research and develop new medicines, conduct clinical research, work in regulatory and marketing divisions of industry, employ in hospitals, career in medical editing or develop new chemicals.

We thank our team wholeheartedly for their spontaneous and unforced enthusiasm in preparing this curriculum.

With a handshake in thought

God bless you all.

Prof. Mamimekalai K.
Prof and Head,
Dept. of Pharmacology
MGMCRI,
Puducherry - 607 402

Prof. Sreelakshmi
Prof & Head,
Dept. of Pharmacology,
SSSMCRI,
Kancheepuram - 603 108

List of Contributors

Dr.Manimekalai. K. Prof.& HOD Pharmacology, MGMCRI, Puducherry.

Dr.Shree Lakshmi, Professor & HOD of Pharmacology, SSSMCRI, Chennai.

Dr.KartikSalwe,Professor of Pharmacology, MGMCRI, Puducherry.

Dr.Sudar Codi, Professor of Pharmacology, MGMCRI, Puducherry.

Dr.Maduram, Professor of Pharmacology, SSSMCRI, Chennai.

Dr.Lavakumar, Professor, SSSMCRI, Chennai.

Dr.Johan Pandian, Asso. Professor, MGMCRI, Puducherry.

Dr.Barathane, Asso. Professor, MGMCRI, Puducherry.

Acknowledgements

External experts:

Dr. Isabella Topno, Prof & HOD of Pharmacology, Pondicherry Institute of Medical Sciences, Puducherry

Dr.Somasundaram.G, Prof&HODofPharmacology,SriLakshminarayanaInstituteofMedical Sciences, Puducherry

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Sri Balaji University
Department of Pharmacology
Post- Graduate Program

1. Preamble

The purpose of Post graduate education is to create specialists who would provide high quality health care and advance the cause of science through research & training. Pharmacology consists of both the experimental (basic) and clinical sciences. Experimental Pharmacology is essential to understanding of drug action in diseases as well as for the pharmaceutical industry for drug discovery and development. Clinical Pharmacology is essential for prescribing practice in medicine, adverse drug reactions, clinical trial and pharmacovigilance. The job Prospects for a medical Pharmacologist are in academics, pharmaceutical industry/clinical research organization, government research institutions, in regulatory bodies and as scientific writer or science manager.

Accordingly, a post graduate (MD) student in Pharmacology should be competent to meet the job requirements at all these places. The applied nature of the discipline, the move towards integrated course structures, the widening of discipline boundaries and increasing number of students seeking postgraduation degree raise issues concerning maintaining and improving competency as along with maintenance of academic standards. These issues also necessitate integration with other biomedical and clinical disciplines. A pragmatic approach to Postgraduate Pharmacology teaching in India is an important step towards addressing the aforesaid challenges and facilitating a fresh curriculum design.

The purpose of this document is to provide teachers and learners illustrative guidelines to achieve defined outcomes through learning and assessment. This document was prepared by various subject-content specialists. The Reconciliation Board of the Academic Committee has attempted to render uniformity without compromise to purpose and content of the document. Compromise in purity of syntax has been made in order to preserve the purpose and content. This has necessitated retention of “domains of learning” under the heading “competencies”.

2. Program Educational Objectives (PEO)

- PEO1:** Specialist who can explain clearly the concepts and principles of Pharmacology and therapeutics.
- PEO2:** Leader and team member who understands health care system and act to provide safe patient care by training the health care professionals with accountability and responsibility.
- PEO3:** Communicator possessing adequate communication skill to convey required information in an appropriate manner in various health care setting.
- PEO4:** Lifelong learner keen on updating oneself regarding the advancement in the field of Pharmacology and therapeutics and able to perform the role of researcher and teacher
- PEO5:** Professional who understands and follows the principle of bio-ethics / ethics related to health care system.

3. Program Outcome (PO)

After three years of residency program postgraduate should be able to

- PO1:** Able to explain clearly concepts and principles of Pharmacology and therapeutics
- PO2:** Apply and integrate the knowledge of pathophysiology of diseases and its modulation by drugs
- PO3:** Acquire Knowledge of the various recent advances in pharmacology pertaining to new drug development and treatment approach of various disorders.
- PO4:** Able to effectively teach undergraduate students in medicine (MBBS, Dentistry, Nursing and Allied Health Sciences) so they become competent healthcare professionals and able to contribute to training of postgraduate trainees.
- PO5:** Perform major in vivo and in vitro animal experiments with proper animal handling and care according to guidelines proposed for animal research.
- PO6:** Demonstrate the skills in prescription writing, auditing and effectively communicate with the patients, health care team, faculty and peers on the rational use of drugs, adverse drug reaction reporting and medication adherence.
- PO7:** Demonstrate and apply the knowledge of basics of research methodology, ethics, biostatistics and important guidelines to perform animal and human research and to have the potential ability to pursue further specializations and eventually be competent to guide students.
- PO8:** Apply skills for self-directed learning to keep up with developments in the field and to continuously build to improve on skills, expertise and perpetual professional development.

4. Course and Course Objectives (CO)

4.1. Course 1 (C1): General Pharmacology

Objectives: At the end of three years post graduate student should be able to

- 1.1** Acquire sound knowledge of general pharmacological principles to explain the mechanisms of action, pharmacokinetics, pharmacodynamics and adverse effects of drugs for various disorders
- 1.2** Acquire knowledge on the rational use of drugs
- 1.3.** Acquire knowledge of the various branches of pharmacology and the principles underlying each
- 1.4.** Demonstrate the skills in prescription writing, auditing and effectively communicate with the patients, health care team, faculty and peers on the rational use of drugs, adverse drug reaction reporting and medication adherence.

4.2. Course 2 (C2): Clinical & Experimental Pharmacology

Objectives: At the end of three years post graduate student should be able to

- 2.1.** Acquire knowledge, understand and apply the principles of various national guidelines proposed and the legal and ethical issues involved in doing human and animal research.

- 2.2. Describe how to evaluate, analyze and monitor preclinical and clinical data in drug discovery
- 2.2. Demonstrate and apply the knowledge of basics of research methodology and biostatistics, develop a research protocol, prepare and take Informed consent form and patient information sheet, conduct the study, record experimental observations, analyse data using currently available statistical software, interpret results and write up a research paper
- 2.4. Demonstrate standard operating procedures of various methods and techniques used in clinical trials and research.
- 2.5. Demonstrate knowledge about computer assisted learning (CAL) software and instrumentation to use them efficiently in promoting learning of pharmacology.
- 2.6. Perform major in vivo and in vitro animal experiments with proper animal handling and care
- 2.7. Demonstrate presentation skills at academic meetings, publications and writing research projects for funding agencies
- 2.8. Estimate toxic drug levels using chemical and biological tests (alkaloids, glycosides, steroids, barbiturates, salicylates) by commonly used method
- 2.9. Evaluate promotional drug literature, prepare “Drug Information Sheet” (WHO criteria), Interpret bioavailability parameters with the help of given pharmacokinetics data, Perform causality assessment and report ADR as per Pharmacovigilance Programme of India (PvPI)

4.3. Course 3 (C3): Systemic Pharmacology

Objectives: At the end of three years post graduate student should be able to

- 2.1. Apply and integrate the knowledge of pathophysiology of diseases and its modulation by drugs
- 2.2. Understand and apply the concepts of general pharmacology on the treatment of various systemic disorders.
- 2.3. Understand and apply the principles of various teaching - learning technology in their practice

4.4. Course 4 (C4): Recent advances in Pharmacology

Objectives: At the end of three years post graduate student should be able to

- 4.1. Acquire Knowledge of the various recent advances in pharmacology pertaining to new drug development and treatment approach of various disorders.
- 4.2. Apply skills for self-directed learning to keep up with developments in the field and to continuously build to improve on skills, expertise and perpetual professional development

The PEO, PO and the CO are mapped with each other. (Table 1)

Table 1. Mapping of PEO, PO and CO

| | PEO 1 | | | PEO2 | PEO3 | | PEO 4 | | PEO 5 |
|----|-------|-----|-----|------|------|-----|-------|-----|-------|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO8 |
| C1 | Y | | | Y | | Y | | | |
| C2 | | | Y | Y | Y | Y | Y | | |
| C3 | Y | Y | Y | Y | | Y | | | |
| C4 | | Y | Y | Y | | | | Y | Y |

All courses run concurrently for 3 years with a summative assessment at the end of 3 years. The program is competency based and the competencies, sub-competencies and milestones are detailed. These are mapped to the Entrustable professional activities (EPA) identified as essential for a specialist. Formative assessment is carried out every three months using appropriate tools, for identifying eligibility for transfer of trust

Competencies, Sub-competencies and Milestone:

At the end of the MD course in Pharmacology, the student should have acquired various competencies i.e. medical knowledge, patient care, interpersonal communication skill, system based practice, practice based learning and implementation and professionalism. Details of each with milestone as level is described below. (Table 2)

Table 2. Description of Competencies, Sub-competencies and Milestone

| <p>COMPETENCY – 1: Medical Knowledge (MK): Demonstrate knowledge of established and evolving biomedical, clinical, epidemiological, and social-behavioral sciences, as well as the application of this knowledge to patient care</p> | | | | | |
|--|--|---|---|---|---|
| MILESTONE | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
| S.No | Sub Competency | Understand and explain Concepts | Analyze/Correlate/Apply the knowledge for treatment | Demonstrates the knowledge | Ability to plan and share their knowledge |
| MK 1 | Describe and apply pharmacological principles to explain the mechanism of action, PK, PD, drug interactions of drugs used in diagnosis, prevention and treatment of diseases | Understands the pharmacological principles and explains the concepts underlying the mechanism of action, PK, PD, drug interactions of drugs used in diagnosis, prevention and treatment of diseases | Analyze the knowledge gained and correlates the mechanism of action, PK, PD, drug interactions of various drugs used in diagnosis, prevention and treatment of diseases | Demonstrates the knowledge gained to the peer groups and faculties and ensure right learning of the pharmacological principles to explain the mechanism of action, PK, PD, drug interactions of drugs used in diagnosis, prevention and treatment of diseases | Able to make a lesson plan and educate the undergraduates and paramedics on the pharmacological principles underlying the mechanism of action, PK, PD, drug interactions of drugs used in diagnosis, prevention and treatment of diseases |
| MK 2 | Apply and integrate knowledge of pathophysiology of diseases and its modulation by drugs. | Apply and integrate the knowledge of various groups of drugs based on the pathophysiology of diseases and its modulation by drugs. | Analyze, correlate and arrive at the drugs of choice used in the treatment of a clinical condition based on their pathophysiology. | Demonstrates the knowledge gained to the peer groups and faculties and ensure right learning of the pathophysiology of diseases and its modulation by drugs. | Able to make a lesson plan and educate the undergraduates and paramedics on pathophysiology of diseases and its modulation by drugs. |

| | | | | | | |
|---------|--|--|--|---|--|--|
| MK 3 | Acquire knowledge on various fields of Pharmacology | Acquire knowledge on various fields of Pharmacology | Understand the basic principles behind the functioning of various fields of Pharmacology | Analyze and apply the knowledge of various fields of pharmacology in the treatment of a given condition. | Demonstrates the knowledge gained to the peer groups and faculties and ensure right learning of the principles of various fields of Pharmacology and their clinical application | Able to make a lesson plan and educate the undergraduates and paramedics on principles of various fields of Pharmacology and their clinical application |
| MK 4 | Acquire knowledge about principles of basic and advanced Instruments used in Pharmacology. | Acquire knowledge on various basic and advanced Instruments used in Pharmacology. | Understand the basic principles behind the functioning of basic and advanced Instruments used in Pharmacology. | Analyze and apply the knowledge of basic and advanced Instruments used in Pharmacology for the treatment of a given condition | Demonstrates the knowledge gained to the peer groups and faculties and ensure right learning of the principles of basic and advanced Instruments used in Pharmacology and their clinical application | Able to make a lesson plan and educate the undergraduates and paramedics on principles of basic and advanced Instruments used in Pharmacology and their clinical application |
| MK 5 | Acquire knowledge on detoxification and rehabilitation | Acquire knowledge on various drugs used in the treatment of common poison consumption and rehabilitation of patient. | Understand the basic mechanisms of the various drugs used in the treatment of common poison consumption and rehabilitation of patient. | Analyze and apply the knowledge of various drugs used in the treatment of common poison for the treatment of a given condition. | Demonstrates the knowledge gained to the peer groups and faculties and ensure right learning of the various drugs used in the treatment of the common poison consumption and rehabilitation of patient.. | Able to make a lesson plan and educate the undergraduates and paramedics on various drugs used in the treatment of common poison consumption and rehabilitation of patient. |

COMPETENCY-2: PATIENT CARE- Provide patient-centered care that is compassionate, appropriate, and effective for the treatment of health problems and the promotion of health.

