Rawalpindi Medical University

Curriculum

RMU Diploma Program in Anesthesia

2021

Faculty

Patron in Chief: Prof. Dr. Muhammad Umar (Vice Chancellor RMU)

Dean of Faculty: Brig. (R)Dr. Muhammad Salim

Course Director: Prof. Dr. Jawad Zahir

Internal Faculty:

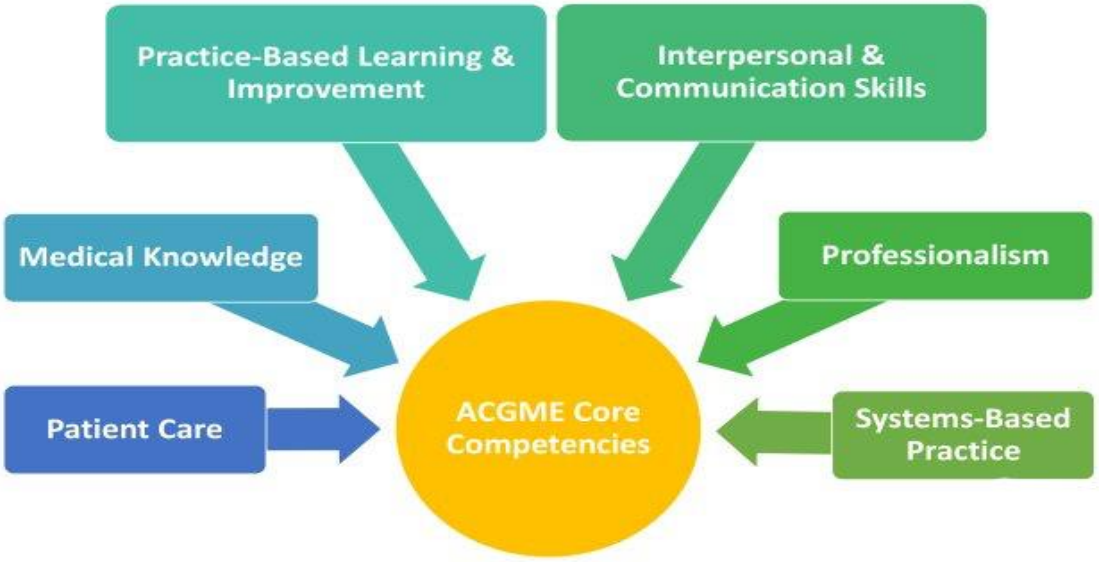
1. Prof. Dr. Jawad Zahir
2. Dr Shafique
3. Dr Abeera Zareen
4. Dr. Ayesha
5. Dr Shahani

Table of Content

Section-1

General Review

ACME Based Competencies Model of Diploma Program in Anesthesia



Mission Statement

The mission statement of Diploma in Anesthesia, Rawalpindi Medical University is:

- To acquire the competence pertaining to Pain that is required to be practiced in the community and at all levels of health care systems.
- To acquire the skills to manage the patient's pain issues effectively.
- To acquire effective communication skills to council patients and his attendants.
- To have the desired interventional skills to perform procedures.
- To be aware of recent advances in the field of Pain Medicine.
- To orient to principles of research methodology.
- To acquire skills in educating medical students juniors and paramedical professionals.

Statues

- **Nomenclature:**

  Name of the proposed course shall be **Diploma in Anesthesia.**

- **Training Centers:**

  Department of Anesthesia at Rawalpindi Medical University

- **Duration of Course:**

  It is a 2 years program

- **Course Structure:**

  It is a 2 years program (one year in part I and one year in part II)

Admission Criteria

For admission in Diploma in Anesthesia the candidate shall be required to have:

- Valid PMC certificate
- Age less than 35 years
- One-year complete house job
- Preference will be given to candidates done M.O ship in Anesthesia

Registration & Enrolment

- 4-6 trainees will be registered with one supervisor.
- The university will approve supervisors for the program.
- The candidates selected for the course shall be registered with the university as per prescribed registration regulations.