| | MILESTONE | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|-------|---|--|---|---|---|--|
| S, No | Sub Competency | Acquire knowledge and recall | Understand and explain Concepts | Analyze/Correlate/Apply the knowledge for treatment | Demonstrates the knowledge | Ability to plan and share their knowledge |
| PC 1 | Acquire knowledge on essential medicines and generic drugs | Acquire knowledge on essential medicines and generic drugs | Apply the essential medicine concept on the choice of treatment of a given medical condition with direct supervision by faculty | Apply the essential medicine concept on the choice of treatment of a given medical condition in routine activities with indirect supervision by faculty | Apply the essential medicine concept to choose the right choice of treatment of a given medical condition independently | Able to make a lesson plan and educate the undergraduates and paramedics on essential medicine concept and its utility in clinical scenario. |
| PC 2 | Acquire knowledge on rational use of drugs and prescription writing and prescription auditing | Acquire knowledge on the rational use of drugs and its clinical importance | Apply the essential medicine concept on the choice of treatment of a given medical condition with direct supervision by faculty | Apply the essential medicine concept on the choice of treatment of a given medical condition in routine activities with indirect supervision by faculty | Apply the essential medicine concept to choose the right choice of treatment of a given medical condition independently | Able to make a lesson plan and educate the undergraduates and paramedics on essential medicine concept and its utility in clinical scenario. |
| PC 2 | Acquire knowledge on rational use of drugs and prescription writing and prescription auditing | Acquire knowledge on the rational use of drugs and its clinical importance | Apply the knowledge of rational use of drugs in writing and auditing a prescription for a given medical condition under direct supervision by faculty | Apply the knowledge of rational use of drugs in writing and auditing a prescription for a given medical condition under indirect supervision by faculty | Write and audit a prescription for a given medical condition independently | Able to educate and train the undergraduates and paramedics on effective prescription writing and auditing |

| | | | | | | |
|------|--|---|--|--|--|--|
| PC 3 | Acquire knowledge on pharmacovigilance and able to predict efficacy and adverse effects associated with use of drugs | Acquire knowledge on pharmacovigilance and causality assessment to report an adverse drug reaction | Apply the knowledge, perform casualty assessment and report an adverse drug reaction with direct supervision by faculty | Apply the knowledge, perform casualty assessment and report an adverse drug reaction with indirect supervision by faculty | Perform Casualty assessment, report Independently | Able to make a lesson plan and educate the undergraduates and paramedics on Pharmacovigilance and Casualty Assessment |
| PC 4 | Acquire knowledge about antimicrobial stewardship programs and strategies for containment of antibiotic resistance | Acquire knowledge on drugs used for the treatment of infections and the antimicrobial stewardship program | Apply the knowledge on choose the right drugs used for the treatment of infections and participate in the hospital antimicrobial stewardship program under direct supervision by faculty | Apply the knowledge on choose the right drugs used for the treatment of infections and participate in the hospital antimicrobial stewardship program under indirect supervision by faculty | Choose the right choice of drug for the treatment of infections and participate independently to combat antimicrobial resistance | Able to make a lesson plan and educate the undergraduates and paramedics on right choice of drug for treatment of various infections |

COMPETENCY -3: INTERPERSONAL COMMUNICATION SKILLS – Demonstrate interpersonal and communication skills that result in the effective exchange of information and collaboration with patients, their families, and health professionals

| | MILESTONE | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|-------|---|---|--|--|---|--|
| S, No | Sub Competency | Acquire knowledge and recall | Understand and explain Concepts | Analyze/Correlate/Apply the knowledge for treatment | Demonstrates the knowledge | Ability to plan and share their knowledge |
| PC 1 | Demonstrate the Instrument used routinely in Pharmacology | Acquire knowledge on Instruments used routinely in Pharmacology | Understand the basic principles behind the functioning of Instruments used routinely in Pharmacology. | Analyze and apply the knowledge of instruments used routinely in Pharmacology for the treatment of a given condition. | Demonstrates the knowledge gained to the peer groups and faculties and ensure right learning of the principles of Instruments used routinely in Pharmacology and their clinical application | Able to make a lesson plan and educate the undergraduates and paramedics on principles of Instruments used routinely in Pharmacology. and their clinical application |
| ICS 2 | Communicate legal and ethical issues involved in drug development and research to patients and peer groups | Understand the legal and ethical issues involved in drug development and research to patients and peer groups | Communicate legal and ethical issues involved in drug development and research to patients and peer groups with direct supervision by faculty. | Communicate legal and ethical issues involved in drug development and research to patients and peer groups with indirect supervision by faculty. | Communicate legal and ethical issues involved in drug development and research to patients and peer groups independently. | Train others to Communicate legal and ethical issues involved in drug development and research to patients and peer groups |
| ICS 3 | Effectively explain to patients, the effects and side effects of drugs, including the need for medication adherence | Understands the importance and learns to explain patients, the effects and side effects of drugs, including the need for medication adherence | Effectively explains to patients, the effects and side effects of drugs, including the need for medication adherence with direct supervision by faculty. | Effectively explains to patients, the effects and side effects of drugs, including the need for medication adherence with indirect supervision by faculty. | Effectively explains to patients, the effects and side effects of drugs, including the need for medication adherence independently. | Train others to Effectively explain to patients, the effects and side effects of drugs, including the need for medication adherence |

| | | | | | | |
|-------|--|--|---|--|---|--|
| ICS 4 | Communicate effectively with health care team on rational use of drugs and ADR reporting | Learns to Communicate effectively with health care team on rational use of drugs and ADR reporting | Communicates effectively with health care team on rational use of drugs and ADR reporting with direct supervision by faculty. | Communicate effectively with health care team on rational use of drugs and ADR reporting with indirect supervision by faculty. | Communicate effectively with health care team on rational use of drugs and ADR reporting independently. | Train others to Communicate effectively with health care team on rational use of drugs and ADR reporting |
| ICS 5 | Demonstrate ability to generate awareness about the use of generic drugs in patients. | Acquire knowledge about the use of generic drugs in patients. | Demonstrate ability to generate awareness about the use of generic drugs in patients with direct supervision by faculty. | Demonstrate ability to generate awareness about the use of generic drugs in patients with indirect supervision by faculty. | Demonstrate ability to generate awareness about the use of generic drugs in patients independently. | Train others to generate awareness about the use of generic drugs in patients.v |

COMPETENCY - 4: SYSTEM BASED PRACTICE - Demonstrate the ability to follow the standard operating procedures relevant to practices of the organisations for patient care .

| | MILESTONE | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|-------|---|---|--|--|---|--|
| S.No | Sub Competency | Acquire knowledge and recall | Understand and explain Concepts | Analyze/Correlate/Apply the knowledge for treatment | Demonstrates the knowledge | Ability to plan and share their knowledge |
| SBP 1 | Acquire knowledge and understanding of principles of Good clinical practice (GCP) and Good laboratory practice (GLP) guidelines and prepare protocol for clinical trial | Acquire knowledge and understanding of principles of Good clinical practice (GCP) and Good laboratory practice (GLP) guidelines and prepare protocol for clinical trial | Demonstrates knowledge and understanding of principles of Good clinical practice (GCP) and Good laboratory practice (GLP) guidelines and prepare protocol for clinical trial under direct supervision by faculty | Demonstrates knowledge and understanding of principles of Good clinical practice (GCP) and Good laboratory practice (GLP) guidelines and prepare protocol for clinical trial under indirect supervision by faculty | Demonstrates knowledge and understanding of principles of Good clinical practice (GCP) and Good laboratory practice (GLP) guidelines and prepare protocol for clinical trial without supervision by faculty | Trains others in acquiring knowledge and understanding of principles of Good clinical practice (GCP) and Good laboratory practice (GLP) guidelines and prepare protocol for clinical trial |

| | | | | | | |
|----------|--|---|--|--|---|---|
| SBP 2 | Acquire knowledge and Demonstrate the basics of research methodology and biostatistics in clinical and experimental research | Acquire knowledge on the basics of research methodology and biostatistics in clinical and experimental research | Demonstrate the basics of research methodology and biostatistics in clinical and experimental research under direct supervision by faculty | Demonstrate the basics of research methodology and biostatistics in clinical and experimental research under indirect supervision by faculty | Demonstrate the basics of research methodology and biostatistics in clinical and experimental research without supervision by faculty | Trains others on the basics of research methodology and biostatistics in clinical and experimental research |
| SBP 3 | Prepare Informed consent form and participant information sheet for research involving human participants | Acquires knowledge to prepare an Informed consent form and participant information sheet for research involving human participants | Prepare Informed consent form and participant information sheet for research involving human participants under direct supervision by faculty | Prepare Informed consent form and participant information sheet for research involving human participants under indirect supervision by faculty | Prepare Informed consent form and participant information sheet for research involving human participants without supervision by faculty | Train others to prepare Informed consent form and participant information sheet for research involving human participants |
| SBP 4 | Acquire knowledge on research and ethical guidelines and perform in vivo and in vitro animal research and toxicity studies | Acquire knowledge on the basics of research methodology and ethical guidelines to perform in vivo and in vitro animal research and toxicity studies | Demonstrate the basics of research methodology and ethical guidelines to perform in vivo and in vitro animal research and toxicity studies under direct supervision by faculty | Demonstrate the basics of research methodology and ethical guidelines to perform in vivo and in vitro animal research and toxicity studies under indirect supervision by faculty | Demonstrate the basics of research methodology and ethical guidelines to perform in vivo and in vitro animal research and toxicity studies without supervision by faculty | Trains others on the basics of research methodology and ethical guidelines to perform in vivo and in vitro animal research and toxicity studies |

COMPETENCY - 5: PROBLEM BASED LEARNING - Demonstrate the commitment to learn by practice and improve upon their ability.

| | MILESTONE | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|-------------------|--|--|---|---|---|---|
| S ₁ No | Sub Competency | Acquire knowledge and recall | Understand and explain Concepts | Analyze/Correlate/Apply the knowledge for treatment | Demonstrates the knowledge | Ability to plan and share their knowledge |
| PBL1 1 | Acquire knowledge and apply the principle of research methodology and biostatistics in the evaluation and interpretation of human and animal pharmacological studies | Acquire knowledge and apply the principle of research methodology and biostatistics in the evaluation and interpretation of human and animal pharmacological studies | Demonstrate the knowledge or evaluate the principle of research methodology and biostatistics in the evaluation and interpretation of human and animal pharmacological studies with direct supervision by faculty 1 studies | Demonstrate the knowledge or evaluate the principle of research methodology and biostatistics in the evaluation and interpretation of human and animal pharmacological studies with indirect supervision by faculty | Evaluate the principle of research methodology and biostatistics in the evaluation and interpretation of human and animal pharmacological studies independently | Assist others in evaluating and interpretation of the principle of research methodology and biostatistics in human and animal pharmacological studies |
| PBL1 2 | Describe how to evaluate, analyse and monitor preclinical and clinical data in drug discovery and treatment | Acquire knowledge to evaluate, analyse and monitor preclinical and clinical data in drug discovery and treatment | Evaluate, analyse and monitor preclinical and clinical data in drug discovery and treatment with direct supervision by faculty | Evaluate, analyse and monitor preclinical and clinical data in drug discovery and treatment with indirect supervision by faculty | Evaluate, analyse and monitor preclinical and clinical data in drug discovery and treatment independently | Assist others to evaluate, analyse and monitor preclinical and clinical data in drug discovery and treatment |
| PBL1 3 | Describe and demonstrate the principles of teaching - learning methodology used in learning Pharmacology | Acquire knowledge to Describe the principles of teaching - learning methodology used in learning Pharmacology | Demonstrate the principles of teaching - learning methodology used in learning Pharmacology with direct supervision by faculty | Describe and demonstrate the principles of teaching - learning methodology used in learning Pharmacology with indirect supervision by faculty | Describe and demonstrate the principles of teaching - learning methodology used in learning Pharmacology independently | Assist others to demonstrate the principles of teaching - learning methodology used in learning Pharmacology |

| | | | | | | |
|-----------|---|---|---|--|--|---|
| PBLI 4 | Demonstrate knowledge about computer assisted learning (CAL) softwares and ability to use them efficiently to promote learning of pharmacology. | Acquire knowledge about computer assisted learning (CAL) softwares and ability to use them efficiently to promote learning of pharmacology. | Demonstrate knowledge about computer assisted learning (CAL) softwares and ability to use them efficiently to promote learning of pharmacology with direct supervision by faculty | Demonstrate knowledge about computer assisted learning (CAL) softwares and ability to use them efficiently to promote learning of pharmacology indirectly supervision by faculty | Demonstrate knowledge about computer assisted learning (CAL) softwares and ability to use them efficiently to promote learning of pharmacology independently | Train others to demonstrate knowledge about computer assisted learning (CAL) softwares and ability to use them efficiently to promote learning of pharmacology. |
| PBLI 5 | Evaluate promotional drug literature | Acquire knowledge to Evaluate promotional drug literature | Evaluate promotional drug literature with direct supervision by faculty | Evaluate promotional drug literature with indirect supervision by faculty | Evaluate promotional drug literature independently | Assist others to Evaluate promotional drug literature |
| PBLI 5 | Evaluate promotional drug literature | Acquire knowledge to Evaluate promotional drug literature | Evaluate promotional drug literature with direct supervision by faculty | Evaluate promotional drug literature with indirect supervision by faculty | Evaluate promotional drug literature independently | Assist others to Evaluate promotional drug literature |
| PBLI 6 | Prepare "Drug Information Sheet" (WHO criteria) | Acquire knowledge to Prepare "Drug Information Sheet" (WHO criteria) | Acquire knowledge to Prepare "Drug Information Sheet" (WHO criteria) with direct supervision by faculty | Acquire knowledge to Prepare "Drug Information Sheet" (WHO criteria) with indirect supervision by faculty | Acquire knowledge to Prepare "Drug Information Sheet" (WHO criteria) independently | Assist others to Prepare "Drug Information Sheet" (WHO criteria) |
| PBLI 7 | Interpret bioavailability parameters with the help of given pharmacokinetics data | Acquire knowledge to Interpret bioavailability parameters with the help of given pharmacokinetics | Interpret bioavailability parameters with the help of given pharmacokinetics data with direct supervision by faculty | Interpret bioavailability parameters with the help of given pharmacokinetics data with indirect supervision by faculty | Interpret bioavailability parameters with the help of given pharmacokinetics data independently | Assist others to Interpret bioavailability parameters with the help of given pharmacokinetics data |

COMPETENCY - 6: PROFESSIONALISM - Demonstrate a commitment to carrying out professional responsibilities and an adherence to ethical principles

| | MILESTONE | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|-------|---|---|---|---|---|---|
| S, No | Sub Competency | Acquire knowledge and recall | Understand and explain Concepts | Analyze/Correlate/Apply the knowledge for treatment | Demonstrates the knowledge | Ability to plan and share their knowledge |
| P 1 | Ability to guide the students to do clinical and experimental research | Acquire knowledge to guide the students to do clinical and experimental research | Demonstrate the ability to guide the students to do clinical and experimental research with direct supervision by faculty | Demonstrate the ability to guide the students to do clinical and experimental research with indirect supervision by faculty | Demonstrate the ability to guide the students to do clinical and experimental research without supervision by faculty | Assumes longterm leadership to guide the students to do clinical and experimental research |
| P 2 | Demonstrate the knowledge about recent advances and trends in research in the field of pharmacology and clinical pharmacology | Demonstrate the knowledge about recent advances and trends in research in the field of pharmacology and clinical pharmacology | Demonstrate the knowledge about recent advances and trends in research in the field of pharmacology and clinical pharmacology | Demonstrate the knowledge about recent advances and trends in research in the field of pharmacology and clinical pharmacology | Demonstrate the knowledge about recent advances and trends in research in the field of pharmacology and clinical pharmacology | Demonstrate the knowledge about recent advances and trends in research in the field of pharmacology and clinical pharmacology |
| P 3 | Demonstrate respect in interactions with peers, and other healthcare professionals. | Demonstrate respect in interactions with peers, and other healthcare professionals. | Demonstrate respect in interactions with peers, and other healthcare professionals and accepts constructive feedback | Demonstrate respect in interactions with peers, and other healthcare professionals and modifies one's behaviour, | Trains undergraduates to demonstrate respect in interactions with peers, and other healthcare professionals. | Assumes leadership in departmental activities. |
| P 4 | Demonstrate ethical behaviour and integrity in one's work | Demonstrate ethical behaviour and integrity in one's work. | Demonstrate ethical behaviour and integrity in one's work and accepts constructive feedback | Demonstrate ethical behaviour and integrity in one's work and modifies one's behaviour | Trains undergraduates to demonstrate ethical behaviour and integrity in one's work. | Assumes long term leadership to train others on ethical behaviour and integrity in one's work. |

| | | | | | | | |
|-----|---|---|---|---|---|--|---|
| P 5 | Acquire skills for self-directed learning to keep up with developments in the field and to continuously build to improve on skills, expertise and perpetual professional development. | Acquire skills for self-directed learning to keep up with developments in the field and to continuously build to improve on skills, expertise and perpetual professional development. | Demonstrates the skills for self-directed learning to keep up with developments in the field and to continuously build to improve on skills, expertise and perpetual professional development by seminar presentation under direct supervision by faculty | Demonstrates the skills for self-directed learning to keep up with developments in the field and to continuously build to improve on skills, expertise and perpetual professional development by seminar presentation under direct supervision by faculty | Demonstrates the skills for self-directed learning to keep up with developments in the field and to continuously build to improve on skills, expertise and perpetual professional development by seminar presentation under indirect supervision by faculty | Performs self-directed learning to keep up with developments in the field and to continuously build to improve on skills, expertise and perpetual professional development independently | Performs long term self-directed learning to keep up with developments in the field and to continuously build to improve on skills, expertise and perpetual professional development. |
| P 6 | Demonstrate presentation skills at academic meetings, publications and writing research projects for funding agencies | Acquires presentation skills at academic meetings, publications and writing research projects for funding agencies. | Demonstrate presentation skills at academic meetings, publications and writing research projects for funding agencies under direct supervision by faculty. | Demonstrate presentation skills at academic meetings, publications and writing research projects for funding agencies under indirect supervision by faculty. | Performs presentation at academic meetings, publications and writing research projects for funding agencies independently. | Assumes longterm leadership in presentation skills at academic meetings, publications and writing research projects for funding agencies. | |

5. Syllabus

5.1. Course 1 General Pharmacology:

5.1.1. General Pharmacology

- Routes of drug administration
- Drug delivery system
- Basic and molecular pharmacology
- Drug receptors and Pharmacodynamics
- Pharmacokinetics (Absorption, Distribution, Metabolism and Excretion)
- Biotransformation
- Factors modifying drug action
- Dose response relationship
 - Therapeutic drug monitoring
 - Adverse drug reactions
 - Use of drugs in special population – pregnancy, Perinatal and Paediatrics Pharmacology, Geriatric Pharmacology
 - Over the counter drugs
 - Dietary supplements and herbal medicines
 - Rational use of drugs
 - Medication adherence
 - Spurious drugs
 - Essential medicines concept
 - ‘P’ drug

5.1.2. Various fields of Pharmacology

- Pharmacovigilance
- Pharmacogenomics
- Pharmacognosy
- Pharmacoepidemiology
- Chronopharmacology
- Pharmacoeconomics
- Pharmacometrics
- Ethnopharmacology

5.1.2. New Drug Development

- Clinical trial Phases
- FDA Guidelines for new drug development
- In silico methods
- High throughput screening
- Computer aided drug designing

5.2. Course 2: Clinical & Experimental Pharmacology

5.2.1. Experimental Pharmacology:

- Laboratory animals
- Euthanasia
- Animal House Laboratory – CPCSEA Guidelines, OECD guidelines, ARRIVE Guidelines
- Bioassays- Bioassay methods, Animal experiments: Ethical considerations, ethical approval, applicable regulatory Guidelines (CPCSEA), humane animal research (principles of 3Rs) and alternatives to animal experimentation. General and statistical considerations, Anesthetics used in laboratory animals, Principles of EC50, ED50, pD2 and pA2 values of drugs, Describe methods of bioassay for estimation of : Acetylcholine, skeletal neuromuscular junction blockers, adrenaline, noradrenaline, histamine, 5 HT, hormones, insulin, vasopressin/ oxytocin, estrogen, progestins, ACTH, Competitive antagonism - pA2 values, Immunoassays: Concept, types of bioassays and their applications, Animal experiments: Ethical consideration, ethical approval, Regulatory Guidelines (CPCSEA) and alternatives to animal experimentation
- In vivo and In vitro animal experiments
- General screening and evaluation of: Analgesics, antipyretics, anticonvulsants, anti-inflammatory drugs, antidepressants, antianxiety and antipsychotics, sedatives, muscle relaxants, antihypertensives, hypocholesterolemic agents, antiarrhythmics, diuretics, adrenergic blocking drugs, Drugs used in peptic ulcer diseases / Prokinetic agents/ antiemetics, Antitussives, /anti-asthma agents, Local Anaesthetics, Oxytocics, antifertility agents, Antidiabetics, Behavioral pharmacology models and evaluation of drugs affecting learning and memory

5.2.2. Biochemical Pharmacology

- Basic principles and applications of simple analytical methods, Principles of quantitative estimation of drugs, endogenous compounds and poisons using Colorimetry, Spectrophotometry, flame photometry, High Performance Liquid Chromatography (HPLC) and enzyme-linked immunosorbent assay (ELISA).

5.2.3. Clinical Pharmacology

- GCP guidelines
- ICMR guidelines for biomedical research

- Drugs and cosmetic act
- New drug & Clinical trials guidelines

5.2.4. Research Methodology for biomedical research

- Literature search & review
- Protocol designing
- Research methodology
- Reference Management
- Basic biostatistics in biomedical research

5.2.5. Ethics in animal and human research

- ICMR guidelines for biomedical research
- CPCSEA Guidelines for animal research

5.3. Course 3: Systemic Pharmacology

- Autonomic Pharmacology
- Drugs acting on Smooth muscles
- Drugs acting on Synaptic and NeuroeffectorJunctional sites
- Drugs acting on Central Nervous System (Sedative, Hypnotics, Antiepileptics, General Anesthetics, Local Anesthetics, Skeletal Muscle Relaxants, Antipsychotic, Antidepressants, Drugs used in Parkinson's disease and other neurodegenerative disorders, opioid agonists and antagonists, Drugs of abuse)
- Drugs modifying renal function
- Drugs acting on cardiovascular system and haemostatic mechanisms (Antihypertensives, Antianginal, Antiarrhythmics, Drugs used in heart failure, Drugs used in Dyslipidemias, Fibrinolytics, Anticoagulants, Antiplatelets)
- Reproductive Pharmacology
- Agents effecting calcification and bone turnover
- Autacoids and related pharmacological agents (NSAIDs) and drugs used in Rheumatoid arthritis and Gout
- Gastrointestinal drugs
- Pharmacology of drugs affecting the respiratory system (drugs used in Bronchial Asthma and COPD)
- Antimicrobial, antiparasitics, disinfectants, antiseptics
- Chemotherapy of neoplastic disease
- Antiviral drugs
- Drugs used in Autoimmune disorder and Graft versus Host Disease
- Dermatological pharmacology

- Ocular pharmacology
- Immunomodulators - immunosuppressants and immunostimulants
- Pharmacology of drugs used in endocrine disorders (drugs used in diabetes mellitus, hypothalamic and pituitary hormones, thyroid and anti-thyroid drugs, adrenal corticoid hormones and their antagonists, gonadal hormones and their inhibitors)
- Drug delivery systems
- Heavy metal poisoning
- Non-metallic toxicants - air pollutants, pesticides etc.

5.4. Course 4: Recent advances in Pharmacology

5.4.1. Important Contribution by scientists

5.4.2. Recent advances in the management of

- Bronchial Asthma, COPD, Rheumatoid arthritis, Migraine, Gout. Angina, Hypertension, Congestive Cardiac Failure, Arrhythmias, Anticoagulants, Hyperlipidemia, Diabetes, Bone homeostasis, Glaucoma, Dermatological disorders, Antimicrobials, Chemotherapy of tuberculosis, Malaria, Viral Infections, Epilepsy, Parkinsonism, Schizophrenia, Depression, Peptic Ulcer, Inflammatory bowel disease and other disorders.

5.4.3. Newer drugs

6. Teaching and Learning Methods

Postgraduate Training Teaching Methodology

Learning in a PG program is primarily self-directed and in Pharmacology and consists of laboratory and academic work. The formal sessions are merely meant to supplement this core effort. Acquisition of practical competencies thus becomes the cornerstone of postgraduate medical education in Pharmacology.

Formal teaching sessions

- In addition to laboratory work, at least 6-hr of formal teaching per week will be followed.

| | |
|-------------------|--------------|
| Journal club | Once a week |
| Seminar | Once a week |
| Practical | Once a week |
| Group Discussions | Once a week |
| Case discussions | Once a month |

Interdepartmental case or seminar Once a month

- Attend accredited scientific meetings (CME, symposia, and conferences).
- A postgraduate student of Pharmacology would be required to present one poster presentation, to read one paper at a national/state conference and to present one research paper which should be published / accepted for publication/sent for publication

during the period of his postgraduate studies so as to make him eligible to appear at the postgraduate degree examination.

- Additional sessions on basic sciences, biostatistics, research methodology, teaching methodology, hospital waste management, health economics, medical ethics and legal issues related to experimentation will be ensured by participation in workshops, conference etc.
- The postgraduate students shall be required to participate in the teaching and training programme of undergraduate students and interns.
- Log book: Maintenance of log book: E-portfolio:- It is an electronic portfolio to be maintained by the resident to record their activities under the section:
 - EPA,
 - Daily log
 - Patient care
 - Procedure
 - Dissertation
 - Academic activities (Seminar, symposium, case presentation, journal club)
 - Co-curricular activities (Conference, CME, Workshop),
 - Teaching Assignments,
 - Awards and achievements
 - Outreach activities.
- E-portfolio shall be checked and assessed periodically by the faculty members. This will enable to monitor progress of the resident, his level of attainment of milestone and impart the training accordingly
- Writing thesis following appropriate research methodology, ethical clearance and good clinical practice guidelines.
- The postgraduate students shall be required to participate in the teaching and training programme of undergraduate students and interns.
- A postgraduate student of a postgraduate degree course in broad specialities/super specialities would be required to present one poster presentation, to read one paper at a national/state conference and to present one research paper which should be published/accepted for publication/sent for publication during the period of his postgraduate studies so as to make him eligible to appear at the postgraduate degree examination.
- Department should encourage e-learning activities.

The postgraduate student in M.D (Pharmacology) shall undergo a 3 - year (6 terms of 6 months each) training that will comprise of the following:

I. Theory: (lectures, seminars, group discussion, journal club) (at least 6 hours a week, daily 2 hours for 3 days)

6.1. Practical and Clinical Training

Practical training in the following suggested areas: (8 hours a week, daily 4 hours for 2 days)

- Experimental Pharmacology:
In vitro (including bioassays), in vivo (including common methods of drug evaluation) experiments, computer simulations and toxicity tests
- Chemical Pharmacology:
Identification of drug/toxin by using chemical, biological and analytical tests. Quantitative estimation - Use of colorimeter, spectrophotometer and/or other advanced analytical equipments
- Clinical Pharmacology:
 - I Evaluation of drugs in healthy volunteers as well as patients
 - II Critical evaluation of drug literature, pharmacoeconomics, pharmacovigilance and pharmacoepidemiology.
 - III Thesis on a suitable problem
 - IV Training in undergraduate teaching
 - V Computer training

During the training programme, patient safety is of paramount importance; therefore, skills are to be learnt initially on the models, later to be performed under supervision followed by performing independently; using simulation lab.