Aim

The goal of DA course in Anesthesia is to produce a knowledgeable and skillful anesthesiologist who:

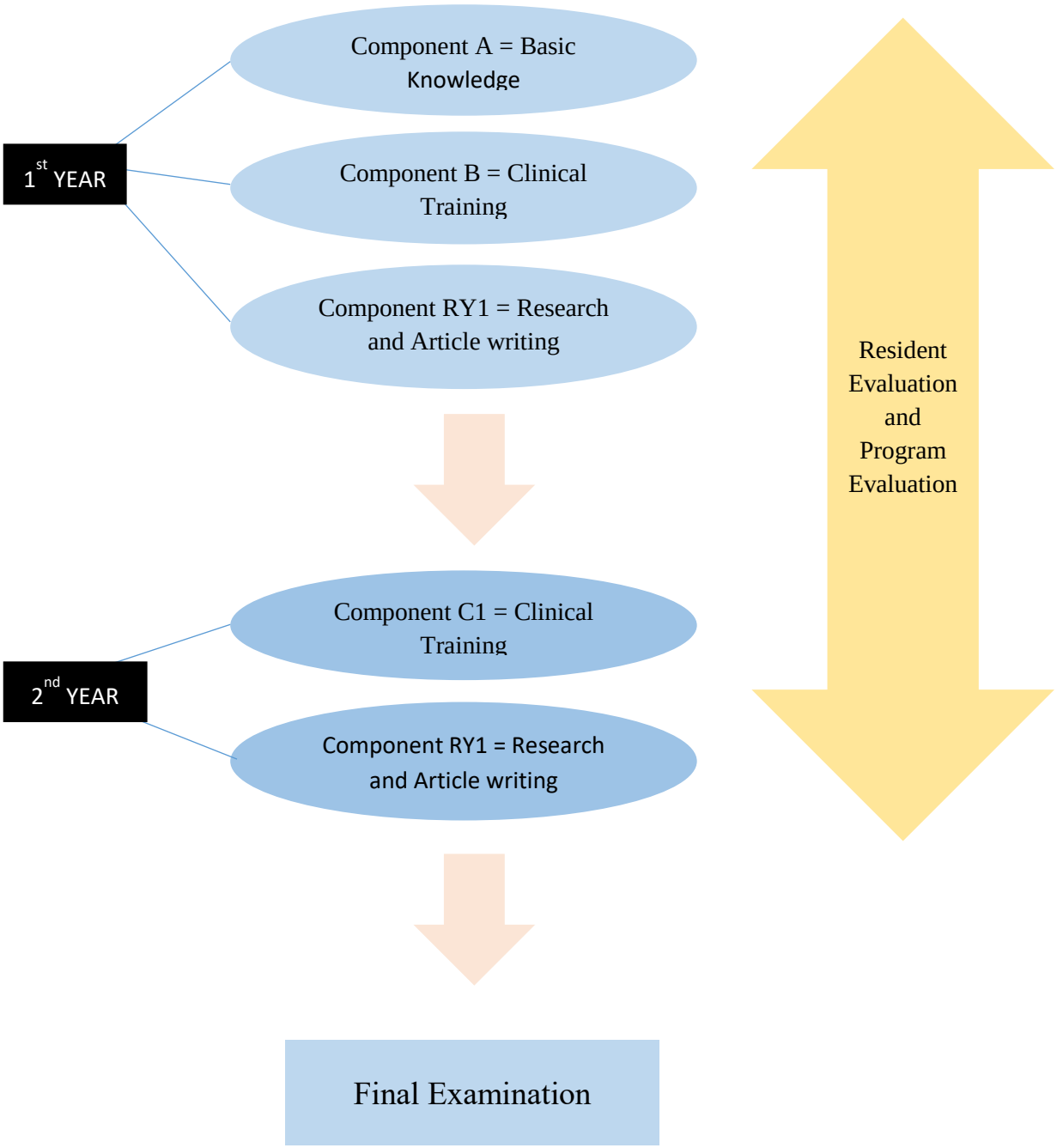
- Is competent to anaesthetize all categories of patients from ASA-I to V with medical problems for every type of elective and emergency surgery.
- Should be able to diagnose and treat acute and chronic pain conditions.
- Should be competent to manage critically ill patients in emergency and ICU requiring routine to advanced monitoring, mechanical ventilation and other interventions.
- Should be aware of the recent advances and developments in medical sciences as related to anesthesia, analgesia and critical care.
- Should be oriented to principles of research methodology; and
- Is competent to teach acquired skills to medical and paramedical professionals.