6.2. Rotations

- Details of 3 years posting in the PG programme (6 terms of 6 months each)

| | 1st Mon | 2nd Mon | 3rd Mon | 4th Mon | 5th Mon | 6th Mon | 7th Mon | 8th Mon | 9th Mon | 10th Mon | 11th Mon | 12th Mon |
|----------|---------|---------|---------|---------|---------|---------|---------|---------|---------|----------|----------|----------|
| 1st year | P | P | P | P | P | I | AP | AP | AP | AP | P | P |
| 2nd year | P | P | P | P | P | I | AP | AP | AP | AP | P | P |
| 3rd year | P | P | P | P | P | P | P | P | P | P | P | P |

P—Pharmacology, I-Industrial Visit, AP-Allied postings

6.4. Allied posts should be done during the course – for 10 weeks

- Medicine - 2 weeks in 1st year
- Cardiology – 2 weeks in 1st year
- Emergency - 2 weeks in 1st year
- Intensive Care - 2 weeks in 1st year
- Biochemistry – 2 weeks in 2nd year
- Microbiology 2 weeks in 2nd year
- Pathology – 2 weeks in 2nd year
- CIDRF – 2 weeks in 2nd year

7. Assessment

7.1. Formative Assessment

Formative assessment is continual and assess medical knowledge, patient care, procedural & academic skills, interpersonal communication skills, system based practice, self-directed learning and professionalism of the activities mentioned every 3/6 monthly. EPAs are listed as below (Table 3) with description of each EPA (Table 4). Progress of the students is recorded after discussion with the student in Entrustable Professional Activity (EPA) assessment form Annexure-1. These EPAs are also mapped with PO and CO. (Table 5)

7.1.1. List of Entrustable Professional Activity

Table 3. List of Entrustable Professional Activities

| EPA No. | GENERAL |
|---------|---|
| 1. | ADR reporting and participating in National Pharmacovigilance Program |
| 2 | Rational Use of Drugs – Essential Medicines List & ‘P’drug |
| 3 | Drug Compliance – Measuring Medication Adherence |
| 4 | Analysing Prescribing pattern using WHO criteria |
| 5 | Identifying Drug-Drug Interactions |
| 6 | Identifying the right choice of drug based on Pharmacoeconomics |
| 7 | Evaluating Drug Promotional Literature |
| 8 | Evaluating the Teaching – Learning Methodologies in Pharmacology |
| 9 | Performing Bioassay of drugs |
| 10 | Performing Herbal Extraction Procedures |
| 11 | Performing In vivo small animal experiments |
| | RESEARCH METHODOLOGY |
| 12 | Understanding Basics of Research Methodology & Performing a Clinical or Experimental research |
| 13 | Obtaining Informed Consent for participation in the clinical trial |
| 14 | Applying basic concepts of Biostatistics in Performing Clinical or Experimental research |
| 15 | Design a Protocol for a Clinical or Experimental study |
| 16 | Criticise a Journal Article |
| 17 | Writing a manuscript for publication |

Description of Entrustable Professional Activity with relevant domains of competence, domain critical behavior

Table 4. EPAs, Competency levels and entrustability

| | |
|---|--|
| EPA 1: ADR reporting and participating in National Pharmacovigilance Program | |
| 1. Description of the activity: This included a brief rationale and a list of the functions required for the EPA. | At the end of 3 year program, Residents should be able to ❖ perform casualty assessment ❖ report an ADR ❖ participate and own long term leadership in national Pharmaco vigilance program |
| 2. Most relevant domains of competence: | MK, PC, ICS |
| 3. Competencies within each domain critical to entrustment decisions: | MK: 1.3 PC: 2.3 ICS: 3.4 |
| 4. Methods of assessment | 1. Formative theory exam 2. Workplace assessment by Faculty 3. Multisource feedback- Nurses, Faculty, Peers |

| Competency | Pre-Entrustable | Entrustable |
|------------|--|--|
| MK 1.3 | Lack of adequate knowledge on Pharmacovigilance program and ADR reporting. Fail to analyze and apply the knowledge of pharmacology in identifying ADR. Fails to explain the basic methodology for casualty assessment and report ADR reporting. Fails to Train the undergraduates and junior residents on Casualty Assessment, ADR reporting and participation in the Pharmacovigilance program | Demonstrates adequate knowledge on Pharmacovigilance program and ADR reporting. Analyze and apply the knowledge of pharmacology in identifying ADR. Explains the basic methodology in identifying and reporting an ADR. Trains the undergraduates and junior residents on Casualty Assessment, ADR reporting and participation in the Pharmacovigilance program |
| PC 1.3 | Fail to analyze and apply the knowledge of pharmacology in identifying ADR. Fails to follow methodology for casualty assessment and report ADR reporting. Fails to perform casualty assessment perfectly and report ADR following the regulatory guidelines Fails to follow the guidelines to monitor the safety of the patient due to the side effect of the drug. | Analyze and apply the knowledge of pharmacology in identifying ADR. Follows methodology for casualty assessment and report ADR reporting. Performs casualty assessment perfectly and reports ADR following the regulatory guidelines Follows the guidelines to monitor the safety of the patient due to the side effect of the drug. |
| ICS 3.4 | Fails to communicate to the patient about the side effect of the drug Fails to communicate to the health care team about the ADR. Fails to actively participate in the Pharmacovigilance program. | Effectively communicates to the patient about the side effect of the drug Effectively communicates to the health care team about the ADR. Actively participates and assumes long term leadership in the smooth functioning of the Pharmacovigilance Program |

EPA2: Rational Use of Drugs – Essential Medicines List & ‘P’ drug

| | |
|---|--|
| 1. Description of the activity: This included a brief rationale and a list of the functions required for the EPA. | At the end of 3 year program, Residents should be able to <ul style="list-style-type: none"> ❖ List the essential medicines needed for a pharmacy ❖ List the group of drugs available to treat the given condition ❖ Choose the right choice of drug based on efficacy, safety & cost |
| 2. Most relevant domains of competence: | MK, PC, ICS |
| 3. Competencies within each domain critical to entrustment decisions: | MK: 1.2 PC: 2.1, 2.2 ICS: 3.4,3.5 |
| 4. Methods of assessment | 1. Formative & Summative theory exam 2. Therapeutic Problems 3. Multisource feedback – faculty, students |

| Competency | Pre-Entrustable | Entrustable |
|-------------|--|--|
| MK 1.2 | Lack of adequate knowledge on the classification, mechanism of action, adverse effects, dosage, drug interactions and uses of various groups of drugs available to treat a given medical condition. Fails to understand & explain the concept of essential medicines list and ‘P’ drug and its clinical importance. | Demonstrates adequate knowledge on the classification, mechanism of action, adverse effects, dosage, drug interactions and uses of various groups of drugs available to treat a given medical condition. Understands & Explains the concept of essential medicines list and ‘P’ drug and its clinical importance. |
| PC 2.1,2.2 | Fail to analyse and apply the knowledge in choosing the right drug for a given medical condition based on specific criteria. Fails to follow the guidelines to prescribe drugs rationally from the essential medicines list | Analyses and apply the knowledge in choosing the right drug for a given medical condition based on specific criteria. Follows the guidelines to prescribe drugs rationally from the essential medicines list |
| ICS 3.4,3.5 | Fails to Train the undergraduates and junior residents on rational use of drugs - essential medicines list and ‘P’ drug concept. Fails to actively follow the regulations guiding rational use of drugs | Trains the undergraduates and junior residents on rational use of drugs - essential medicines list and ‘P’ drug concept. Actively follows the regulations guiding rational use of drugs |

EPA 3: Drug Compliance – Measuring Medication Adherence

| | |
|---|--|
| 1. Description of the activity: This included a brief rationale and a list of the functions required for the EPA. | At the end of 3 year program, Residents should be able to <ul style="list-style-type: none"> ❖ Understand the clinical importance of drug compliance ❖ Measuring medication adherence ❖ Communicate effectively the importance of medication adherence to the patient |
| 2. Most relevant domains of competence: | ICS |
| 3. Competencies within each domain critical to entrustment decisions: | ICS: 3.3 |
| 4. Methods of assessment | 1. Workplace Assessment by Faculty |

| Competency | Pre-Entrustable | Entrustable |
|------------|---|--|
| MK 1.2 | Fails to understand the clinical importance of drug compliance. Fails to communicate effectively the importance of medication adherence to the patient Fails to measure medication adherence according to Morisky Scale | Understands the clinical importance of drug compliance Communicates effectively the importance of medication adherence to the patient Measures medication adherence according to Morisky Scale |
| P 6.1 | Fails to Train the undergraduates to measure medication adherence | Trains the undergraduates to measure medication adherence |

EPA 4: Analysing Prescribing pattern using WHO criteria

| | |
|---|--|
| 1. Description of the activity: This included a brief rationale and a list of the functions required for the EPA. | At the end of 3 year program, Residents should be able to ❖ List the available prescribing indicators ❖ Analyse the prescribing pattern and rationality of prescriptions for a given medical condition based on WHO prescribing indicators |
| 2. Most relevant domains of competence: | PC, ICS |
| 3. Competencies within each domain critical to entrustment decisions: | PC: 2.2 ICS: 3.4,3.5 |
| 4. Methods of assessment | 1. Problem Solving Exercises 2. Formative practical exam |

| Competency | Pre-Entrustable | Entrustable |
|-------------|--|--|
| PC: 2.2 | Lack of adequate knowledge on the available prescribing indicators Fail to analyse the prescribing pattern and rationality of prescriptions for a given medical condition based on WHO prescribing indicators | Demonstrates adequate knowledge on available prescribing indicators Analyses the prescribing pattern and rationality of prescriptions for a given medical condition based on WHO prescribing indicators |
| ICS 3.4,3.5 | Fails to Train the peer groups to analyse the prescribing pattern and rationality of prescriptions for a given medical condition based on WHO prescribing indicators | Trains the peer groups to analyse the prescribing pattern and rationality of prescriptions for a given medical condition based on WHO prescribing indicators |

EPA 5: Identifying Drug-Drug Interactions

| | |
|---|---|
| 1. Description of the activity: This included a brief rationale and a list of the functions required for the EPA. | At the end of 3 year program, Residents should be able to ❖ Gain adequate knowledge on the drug-drug interactions ❖ Identify the drug-drug interactions for a given medical conditions and list the ways to combat it |
| 2. Most relevant domains of competence: | MK, PC |
| 3. Competencies within each domain critical to entrustment decisions: | MK: 1.1 PC: 2.2 |
| 4. Methods of assessment | 1. Formative & Summative practical exam – Problem Solving Exercises |

| Competency | Pre-Entrustable | Entrustable |
|------------|---|--|
| MK 1.2 | Lack of adequate knowledge on the classification, mechanism of action, adverse effects, dosage, drug interactions and uses of various groups of drugs available to treat a given medical condition. Fails to understand & explain the drug interactions and its clinical importance. | Demonstrates adequate knowledge on the classification, mechanism of action, adverse effects, dosage, drug interactions and uses of various groups of drugs available to treat a given medical condition. Understands & Explains the drug interactions and its clinical importance |
| PC 2.1,2.2 | Fail to analyse and apply the knowledge in identifying the drug-drug interaction for a given medical condition | Analyses and apply the knowledge in identifying the drug-drug interaction for a given medical condition |

EPA 6: Identifying the right choice of drug based on Pharmacoeconomics

| | |
|--|---|
| 1. Description of the activity: This included a brief rationale and a list of the functions required for the EPA | At the end of 3 year program, Residents should be able to ❖ Perform Pharmacoeconomic analysis and choose the right choice of drug for a patient with given medical condition |
| 2. Most relevant domains of competence: | MK, PC, ICS |
| 3. Competencies within each domain critical to entrustment decisions: | MK: 1.3 PC: 2.2 ICS: 3.4 |
| 4. Methods of assessment | 1. Formative practical exam – Problem Solving Exercise |

| Competency | Pre-Entrustable | Entrustable |
|------------|--|--|
| MK 1.3 | Lack of adequate knowledge on field of Pharmacoeconomics, various methods to analyse the cost and effectiveness of a drug Fails to understand & explain the methods of Pharmacoeconomic analysis | Demonstrates adequate knowledge on field of Pharmacoeconomics, various methods to analyse the cost and effectiveness of a drug Understands & Explains the methods of Pharmacoeconomic analysis. |
| PC 2.2 | Fail to analyse and apply the knowledge of Pharmacoeconomics in choosing the right drug for a given medical condition by various methods | Analyses and the knowledge of Pharmacoeconomics in choosing the right drug for a given medical condition by various methods |
| ICS 3.4 | Fails to Train the undergraduates to analyse and apply Pharmacoeconomics in choosing the right drug for a given medical condition by various methods | Trains the undergraduates to analyse and apply Pharmacoeconomics in choosing the right drug for a given medical condition by various methods |

EPA 7: Evaluating Drug Promotional Literature

| | |
|--|---|
| 1. Description of the activity: This included a brief rationale and a list of the functions required for the EPA | At the end of 3 year program, Residents should be able to ❖ List the essential medicines needed for a pharmacy ❖ List the group of drugs available to treat the given condition ❖ Choose the right choice of drug based on efficacy, safety and cost |
| 2. Most relevant domains of competence: | MK, PBL |
| 3. Competencies within each domain critical to entrustment decisions: | MK: 1.1 PBL: 5.5 |
| 4. Methods of assessment | 1. Formative Practical exam – Problem Solving Exercise |

| Competency | Pre-Entrustable | Entrustable |
|------------|---|--|
| MK 1.2 | Lack of adequate knowledge on the classification, mechanism of action, adverse effects, dosage, drug interactions and uses of various groups of drugs available to treat a given medical condition. Fails to understand the need to evaluate drug promotional literature and its importance. | Demonstrates adequate knowledge on the classification, mechanism of action, adverse effects, dosage, drug interactions and uses of various groups of drugs available to treat a given medical condition. Understands the need to evaluate drug promotional literature and its importance. |
| PBL 5.5 | Fails to follow the methodology to evaluate a given drug promotional literature Fails to Train the undergraduates to evaluate a given drug promotional literature | Follows the methodology to evaluate a given drug promotional literature Trains the undergraduates to evaluate a given drug promotional literature |

EPA 8: Evaluating the Teaching – Learning Methodologies in Pharmacology

| | |
|--|---|
| 1. Description of the activity: This included a brief rationale and a list of the functions required for the EPA | At the end of 3 year program, Residents should be able to ❖ List the merits and demerits of various teaching learning methods in Pharmacology ❖ Analyse the merits and demerits of various teaching learning methods and choose the right method for a given topic ❖ Gain adequate knowledge about computer assisted learning (CAL) softwares and able to use them efficiently to promote learning of pharmacology |
| 2. Most relevant domains of competence: | PBL, P |
| 3. Competencies within each domain critical to entrustment decisions: | PBL: 3.3, 3.4 P: 6.5 |
| 4. Methods of assessment | 1. Formative & Summative Practical exam 2. Workplace assessment by Faculty 3. Multisource feedback – Faculty, students |

| Competency | Pre-Entrustable | Entrustable |
|---------------|--|---|
| PBL: 3.3, 3.4 | Lack of adequate knowledge on the various teaching learning methods in Pharmacology and their merits and demerits. Fails to analyse & identify the right teaching learning method for a given topic Lack of adequate knowledge about computer assisted learning (CAL) softwares Unable to use CAL efficiently to promote learning of pharmacology | Demonstrates adequate knowledge on the various teaching learning methods in Pharmacology and their merits and demerits. Analyses & identifies the right teaching learning method for a given topic Demonstrates adequate knowledge about computer assisted learning (CAL) softwares Able to use them CAL efficiently to promote learning of pharmacology |
| P 6.5 | Fails to actively follow the right teaching learning method for a given topic and situation | Actively follows the right teaching learning method for a given topic and situation |

EPA 9: Performing Bioassay of drugs

| | |
|--|--|
| 1. Description of the activity: This included a brief rationale and a list of the functions required for the EPA | At the end of 3 year program, Residents should be able to <ul style="list-style-type: none"> ❖ List the things required for performing bioassay of drugs ❖ Set up an equipment and validate for performing a bio assay ❖ Handle animals, euthanize them, isolate and mount the tissue ❖ Perform a bioassay |
| 2. Most relevant domains of competence: | PBL, P |
| 3. Competencies within each domain critical to entrustment decisions: | PBL: 3.3, 3.4 P: 6.5 |
| 4. Methods of assessment | 1. Formative & Summative Practical exam 2. Workplace assessment by Faculty 3. Multisource feedback – Faculty, students |

| Competency | Pre-Entrustable | Entrustable |
|------------|---|---|
| MK 1.4 | Lack of knowledge on the commonly used instruments used in bioassay Lack of knowledge on the bioassay methods Fails to understand the functions of each instrument used in bioassay | Demonstrates knowledge on the commonly used instruments used in bioassay Demonstrates knowledge on the bioassay methods Understands the functions of each instrument used in bioassay |
| SBP 4.2 | Fails to follow the guidelines for preparation for setting up the equipment Unable to handle animals and euthanize according to the guidelines Fails to isolate and mount the tissue Unable to set up and validate the equipment for bioassay Fails to perform a bioassay according to specific methodology | Fails to follow the guidelines for preparation for setting up the equipment Unable to handle animals and euthanize according to the guidelines Fails to isolate and mount the tissue Unable to set up and validate the equipment for bioassay Fails to perform a bioassay according to specific methodology |
| P 6.1 | Fails to assist fellow peers in performing a bioassay | Assist fellow peers in performing a bioassay |

EPA 10: Performing Herbal Extraction Procedures

| | |
|--|---|
| 1. Description of the activity: This included a brief rationale and a list of the functions required for the EPA | At the end of 3 year program, Residents should be able to ❖ List the things required for performing herbal extraction procedures ❖ Set up the equipment and validate for performing extraction procedures ❖ Perform a bioassay |
| 2. Most relevant domains of competence: | PBL, P |
| 3. Competencies within each domain critical to entrustment decisions: | PBL: 4.1, 4.2 P: 5.1 |
| 4. Methods of assessment | 1. Formative & Summative practical exam 2. Workplace assessment by faculty 3. Multisource feedback – faculty, technician, peer group |

| Competency | Pre-Entrustable | Entrustable |
|---------------|--|---|
| PBL: 4.1, 4.2 | Lack of knowledge on the commonly used instruments in herbal extraction procedures Lack of knowledge on the herbal extraction methods Fails to follow the guidelines for preparation & setting up the equipment Fails to perform herbal extraction procedures according to specific methodology | Demonstrates knowledge on the commonly used instruments in herbal extraction procedures Demonstrates knowledge in herbal extraction procedures Follows the guidelines for preparation for setting up the equipment Performs herbal extraction procedures according to specific methodology |
| P 6.1 | Fails to assist fellow peers in performing herbal extraction procedures | Assist fellow peers in performing herbal extraction procedures |

EPA 11: Performing in-vivo animal experiments

| | |
|--|--|
| 1. Description of the activity: This included a brief rationale and a list of the functions required for the EPA | At the end of 3 year program, Residents should be able to <ul style="list-style-type: none"> ❖ List the things required for performing in-vivo animal experiments ❖ Set up an equipment and validate for performing in-vivo animal experiments ❖ Handling animals ❖ Perform in-vivo animal experiments |
| 2. Most relevant domains of competence: | MK, SBP,P |
| 3. Competencies within each domain critical to entrustment decisions: | MK: 1.4 SBP: 4.2, 4.4 P: 6.1 |
| 4. Methods of assessment | 1. Formative & Summative practical exam 2. Workplace assessment by faculty 3. Multisource feedback – faculty, technician, peer group |

| Competency | Pre-Entrustable | Entrustable |
|------------|--|---|
| MK 1.4 | Lack of knowledge on the commonly used instruments for in-vivo animal experiments Lack of knowledge on the methodology for performing in-vivo animal experiments Fails to understand the functions of each instrument used in in-vivo animal experiments | Demonstrates knowledge on the commonly used instruments for in-vivo animal experiments Demonstrates knowledge on the methodology for performing in-vivo animal experiments Understands the functions of each instrument used in in-vivo animal experiments |
| SBP 4.2 | Fails to follow the methodology for performing in-vivo animal experiments Unable to handle animals according to the guidelines Unable to set up and validate the equipment for in-vivo animal experiments Fails to perform in-vivo animal experiments according to specific methodology | Follows the methodology for performing in-vivo animal experiments Able to handle animals according to the guidelines Able to set up and validate the equipment for in-vivo animal experiments Performs an in-vivo animal experiments according to specific methodology |
| P 6.1 | Fails to assist fellow peers in performing an in-vivo animal experiments | Assists fellow peers in performing an in-vivo animal experiments |

EPA 12: Understanding Basics of Research Methodology & Performing a Clinical or Experimental research

| | |
|--|--|
| 1. Description of the activity: This included a brief rationale and a list of the functions required for the EPA | At the end of 3 year program, Residents should be able to <ul style="list-style-type: none"> ❖ Acquire knowledge on basics of research methodology for performing clinical and experimental research ❖ Acquire knowledge of guide lines for performing clinical and experimental research ❖ Analyses and applies the knowledge in performing clinical and experimental research ❖ Assist others in performing clinical and experimental research |
| 2. Most relevant domains of competence: | SBP, PBL, P |
| 3. Competencies within each domain critical to entrustment decisions: | SBP: 4.1, 4.2, 4.4 PBL: 5.1 P: 6.1, 6.6 |
| 4. Methods of assessment | 1. Formative & Summative practical exam 2. Workplace assessment by faculty |

| Competency | Pre-Entrustable | Entrustable |
|--------------------|---|--|
| SBP: 4.1, 4.2, 4.4 | Lack of knowledge of guidelines for performing clinical and experimental research Lack of knowledge on the basics of research methodology for performing clinical and experimental research Fails to Analyses and apply the knowledge in performing clinical and experimental research | Demonstrates knowledge of guidelines for performing clinical and experimental research Demonstrates knowledge on the basics of research methodology for performing clinical and experimental research Understands the knowledge in performing clinical and experimental research |
| PBL 5.1 | Fails to follow the specific guidelines for performing clinical and experimental research Fails to Analyses and apply the knowledge on the basics of research methodology for performing clinical and experimental research Fails to perform clinical and experimental research according to specific methodology | Follows the methodology for performing in-vivo animal experiments Able to handle animals according to the guidelines Performs clinical and experimental research according to specific methodology |
| P 6.1 | Fails to assist fellow peers in applying basics of research methodology for performing clinical and experimental research | Assists fellow peers in applying basics of research methodology for performing clinical and experimental research |

EPA 13: Obtaining Informed Consent for participation in the clinical trial

| | |
|--|--|
| 1. Description of the activity: This included a brief rationale and a list of the functions required for the EPA | At the end of 3 year program, Residents should be able to <ul style="list-style-type: none"> ❖ Acquire knowledge on basics of research methodology for performing clinical and experimental research ❖ Acquire knowledge of guide lines for performing clinical and experimental research ❖ Analyses and applies the knowledge in performing clinical and experimental research ❖ Assist others in performing clinical and experimental research |
| 2. Most relevant domains of competence: | SBP, PBL, P |
| 3. Competencies within each domain critical to entrustment decisions: | SBP: 4.1, 4.2, 4.4 PBL: 5.1 P: 6.1, 6.6 |
| 4. Methods of assessment | 1. Formative & Summative practical exam 2. Workplace assessment by faculty |

| Competency | Pre-Entrustable | Entrustable |
|---------------|---|---|
| ICS 3.2 | Fail to demonstrate compassion, integrity and respect for patient Fail to communicate effectively about the risk involved in participation of the study Fail to communicate effectively to the patient about the study procedure Fail to answer effectively the questions raised by the patient and ensure them the voluntariness for participation and withdrawal from the study | Demonstrates compassion, integrity and respect for patient Communicates effectively about the risk involved in participation of the study Communicates effectively to the patient about the study procedure Answers effectively the questions raised by the patient and ensure them the voluntariness for participation and withdrawal from the study. |
| SBP: 4.4, 4.5 | Lack of knowledge on the ethical guidelines for performing clinical research Lack of knowledge on the ethical guidelines for obtaining informed consent Fails to Analyse and apply the knowledge for the individual study participant while performing clinical research Fails to follow the specific guidelines to obtain informed consent from patient for participation in clinical trial | Demonstrates knowledge on the ethical guidelines for performing clinical research Demonstrates knowledge on the ethical guidelines for obtaining informed consent Analyses and applies the knowledge for the individual study participant while performing clinical research Follows the specific guidelines to obtain informed consent from patient for participation in clinical trial |
| P 6.4 | Fail to accept constructive feedback to improve his or her ability to demonstrate compassion, integrity, and respect for others. | Accepts constructive feedback to improve his or her ability to demonstrate compassion, integrity, and respect for others |

EPA 14: Applying basic concepts of Biostatistics in Performing Clinical or Experimental research

| | |
|---|---|
| 1. Description of the activity: This included a brief rationale and a list of the functions required for the EPA. | At the end of 3 year program, Residents should be able to <ul style="list-style-type: none"> ❖ Acquire knowledge on basics concepts of biostatistics for performing clinical and experimental research ❖ Analyses and applies the basics concepts of biostatistics for performing clinical and experimental research ❖ Assist others in applying the basics concepts of biostatistics in performing clinical and experimental research |
| 2. Most relevant domains of competence: | SBP, PBL, P |
| 3. Competencies within each domain critical to entrustment decisions: | SBP: 4.2, PBL: 5.1, P: 6.1 |
| 4. Methods of assessment | 1. Formative & Summative practical exam 2. Workplace assessment by faculty |

| Competency | Pre-Entrustable | Entrustable |
|------------|---|--|
| MK 1.4 | Lack of knowledge on basics concepts of biostatistics for performing clinical and experimental research Fails to Understand the importance of biostatistics in performing clinical and experimental research | Demonstrates knowledge on basics concepts of biostatistics for performing clinical and experimental research Understands the importance of biostatistics in performing clinical and experimental research |
| SBP 4.2 | Fails to Analyses and apply the knowledge of basics concepts of biostatistics in performing clinical and experimental research Fails to perform basic biostatistics in clinical and experimental research Using computer software | Analyses and apply the knowledge of basics concepts of biostatistics in performing clinical and experimental research Performs basic biostatistics in clinical and experimental research Using computer software |
| P 6.1 | Fails to assist fellow peers in applying basics of biostatistics for performing clinical and experimental research | Assists fellow peers in applying basics of biostatistics for performing clinical and experimental research |