Objectives

Department of anesthesia makes sure that the candidate develops in all fronts i.e., cognitive, affective and psychomotor domain as it is important for anesthesiologist to work as member/ team leader in various clinical and critical situations in Operation Room and outside OR. Candidate should be able to demonstrate following at the end of training.

- Demonstrate familiarity with diagnostic skills and laboratory procedures relevant to the diagnosis and evaluation of patients under care.
- Critically evaluate recent medical literature from journals, reference books: monographs update knowledge and adapt therapeutic procedures based on this appraisal.
- Manage administration of anesthesia to patients of all grades of ASA risk grading and all types of surgical subspecialties both for elective and emergency procedures.
- Demonstrate aptitude and will to remain clear headed and act correctly when faced with critical incidence in the operating room and critical care units.
- Demonstrate the knowledge of ethics and medico legal aspects related to the practice of anesthesiology and critical care.
- To work in a team and show leadership qualities in dealing with paramedics.

General Road Map of the Diploma in Anesthesia



Scheme of the Course

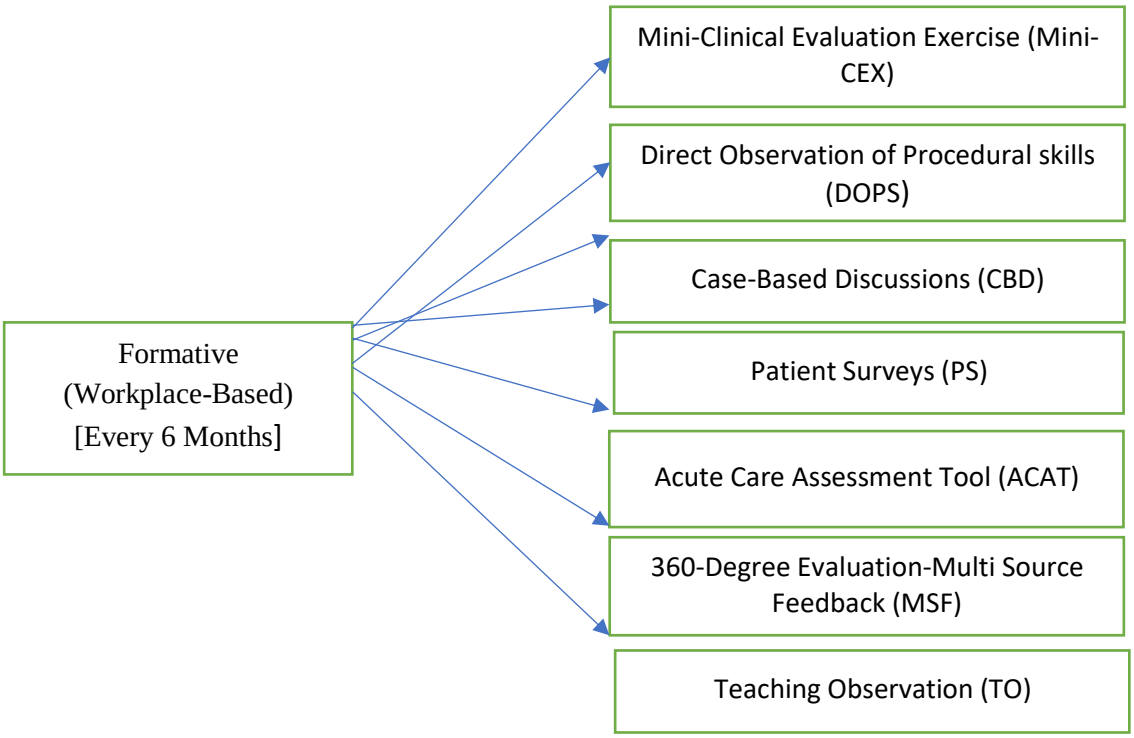
A summary of 2 years course in D.A is as under:

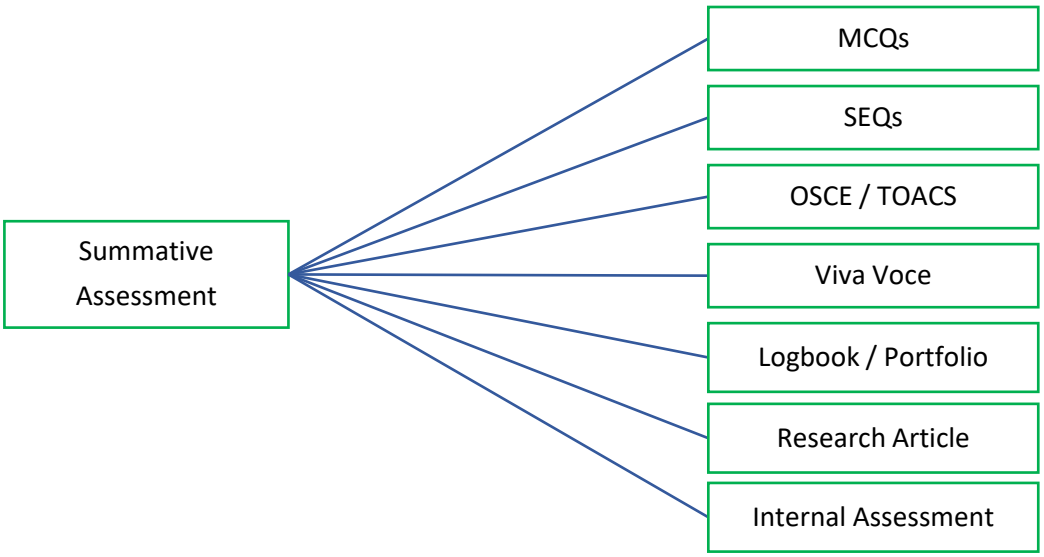
Course Structure	Theoretical Component	Practical component	Rotations	Workshops
First year D.A training	• Applied anatomy • Applied physiology • Pharmacology • General pathology • Applied hematology • Applied physics • Anesthesia equipment • Monitoring equipment • Biostatistics an research • Behavioral sciences • Resuscitation and crisis management	• Preoperative assessment • Clinical examination and recognition of medical diseases • Premedication • Induction of Anesthesia • Airway maintenance • Monitoring during Anesthesia • Recovery from Anesthesia • Post-operative anesthesia care	• Pre-anesthesia clinic-1 month • General surgery - 6 months • Post-anesthesia care unit -1 month • Gynae /Obs 4 months	• Research methodology • Communication skills • Basic life support
Second year D.A training	• General anesthesia • Medical diseases and Anesthesia • Obstetrical and gynecological anesthesia • Neuro-anesthesia • Pediatric anesthesia • Urology anesthesia • Day care anesthesia • Eye & ENT anesthesia • Trauma &orthopedic anesthesia • Cardiac arrest and principles of resuscitation • Regional anesthesia including neuraxial and extremity blocks	• Preoperative assessment • Effective Counselling and communication • Premedication • Induction of anesthesia • Airway maintenance • Monitoring during anesthesia • Recovery from anesthesia • Post-operative problems and care	• Ent-2 months • Eye -2 months • Neurosurgery-2 months • urology 2 months • ICU 2 months • Cardiothoracic 1 month • Paediatric1 month	• ACLS workshop • Research methodology

Methods of Teaching & Learning

- Classrooms
- Modular (workshops/ seminar/master classes)
- Hands-on live procedures, cadavers
- Video conferencing system
- Log book completion under supervision of supervisor
- Dissertation

Assessment Model of DA





At the end of first year:

- Theory paper of 100 MCQS (passing criteria 60 %)
- Logbook /Portfolio
- Synopsis approved by ethical approval committee

At the end of second year:

- One article published in PMDC recognized journal
- Summative exam at the end of second year as mentioned above
-