EPA 15: Design a Protocol for a Clinical or Experimental study

| | |
|---|---|
| 1. Description of the activity: This included a brief rationale and a list of the functions required for the EPA. | At the end of 3 year program, Residents should be able to <ul style="list-style-type: none"> ❖ Analyses and apply the knowledge of research methodology, ethics and biostatistics in performing clinical or experimental study ❖ Design a protocol for a Clinical or Experimental study ❖ Assist others in performing clinical and experimental research |
| 2. Most relevant domains of competence: | SBP, PBL, P |
| 3. Competencies within each domain critical to entrustment decisions: | SBP: 4.1, 4.2, 4.3, 4.4 PBL: 5.1 P: 6.1 |
| 4. Methods of assessment | 1. Formative & Summative practical exam 2. Workplace assessment by faculty |

| Competency | Pre-Entrustable | Entrustable |
|--------------------|--|--|
| SBP: 4.1, 4.2, 4.4 | Lack of knowledge of basics of research methodology, ethical guidelines and basic biostatistics for design a protocol for clinical or experimental study | Demonstrates knowledge of basics of research methodology, ethical guidelines and basic biostatistics for design a protocol for clinical or experimental study |
| PBL 5.1 | Fails to follow the specific guidelines to design a protocol for clinical or experimental study Fails to Analyses and applythe knowledge of basics of research methodology, ethical guidelines and basic biostatistics for design a protocol for clinical or experimental study Fails to design a protocol forclinical or experimental study | Follows the specific guidelines to design a protocol for clinical or experimental study Analyses and applythe knowledge of basics of research methodology, ethical guidelines and basic biostatistics for design a protocol for clinical or experimental study Designsa protocol forclinical or experimental study |
| P 6.1 | Fails to assist fellow peers to design a protocol forclinical or experimental study | Assists fellow peers to design a protocol forclinical or experimental study |

EPA 16: Criticise a journal article

| | |
|---|--|
| 1. Description of the activity: This included a brief rationale and a list of the functions required for the EPA. | At the end of 3 year program, Residents should be able to ❖ Analyses and apply the knowledge of research methodology, ethics and biostatistics to criticise a journal article according to specific guidelines ❖ Assist others to criticise a journal article according to specific guidelines |
| 2. Most relevant domains of competence: | SBP, PBL, P |
| 3. Competencies within each domain critical to entrustment decisions: | SBP: 4.1, 4.2, 4.3, 4.4 PBL: 5.1 P: 6.1 |
| 4. Methods of assessment | 1. Formative & Summative practical exam |

| Competency | Pre-Entrustable | Entrustable |
|--------------------|---|--|
| SBP: 4.1, 4.2, 4.4 | Lack of knowledge of basics of research methodology, ethical guidelines and basic biostatistics to criticise a journal article according to specific guidelines | Demonstrates knowledge of basics of research methodology, ethical guidelines and basic biostatistics to criticise a journal article according to specific guidelines |
| PBL 5.1 | Fails to follow the specific guidelines to criticise a journal article according to specific guidelines Fails to Analyses and applythe knowledge of basics of research methodology, ethical guidelines and basic biostatistics to criticise a journal article according to specific guidelines | Follows the specific guidelines to criticise a journal article according to specific guidelines Analyses and applythe knowledge of basics of research methodology, ethical guidelines and basic biostatistics to criticise a journal article according to specific guidelines |
| P 6.1 | Fails to assist fellow peers tocriticise a journal article according to specific guidelines | Assists fellow peers to criticise a journal article according to specific guidelines |

EPA 17: Writing a manuscript for publication

| | |
|---|--|
| 1. Description of the activity: This included a brief rationale and a list of the functions required for the EPA. | At the end of 3 year program, Residents should be able to ❖ Analyses and apply the knowledge of research methodology, ethics and biostatistics to write a manuscript for publication ❖ Assist others to write a manuscript for publication |
| 2. Most relevant domains of competence: | SBP, PBL, P |
| 3. Competencies within each domain critical to entrustment decisions: | SBP: 4.1, 4.2, 4.4 PBL: 5.1 P: 6.1,6.5, 6.6 |
| 4. Methods of assessment | 1. Workplace assessment by faculty |

| Competency | Pre-Entrustable | Entrustable |
|--------------------|--|---|
| SBP: 4.1, 4.2, 4.4 | Lack of knowledge of basics of research methodology, ethical guidelines and basic biostatistics to write a manuscript for publication according to specific guidelines | Demonstrates knowledge of basics of research methodology, ethical guidelines and basic biostatistics to write a manuscript for publication according to specific guidelines |
| PBL 5.1 | Fails to follow the specific guidelines to write a manuscript for publication according to specific guidelines Fails to Analyses and apply the knowledge of basics of research methodology, ethical guidelines and basic biostatistics to write a manuscript for publication according to specific guidelines | Follows the specific guidelines to write a manuscript for publication according to specific guidelines Analyses and apply the knowledge of basics of research methodology, ethical guidelines and basic biostatistics to write a manuscript for publication according to specific guidelines |
| P: 6.1,6.5, 6.6 | Fails to assist fellow peers to write a manuscript for publication according to specific guidelines | Assists fellow peers to write a manuscript for publication according to specific guidelines |

Table 5. Mapping of PO, CO, EPA, Competency and Sub-competency with level

| EPA | | Program outcomes | | | | | | | |
|-----|---|------------------|---|---|---|---|---|-----|--|
| 1 | ADR reporting and participating in National Pharmacovigilance Program | 1 | 2 | 3 | 4 | 6 | | | MK: 1.3 PC: 2.3 ICS: 3.4 |
| 2 | Rational Use of Drugs – Essential Medicines List & ‘P’ drug | 1 | 2 | | 4 | 6 | | | MK: 1.2 PC: 2.1, 2.2 ICS: 3.4, 3.5 |
| 3 | Drug Compliance – Measuring Medication Adherence | 1 | 2 | | 4 | 6 | | | ICS: 3.3 |
| 4 | Analysing Prescribing pattern using WHO criteria | 1 | 2 | | 4 | 6 | | | PC: 2.2 ICS: 3.4, 3.5 |
| 5 | Identifying Drug-Drug Interactions | 1 | 2 | | 4 | 6 | | | MK: 1.1 PC: 2.2 |
| 6 | Identifying the right choice of drug based on Pharmacoeconomics | 1 | 2 | | 4 | 6 | | | MK: 1.3 PC: 2.2 ICS: 3.4 |
| 7 | Evaluating Drug Promotional Literature | 1 | 2 | | 4 | 6 | | | MK: 1.1 PBL: 5.5 |
| 8 | Analysing the Teaching – Learning Methodologies in Pharmacology | 1 | 2 | | 4 | | 7 | | PBL: 3.3, 3.4 P: 6.5 |
| 9 | Performing Bioassay of drugs | | | | 4 | 5 | | 7 | MK: 1.4 SBP: 4.2, 4.4 P: 5.1 |
| 10 | Performing Herbal Extraction Procedures | | | | 4 | 5 | | 7 | PBL: 4.1, 4.2 P: 5.1 |
| 11 | Performing In vivo small animal experiments | | | | 4 | 5 | | 7 | MK: 1.4 SBP: 4.2, 4.4 P: 6.1 |
| 12 | Understanding Basics of Research Methodology & Performing a Clinical or Experimental research | | | | 4 | | | 7 8 | SBP: 4.1, 4.2, 4.4 PBL: 5.1 P: 6.1, 6.6 |
| 13 | Obtaining Informed Consent for participation in the clinical trial | | | | 4 | | | 7 8 | ICS: 3.2 SBP: 4.4, 4.5 P: 6.4 |
| 14 | Applying basic concepts of Biostatistics in Performing Clinical or Experimental research | | | | 4 | | | 7 8 | SBP: 4.2 PBL: 5.1 P: 6.1 |
| 15 | Design a Protocol for a Clinical or Experimental study | | | | 4 | | | 7 8 | SBP: 4.1, 4.2, 4.3, 4.4 PBL: 5.1 P: 6.1 |
| 16 | Criticise a Journal Article | | | | 4 | | | 7 8 | SBP: 4.1, 4.2, 4.3, 4.4 PBL: 5.1 P: 6.1 |
| 17 | Writing a manuscript for publication | | | | 4 | | | 7 8 | SBP: 4.1, 4.2, 4.4 PBL: 5.1 P: 6.1, 6.5, 6.6 |

- The Internal Assessment should be conducted in theory and clinical examination every 6 months
- Quarterly assessment during the MD training should be based on following educational activities:
 1. Journal based / recent advances learning
 2. Patient based /Laboratory or Skill based learning
 3. Self directed learning and teaching
 4. Departmental and interdepartmental learning activity
 5. External and Outreach Activities / CMEs

The student to be assessed periodically as per categories listed in postgraduate student appraisal form (Annexure-2).

7.2. Summative Assessment

Eligibility for appearing in the final university exam

- Attendance : 75 % in each year
- One poster presentation in International/National/ State level conference.
- One oral presentation International/National/ State level conference.
- Submission of one scientific paper for publication to an indexed journal

Postgraduate Examination shall be in three parts:

1. Thesis

Every post graduate student shall carry out work an assigned research project under the guidance of a recognised Post Graduate Teacher, the result of which shall be written up and submitted in the form of a Thesis. Work for writing the Thesis is aimed at contributing to the development of a spirit of enquiry, besides exposing the post graduate student to the techniques of research, critical analysis, acquaintance with the latest advances in medical science and the manner of identifying and consulting available literature. Thesis shall be submitted at least six months before the Theory and Practical examination and will be evaluated by two external members. A post graduate student shall be allowed to appear for the Theory and Practical examination only after the acceptance of the Thesis by the external members.

2. Theory Examination:

There should be four theory papers, as given below:

- **Paper I:** General Pharmacology
- **Paper II:** Clinical & Experimental Pharmacology
- **Paper III:** Systemic Pharmacology
- **Paper IV:** Recent Advances in Pharmacology

Each theory paper will be of 100 marks i.e. 4 papers – 100 marks each (Total 400). Each paper will have 10 short essay answer questions of 10 marks each.

3. Practical and viva voce examination

a) Long Experiment:

- Demonstrating effects of drugs/interpretation of results in anesthetized animal
- Table exercise - Examples are given below:
- Calculating pharmacokinetic parameters
- Statistical exercise
- Critical appraisal of a published paper
- Evaluation of drug literature.
- Protocol designing
- ADR reporting and causality assessment
- Assessment of preclinical toxicity data
- Analysis of rational and irrational formulations

b) Short experiment

- Isolated tissue experiment (Bioassay of drugs) (as per Govt regulations) or interpretation of results of a previous tracing
- In vivo experiment
- Spotting exercises: Various drug delivery systems, inhalers, insulin syringe, drip chamber, various tablets, etc.

Oral/Viva voce Examination

- Microteaching (teaching exercise)
- Discussion on dissertation
- Principles of general and systemic pharmacology
- Recent advances in pharmacology & drug therapy

Pass criteria: The examination MS shall be held at the end of 3rd academic year. There will be four evaluation for each theory paper. The examinations shall be organised on the basis of 'Marking system' to evaluate and to certify post graduate student's level of knowledge, skill and competence at the end of the training. Obtaining a minimum of 50% marks in 'Theory' as well as 'Practical' separately shall be mandatory for passing examination as a whole. Student must secure minimum of 40% in each paper and in aggregate 50% overall as far as theory is concerned .

8. Blue print of Weight of the system

Each paper shall contain the structure as follows:

Ten Long answer question (LAQ) for 10 marks each.(10 x 10 = 100)

8.1. Paper I : General Pharmacology

| Sl. NO | Section | Topics | Weight-age | Marks Allotted | No. of Question |
|--------|------------------------------------|---|------------|----------------|-----------------|
| 1 | General Pharmacology | Various routes of drug administration & drug delivery systems | 10% | 10 | 1 |
| 2 | General Pharmacology | Drug receptors and Pharmacodynamics | 10% | 10 | 1 |
| 3 | General Pharmacology | Pharmacokinetics (Absorption, Distribution, Metabolism and Excretion) | 10% | 10 | 1 |
| 4 | General Pharmacology | Factors modifying drug action | 10% | 10 | 1 |
| 5 | General Pharmacology | Dose Response Relationship | 10% | 10 | 1 |
| 6 | General Pharmacology | Adverse drug reactions | 10% | 10 | 1 |
| 7 | General Pharmacological Principles | General Pharmacological Principles of special population groups | 10% | 10 | 1 |
| 8 | Rational Therapeutics | Rational Use of Drugs | 10% | 10 | 1 |
| 9 | New Drug Development | New Drug Development | 10% | 10 | 1 |
| 10 | Fields of Pharmacology | Various branches of Pharmacology and their applications | 10% | 10 | 1 |

8.2. Paper II: Clinical & Experimental Pharmacology

| Sl. NO | Section | Topics | Weight-age | Marks Allotted | No. of Question |
|--------|---------------------------|---|------------|----------------|-----------------|
| 1 | Clinical Pharmacology | Guidelines pertaining to conducting human research | 10% | 10 | 1 |
| 2 | Clinical Pharmacology | Evidence based Medicine | 10% | 10 | 1 |
| 3 | Ethics | Ethics in animal and human research | 10% | 10 | 1 |
| 4 | Research Methodology | Basics of Research Methodology pertaining to animal and human research | 10% | 10 | 1 |
| 5 | Biostatistics | Basics of Biostatistics pertaining to animal and human research | 10% | 10 | 1 |
| 6 | Instrumentation | Principles of instruments in human and animal pharmacology | 10% | 10 | 1 |
| 7 | Experimental Pharmacology | Screening methods for evaluation of drugs | 10% | 10 | 1 |
| 8 | Experimental Pharmacology | Guidelines pertaining to conducting animal research | 10% | 10 | 1 |
| 9 | Experimental Pharmacology | Laboratory animal care Bioassay, Euthanasia, Blood collection, In-vivo animal experiments | 10% | 10 | 1 |
| 10 | Experimental Pharmacology | Alternatives to animal experimentation | 10% | 10 | 1 |

8.3. PaperIII: Systemic Pharmacology

| Sl. No | Section | Topics | Weight-age | Marks Allotted | No. of Question |
|--------|---|---|------------|----------------|-----------------|
| 1 | Autonomic & Peripheral Nervous system | Classification, Mechanism of action, adverse effects and uses of Drugs acting on Autonomic & Peripheral Nervous system | 10% | 10 | 1 |
| 2 | Autacoids | Antihistamines, 5HT agonist & antagonists, | 10% | 10 | 1 |
| 3 | Respiratory system | Antiasthmatics, drugs for cough, COPD | 10% | 10 | 1 |
| 4 | Cardiovascular system including diuretics | antianginals, antihypertensives, diuretics, antiarrhythmics, antidiuretics, drugs for CCF | 10% | 10 | 1 |
| 5 | Gastrointestinal system | Antiulcer drugs, drugs for vomiting, diarrhoea, constipation, indigestion, inflammatory bowel disease | 10% | 10 | 1 |
| 6 | Hormones | Drugs acting on pituitary, thyroid, bone, sex hormones. Antidiabetics, steroids | 10% | 10 | 1 |
| 7 | Central Nervous system | Classification, Mechanism of action, adverse effects and uses of Drugs acting on CNS | 10% | 10 | 1 |
| 8 | Antimicrobials & Cancer chemotherapy | Antibiotics, drugs for TB, Leprosy, fungal infections, viral infections, protozoal infections, parasitic infections, cancer | 10% | 10 | 1 |
| 9 | Miscellaneous | Immunomodulators, vaccines, chelating agents, vitamins, drugs for skin disorders | 10% | 10 | 1 |

8.4. Paper IV: Recent advances in Pharmacology

| Sl. No | Section | Topics | Weight-age | Marks Allotted | No. of Question |
|--------|---|--|------------|----------------|-----------------|
| 1 | History | Important scientific contributions by scientists | 10% | 10 | 1 |
| 2 | Drug Update | FDA approved newer drugs , Banned drugs | 10% | 10 | 1 |
| 3 | Newer Developments in Pharmacology | Stem Cell therapy, Monoclonal Antibodies, Gene therapy, JAK STAT Kinase receptors, inhalational insulin delivery etc | 10% | 10 | 1 |
| 4 | Respiratory system | Recent advances in treatment of respiratory disorders | 10% | 10 | 1 |
| 5 | Cardiovascular system including diuretics | Recent advances in treatment of cardiovascular & blood disorders | 10% | 10 | 1 |
| 6 | Gastrointestinal system | Recent advances in treatment of gastrointestinal disorders | 10% | 10 | 1 |
| 7 | Hormones | Recent advances in treatment of hormonal disorders | 10% | 10 | 1 |
| 8 | Central Nervous system | Recent advances in treatment of nervous disorders | 10% | 10 | 1 |
| 9 | Antimicrobials & Cancer chemotherapy | Recent advances in treatment of microbial infections and cancer chemotherapy | 10% | 10 | 1 |
| 10 | Miscellaneous | Recent advances in treatment of eye, skin disorders, rheumatoid arthritis, gout, migraine. | 10% | 10 | 1 |

9. Model Question Paper

Model Question Papers Subject- Pharmacology

9.1. Paper I :General Pharmacology

3 Hours

(10 x 10 = 100 marks)

ANSWER ALL QUESTIONS

(Draw labelled diagram wherever required)

1. Describe the role of liposomes in drug therapy
2. Describe the role of G-protein coupled receptors in drug therapy.
3. Explain Clinical Significance of drug-protein binding with examples
4. Explain genetics as a factor modifying drug action
5. Explain drug antagonism with examples.
6. Discuss the Pharmacovigilance Programme of India
7. Describe pharmacological implications of drug use in pregnant patients.
8. Discuss the Pros and Cons of Essential Medicines Concept
9. Describe Phase '0' Clinical trial.
10. Describe Chronopharmacology and their therapeutic application.

9.2. Paper II: Clinical and Experimental Pharmacology

3 Hours

(10 x 10 = 100 marks)

(Draw labelled diagram wherever required)

ANSWER ALL QUESTIONS

1. Discuss the current regulatory requirements for conducting clinical trials in India.
2. Describe the CPCSEA guidelines for animal housing.
3. Describe Informed Consent in biomedical research.
4. Design a protocol to evaluate an antihypertensive in Phase III clinical trial.
5. Describe the tests of statistical significance in research.
6. Describe the principles and application of HPLC.
7. Discuss the methods used to screen a compound with analgesic activity.
8. Discuss the various methods of bioassay and explain how to perform bioassay of histamine in guinea pig ileum
9. Describe blood collection techniques in small animals
10. Describe 'Rs' in preclinical research.

9.3. Paper III: Systemic Pharmacology

3 Hours

(10 x 10 = 100 marks)

ANSWER ALL QUESTIONS

(Draw labelled diagram wherever required)

1. Illustrate with suitable diagrams the steps involved in cholinergic and adrenergic neurotransmission
2. Describe the role of Biological response modifiers in rheumatoid arthritis management.
3. Describe the drugs acting on Phosphodiesterase enzyme and comment on their therapeutic application
4. Explain the pathophysiology of heart failure and how drugs can modify it.
5. Compare and contrast Conventional and Low molecular Weight Heparin.
6. Discuss the regulation of gastric secretion and how drugs act on it
7. Describe the therapeutic uses of steroids in non endocrinological disorders and their rationale behind their use
8. Describe the GABA modulators in treatment of epilepsy
9. Describe the molecular targets for treatment of HIV virus infection
10. Explain the role of Immunomodulators in treatment of various diseases

9.4. Paper IV : Recent advance in Pharmacology

3 Hours

(10 x 10 = 100 marks)

ANSWER ALL QUESTIONS

(Draw labelled diagram wherever required)

1. Summarise the contributions of Dale to Pharmacology
2. Explain the mechanism of action, adverse effects and uses of Bedaquiline.
3. Discuss the application of nanotechnology in the treatment of various disorders
4. Describe the newer molecular targets in the treatment of COPD
5. Highlight the salient features of JNC VIII report in treatment of hypertension
6. Discuss the newer targets in the management of inflammatory bowel disease
7. Discuss the recent advances in the management of diabetes mellitus
8. Discuss the role of cannabinoid receptors in therapeutics
9. Describe the newer treatment schedule of RNTCP for Tuberculosis.
10. Describe the current status of use of botulinum toxin in therapeutics

10. Recommended reading

10.1. Books

(Latest editions of the following books are recommended)

| | |
|----|--|
| 1 | Good Mann & Gillman's The Pharmacological Basis of Therapeutics |
| 2 | Basic and Clinical Pharmacology by Katzung |
| 3 | Rang & Dale's Pharmacology |
| 4 | Clinical Pharmacology by Morris.J. Brown |
| 5 | Oxford Handbook of Practical Drug Therapy – Richards & Jeffrey |
| 6 | Principles of Pharmacology by David E Golan |
| 7 | Essentials of Medical Pharmacology by K.D.Tripathi |
| 8 | Principles of Pharmacology by Sharma & Sharma |
| 9 | Lippincott Illustrated Reviews: Pharmacology by Karen Whalen |
| 10 | Drug Discovery & Evaluation: Methods in Clinical Pharmacology by Gerhard Vogel |
| 11 | Practical Manual of Experimental and Clinical Pharmacology by BikashMedhi |
| 12 | Fundamentals of Experimental Pharmacology by M.N.Ghosh |
| 13 | Drug Screening Methods by S.K.Gupta |
| 14 | Research Methodology: Methodology: Methods & Techniques. |
| 15 | Mahajan's Methods in Biostatistics for Medical Students & Research Workers |

10.2. Journals

1. Indian Journal of Pharmacology
2. Indian Journal of Physiology and Pharmacology
3. Journal of Pharmacology and Pharmacotherapeutics
4. Fundamental and clinical pharmacology
5. European Journal of Clinical Pharmacology
6. Journal of Ethnopharmacology
7. British Journal of Pharmacology
8. The Lancet

11. Annexures

Annexure-1: Entrustable Professional Activities Assessment Department Of Pharmacology Entrustable Professional Activities Assessment Form MD residents

Name of the Resident:

UIN No:

Levels of competence:

- ❖ **Level I:** Knowledge only; can observe
- ❖ **Level II:** Can perform under direct supervision by Faculty
- ❖ **Level III:** Can perform under indirect supervision by Faculty
- ❖ **Level IV:** Can do independently
- ❖ **Level V:** Has expertise to teach others

| S. No | EPAs | 1st quarter | | 2nd quarter | | 3rd quarter | | 4th quarter | |
|-------|---|-------------|---------|-------------|---------|-------------|---------|-------------|---------|
| | | Resident | Faculty | Resident | Faculty | Resident | Faculty | Resident | Faculty |
| 1 | ADR reporting and participating in National Pharmacovigilance Program | | | | | | | | |
| 2 | Rational Use of Drugs – Essential Medicines List & ‘P’ drug | | | | | | | | |
| 3 | Drug Compliance – Measuring Medication Adherence | | | | | | | | |
| 4 | Analysing Prescribing pattern using WHO criteria | | | | | | | | |
| 5 | Identifying Drug-Drug Interactions | | | | | | | | |
| 6 | Identifying the right choice of drug based on Pharmacoeconomics | | | | | | | | |
| 7 | Evaluating Drug Promotional Literature | | | | | | | | |

| | | | | | | | | | |
|----|---|--|--|--|--|--|--|--|--|
| 8 | Analysing the Teaching – Learning Methodologies in Pharmacology | | | | | | | | |
| 9 | Performing Bioassay of drugs | | | | | | | | |
| 10 | Performing Herbal Extraction Procedures | | | | | | | | |
| 11 | Performing In vivo small animal experiments | | | | | | | | |
| 12 | Understanding Basics of Research Methodology & Performing a Clinical or Experimental research | | | | | | | | |
| 13 | Obtaining Informed Consent for participation in the clinical trial | | | | | | | | |
| 14 | Applying basic concepts of Biostatistics in Performing Clinical or Experimental research | | | | | | | | |
| 15 | Design a Protocol for a Clinical or Experimental study | | | | | | | | |
| 16 | Criticise a Journal Article | | | | | | | | |
| 17 | Writing a manuscript for publication | | | | | | | | |

Second year of the residency

| S. No | EPAs | 1st quarter | | 2nd quarter | | 3rd quarter | | 4th quarter | |
|-------|---|-------------|---------|-------------|---------|-------------|---------|-------------|---------|
| | | Resident | Faculty | Resident | Faculty | Resident | Faculty | Resident | Faculty |
| 1 | ADR reporting and participating in National Pharmacovigilance Program | | | | | | | | |
| 2 | Rational Use of Drugs – Essential Medicines List & ‘P’ drug | | | | | | | | |
| 3 | Drug Compliance – Measuring Medication Adherence | | | | | | | | |
| 4 | Analysing Prescribing pattern using WHO criteria | | | | | | | | |
| 5 | Identifying Drug-Drug Interactions | | | | | | | | |
| 6 | Identifying the right choice of drug based on Pharmacoeconomics | | | | | | | | |
| 7 | Evaluating Drug Promotional Literature | | | | | | | | |
| 8 | Analysing the Teaching – Learning Methodologies in Pharmacology | | | | | | | | |
| 9 | Performing Bioassay of drugs | | | | | | | | |
| 10 | Performing Herbal Extraction Procedures | | | | | | | | |
| 11 | Performing In vivo small animal experiments | | | | | | | | |

| | | | | | | | | | |
|----|---|--|--|--|--|--|--|--|--|
| 12 | Understanding Basics of Research Methodology & Performing a Clinical or Experimental research | | | | | | | | |
| 13 | Obtaining Informed Consent for participation in the clinical trial | | | | | | | | |
| 14 | Applying basic concepts of Biostatistics in Performing Clinical or Experimental research | | | | | | | | |
| 15 | Design a Protocol for a Clinical or Experimental study | | | | | | | | |
| 16 | Criticise a Journal Article | | | | | | | | |
| 17 | Writing a manuscript for publication | | | | | | | | |

Third year of the residency

| S. No | EPAs | 1st quarter | | 2nd quarter | | 3rd quarter | | 4th quarter | |
|-------|---|-------------|---------|-------------|---------|-------------|---------|-------------|---------|
| | | Resident | Faculty | Resident | Faculty | Resident | Faculty | Resident | Faculty |
| 1 | ADR reporting and participating in National Pharmacovigilance Program | | | | | | | | |
| 2 | Rational Use of Drugs – Essential Medicines List & ‘P’ drug | | | | | | | | |
| 3 | Drug Compliance – Measuring Medication Adherence | | | | | | | | |
| 4 | Analysing Prescribing pattern using WHO criteria | | | | | | | | |
| 5 | Identifying Drug-Drug Interactions | | | | | | | | |
| 6 | Identifying the right choice of drug based on Pharmacoeconomics | | | | | | | | |
| 7 | Evaluating Drug Promotional Literature | | | | | | | | |
| 8 | Analysing the Teaching – Learning Methodologies in Pharmacology | | | | | | | | |
| 9 | Performing Bioassay of drugs | | | | | | | | |
| 10 | Performing Herbal Extraction Procedures | | | | | | | | |
| 11 | Performing In vivo small animal experiments | | | | | | | | |

| | | | | | | | | | |
|----|---|--|--|--|--|--|--|--|--|
| 12 | Understanding Basics of Research Methodology & Performing a Clinical or Experimental research | | | | | | | | |
| 13 | Obtaining Informed Consent for participation in the clinical trial | | | | | | | | |
| 14 | Applying basic concepts of Biostatistics in Performing Clinical or Experimental research | | | | | | | | |
| 15 | Design a Protocol for a Clinical or Experimental study | | | | | | | | |
| 16 | Criticise a Journal Article | | | | | | | | |
| 17 | Writing a manuscript for publication | | | | | | | | |

Annexure 2: Postgraduate Students Appraisal Form

Sri Balaji Vidyapeeth

Department of Pharmacology

Name of the PG Student:

UNI No:

Period of Training FROM.....TO.....

| Sr. No. | PARTICULARS | Not Satisfactory | Satisfactory | More Than Satisfactory | Remarks |
|---------|--|------------------|--------------|------------------------|---------|
| | | 123 | 4 56 | 789 | |
| 1 | Journal based / recent advances learning | | | | |
| 2 | Patient based /Laboratory or Skill based learning | | | | |
| 3 | Self directed learning and teaching | | | | |
| 4 | Departmental and interdepartmental learning activity | | | | |
| 5 | External and Outreach Activities / CMEs | | | | |
| 6 | Thesis / Research work | | | | |
| 7 | E-portfolio Maintenance | | | | |

Publications

Yes/ No

Remarks* _____

*REMARKS: Any significant positive or negative attributes of a postgraduate student to be mentioned. For score less than 4 in any category, remediation must be suggested. Individual feedback to postgraduate student is strongly recommended.

SIGNATURE OF ASSESSE

SIGNATURE OF HOD

Annexure 3:Multisource feedback

Sri Balaji Vidyapeeth

Department of Pharmacology

Multisource feedback

(To be completed by Faculty)

Name of the Resident: UIN No.:

Name of the Faculty: Date:

| Sl. No. | Criteria to be assessed | Score | | |
|---------|---|------------------|---------------|------------------|
| | | Below par (1) | At par (2) | Above par (3) |
| 1 | Teaching Methodology | | | |
| 2 | Practical Skills | | | |
| 3 | ADR reporting | | | |
| 4 | Communication skills | | | |
| 5 | Methodological skills | | | |
| 6 | Self directed learning | | | |
| 7 | Professionalism | | | |
| 8 | Proper and complete documentation | | | |
| 9 | Relationship with peers | | | |
| 10 | Works constructively in the health care system | | | |
| | | Total score: | | |
| | General Comments: | | | |
| | Highlights in performance (strengths) | | | |
| | Possible suggested areas for improvement (weakness) | | | |
| | Signature: | | | |

(To be completed by Nurse / Technician / Other Health Professionals)

Name of the Resident: UIN No.:

Name of the Respondent: Date:

| Sl. No. | Criteria to be assessed | Score | | |
|---------|--|------------------|---------------|------------------|
| | | Below par (1) | At par (2) | Above par (3) |
| 1 | Shows ethics in animal care | | | |
| 2 | Follows guidelines | | | |
| 3 | Follows methodologies | | | |
| 4 | Performs experiments with confidence | | | |
| 5 | Communicates effectively with technicians | | | |
| 6 | Communicates effectively with nurses in ADR reporting | | | |
| 7 | Communicates effectively with other health professionals | | | |
| 8 | Allows them to express their doubts or concern | | | |
| 9 | Proper and complete documentation | | | |
| 10 | Works constructively in the health care system | | | |
| | | Total score: | | |
| | General Comments: | | | |
| | Highlights in performance (strengths) | | | |
| | Possible suggested areas for improvement (weakness) | | | |
| | Signature: | | | |

(To be completed by Nurse / Technician / Other Health Professionals)

Name of the Resident: UIN No.:

Name of the Respondent: Date:

| Sl. No. | Criteria to be assessed | Score | | |
|---------|--|------------------|---------------|------------------|
| | | Below par (1) | At par (2) | Above par (3) |
| 1 | Shows ethics in animal care | | | |
| 2 | Follows guidelines | | | |
| 3 | Follows methodologies | | | |
| 4 | Performs experiments with confidence | | | |
| 5 | Communicates effectively with technicians | | | |
| 6 | Communicates effectively with nurses in ADR reporting | | | |
| 7 | Communicates effectively with other health professionals | | | |
| 8 | Allows them to express their doubts or concern | | | |
| 9 | Proper and complete documentation | | | |
| 10 | Works constructively in the health care system | | | |
| | | Total score: | | |
| | General Comments: | | | |
| | Highlights in performance (strengths) | | | |
| | Possible suggested areas for improvement (weakness) | | | |
| | Signature: | | | |

(To be completed by Nurse / Technician / Other Health Professionals)

Name of the Resident: UIN No.:

Name of the Respondent: Date:

| Sl. No. | Criteria to be assessed | Score | | |
|---------|--|------------------|---------------|------------------|
| | | Below par (1) | At par (2) | Above par (3) |
| 1 | Shows a caring attitude to patients | | | |
| 2 | Effectively explains importance of medication adherence, side effects of drugs | | | |
| 3 | Provides proper drug information | | | |
| 4 | Communicates effectively with patients | | | |
| 5 | Effectively answers doubts or concern | | | |
| | | Total score: | | |
| | General Comments: | | | |
| | Highlights in performance (strengths) | | | |
| | Possible suggested areas for improvement (weakness) | | | |
| | Signature: | | | |

Annexure 4: Work Place Based Assessment

Sri Balaji Vidyapeeth

Department of Pharmacology
Work Place Based Assessment

Name of the Resident: UIN No.:

Name of the Faculty: Date:

| | Below expectation | Borderline | Meet expectation | Above expectation | Not observed |
|---------------------------|-------------------|------------|------------------------------|-------------------|--------------|
| Teaching skill | | | | | |
| Experimental skill | | | | | |
| Methodological skill | | | | | |
| Communication skill | | | | | |
| Clinical judgement | | | | | |
| Professionalism | | | | | |
| Organisational efficiency | | | | | |
| Overall Performance | | | | | |
| Anything good: | | | Suggestions for improvement: | | |
| Agreed upon action: | | | | | |
| Signature of the resident | | | Signature of the Assessor | | |

Annexure 5: Feedback for Journal club

Sri Balaji Vidyapeeth

Department of Pharmacology

Evaluation Sheet For Postgraduate Journal Club

(To Be Marked Individually By Each Faculty)

Name of the Resident: UIN No.:

Name of the Faculty: Date:

| Sl. No. | Criteria to be assessed | Score | | |
|---------|--|------------------|---------------|------------------|
| | | Below par (1) | At par (2) | Above par (3) |
| 1 | Relevance of article chosen | | | |
| 2 | Identifies the problem addressed in the paper | | | |
| 3 | Completeness of presentation | | | |
| 4 | Analyses and gives comments on methodology and statistics | | | |
| 5 | Brief summary of results | | | |
| 6 | Comparison of work with other published work | | | |
| 7 | Merits and demerits of the paper | | | |
| 8 | Summary and take home message | | | |
| 9 | Time management | | | |
| 10 | Overall performance – relevant answers to questions, attitude during presentation and confidence | | | |
| | | Total score: | | |
| | General Comments: | | | |
| | Highlights in performance (strengths) | | | |
| | Possible suggested areas for improvement (weakness) | | | |
| | Signature: | | | |

Annexure 6: Feedback for Seminar

**Sri Balaji Vidyapeeth
Department of Pharmacology**

Evaluation Sheet For Postgraduate Journal Club
(To Be Marked Individually By Each Faculty)

Name of the Resident: UIN No.:

Name of the Faculty: Date:

| Sl. No. | Criteria to be assessed | Score | | |
|---------|--|------------------|---------------|------------------|
| | | Below par (1) | At par (2) | Above par (3) |
| 1 | Introduction of subject and its importance / Objectives | | | |
| 2 | Completeness of presentation | | | |
| 3 | Coherency of presentation | | | |
| 4 | Consulted all relevant literature | | | |
| 5 | Use of audio-visual aids | | | |
| 6 | Understanding of subject | | | |
| 7 | Summary and take home message | | | |
| 8 | Cites appropriate references / suggests further reading | | | |
| 9 | Time management | | | |
| 10 | Overall performance – relevant answers to questions, attitude during presentation and confidence | | | |
| | | Total score: | | |
| | General Comments: | | | |
| | Highlights in performance (strengths) | | | |
| | Possible suggested areas for improvement (weakness) | | | |
| | Signature: | | | |

Annexure 7: Practical Procedural Skills Assessment

**Sri Balaji Vidyapeeth
Department of Pharmacology**

Evaluation Sheet For Postgraduate Practical Work
(To be marked individually by each faculty)

Name of the Resident: UIN No.:

Name of the Faculty: Date:

| Sl. No. | Criteria to be assessed | Score | | |
|---------|---|------------------|---------------|------------------|
| | | Below par (1) | At par (2) | Above par (3) |
| 1 | Animal Handling | | | |
| 2 | Setting up equipment | | | |
| 3 | Procedural skills | | | |
| 4 | Calculational skills | | | |
| 5 | Problem Solving skills | | | |
| 6 | Communication Skills | | | |
| 7 | Documentation skills | | | |
| 8 | Management skills | | | |
| 9 | Teaching skills | | | |
| 10 | Overall performance | | | |
| | | Total score: | | |
| | General Comments: | | | |
| | Highlights in performance (strengths) | | | |
| | Possible suggested areas for improvement (weakness) | | | |
| | Signature: | | | |

Annexure 8: Patient Information Sheet

**Sri Balaji Vidyapeeth
Department of Pharmacology**

Information for Participants of the Study

Evaluation Sheet For Postgraduate Practical Work
(To be marked individually by each faculty)

Information for Participants of the Study

Instructions – This is the patient information sheet. It should address the participant of this study. Depending upon the nature of the individual project, the details provided to the participant may vary. A separate consent form for the patient/test group and control (drug/procedure or placebo) should be provided as applicable. While formulating this sheet, the investigator must provide the following information as applicable in a simple language in English and Tamil which can be understood by the participant.

We welcome you and thank you for having accepted our request to consider whether you can participate in our study. This sheet contains the details of the study, the possible risks, discomfort and benefits for the participants are also given. You can read and understand by yourself; if you wish, we are ready to read and explain the same to you.

If you do not understand anything or if you want any more details we are ready to provide the details.

1. What is the title of the Research Project?
2. Who /where this study is being conducted?

This study is being conducted by ----- a Post graduate medical student belonging to Department under the guidance of

3. What is the purpose of the study?
4. Procedure/Methods of the study (in brief, simple terms)

Note: Do not copy paste from the protocol

5. How long you are expected to participate in this study ?
6. Why I am being considered as one of the participant?

Because.....

7. Should I definitely have to take part in this study?

No. If you do not wish to participate you will not be included in this study. Also you will continue to get the medical treatment without any prejudice.

8. If I am participating in this study, what are my responsibilities?

You may have follow some simple rules.

These are:

9. Are there any benefits for me/Public ?

Yes.....The benefits to be expected from the research to the participant or to others and the post-trial responsibilities of the investigator.

10. Will there be any discomfort / risks to me?

No risks. But some discomforts may be there like giving few ml of blood for investigation, undergoing some medical examinations, or any other risks expected from the study to the participant.

11. Will my participating in this study, my personal details will be kept confidentially?

Yes, confidentiality will be maintained.

12. Will I be paid for the Study?

Provision of free treatment for research related injury.

13. Can I withdraw from this study at any time during the study period?

Freedom to withdraw from the study at any time during the study period without the loss of benefits that the participant would otherwise be entitled.

14. Possible current and future uses of the biological material to be generated from the research and if the material is likely to be used for secondary purposes or would be shared with others, for which we seek your permission prior to the study inclusion?

15. Possible current and futures uses of the data to be generated from the research and if the data is likely to be used for secondary purposes or would be shared with others, for which we seek your permission prior to the study inclusion?

16. Will I be informed of this study's results and the findings?

Yes, on your request for the results of the study and its findings.

17. Address and mobile number of the Principal Investigator (PI) and Co-PI, if any:

18. Address and telephone number of the IHEC office, MGMCRI and Mobile numbers of the IHEC Member Secretary / Additional Member Secretary:

Signature of the Participant

Signature of the Investigators

Annexure 9: Informed Consent Form

**Sri Balaji Vidyapeeth
Department of Pharmacology**

Information for Participants of the Study

**FORM FOR GETTING INFORMED CONSENT FOR THOSE PARTICIPATING IN THE
RESEARCH PROJECT**

Title of the project:

Participant's name:

Address

The details of the study have been provided to me in writing and explained to me in my own language. I confirm that I have understood the above study and had the opportunity to ask questions. I understand that my participation in the study is voluntary and that I am free to withdraw at any time, without giving any reason, without the medical care that will normally be provided by the hospital being affected. I agree not to restrict the use of any data or results that arise from this study provided such a use is only for scientific purpose(s). I have been given an information sheet giving details of the study. Risk and benefit of this project has been explained to me. I fully consent to participate in the above study.

(I also consent / do not consent to use my stored biological samples for future scientific purposes: Yes/ No – if applicable)

Signature/thumb impression of the participant: _____ Date: _____

Signature of the witness: _____ Date: _____

Name and address of the witness:

Signature of the investigator: _____ Date: _____