Tools of Assessment

- **360-Degree Evaluation Instrument-Multi-Source Feedback (MSF):**
  - 360-degree evaluations consist of measurement tools completed by multiple people in a person's sphere of influence.
  - Evaluators completing rating forms in a 360-degree evaluation usually are superiors, peers, subordinates, and patients and families.
  - Most 360-degree evaluation processes use a survey or questionnaire to gather information about an individual's performance on several topics (e.g., teamwork, communication, management skills & decision-making).
  - Most 360-degree evaluations use rating scales to assess how frequently a behavior is performed (e.g., a scale of 1 to 5, with 5 meaning "all the time" and 1 meaning "never").
  - The ratings are summarized for all evaluators by topic and overall to provide feedback. Evaluators provide more accurate and less lenient ratings when the evaluation is intended to give formative feedback rather than summative evaluations.
  - A 360-degree evaluation can be used to assess ACGME criteria including interpersonal and communication skills, professional behaviors, and some aspects of patient care and systems-based practice.
- **Chart Stimulated Recall (CSR)**
  - In a chart stimulated recall (CSR) examination patient cases of the examinee (resident) are assessed in a standardized oral examination.
  - A trained and experienced physician examiner questions the examinee about the care provided probing for reasons behind the work-up, diagnoses, interpretation of clinical findings, and treatment plans.
  - The examiners rate the examinee using a well-established protocol and scoring procedure. In efficiently designed CSR oral exams each patient case (test item) takes 5 to 10 minutes.
  - A typical CSR exam is two hours with one or two physicians as examiners per separate 30 or 60-minute session. These exams assess clinical decision-making and the application or use of medical knowledge with actual patients.
- **Checklist Evaluation**
  - Checklists consist of essential or desired specific behaviors, activities, or steps that make up a more complex competency or competency component.
  - Typical response options on these forms are a check (√) or "yes" to indicate that the behavior occurred or options to indicate the completeness (complete, partial, or absent) or correctness (total, partial, or incorrect) of the action.
  - The forms provide information about behaviors but for the purpose of making a judgment about the adequacy of the overall performance, standards need to be set that indicate, for example, pass/fail or excellent, good, fair, or poor performance.

- Checklists are useful for evaluating any competency and competency component that can be broken down into specific behaviors or actions. Documented evidence for the usefulness of checklists exists for the evaluation of patient care skills (history and physical examination, procedural skills) and for interpersonal and communication skills.
- Checklists have also been used for self-assessment of practice-based learning skills (evidence-based medicine). Checklists are most useful to provide feedback on performance because checklists can be tailored to assess detailed actions in performing a task.

- **Objective Structured Clinical Examination (OSCE)**
  - In an objective structured clinical examination (OSCE) one or more assessment tools are administered at 12 to 20 separate standardized patient encounter stations, each station lasting 5-10 minutes.
  - Between stations candidates may complete patient notes or a brief written examination about the previous patient encounter. All candidates move from station to station in sequence on the same schedule.
  - Standardized patients are the primary assessment tool used in OSCEs, but OSCEs have included other assessment tools such as data interpretation exercises using clinical cases and clinical scenarios with mannequins, to assess technical skills.
  - OSCEs have been administered in most of the medical schools worldwide, many residency programs, and by the licensure board examinations.
  - The OSCE format provides a standardized means to assess: physical examination and history taking skills; communication skills with patients and family members, breadth and depth of knowledge; ability to summarize and document findings; ability to make a differential diagnosis, or plan treatment; and clinical judgment based upon patient notes.
- **Procedure, Operative or Case Logs**
  - Procedure, operative, or case logs document each patient encounter by medical conditions seen, surgical operation or procedures performed.
  - The logs may or may not include counts of cases, operations, or procedures. Patient case logs currently in use involve recording of some number of consecutive cases in a designated time frame.
  - Operative logs in current use vary; some entail comprehensive recording of operative data by CPT code while others require recording of operations or procedures for a small number of defined categories.
  - Logs of types of cases seen or procedures performed are useful for determining the scope of patient care experience. Regular review of logs can be used to help the resident track what cases or procedures must be sought out in order to meet residency requirements or specific learning objectives.
  - Patient logs documenting clinical experience for the entire residency can serve as a

summative report of that experience; as noted below, the numbers reported do not necessarily indicate competence.

- **Patient Surveys**
  - Surveys of patients to assess satisfaction with hospital, clinic, or office visits typically include questions about the physician's care.
  - The questions often assess satisfaction with general aspects of the physician's care, (e.g., amount of time spent with the patient, overall quality of care, physician competency (skills and knowledge), courtesy, and interest or empathy).
  - A typical patient survey asks patients to rate their satisfaction with care using rating categories (e.g., poor, fair, good, very good, excellent).
  - Each rating is given a value and a satisfaction score calculated by averaging across responses to generate a single score overall or separate scores for different clinical care activities or settings.
  - Patient feedback accumulated from single encounter questionnaires can assess satisfaction with patient care competencies (aspects of data gathering, treatment, and management; counseling, and education; preventive care); interpersonal and communication skills; professional behavior; and aspects of systems-based practice (patient advocacy; coordination of care).
  - If survey items about specific physician behaviors are included, the results can be used for formative evaluation and performance improvement.
- **Portfolios**
  - A portfolio is a collection of products prepared by the resident that provides evidence of learning and achievement related to a learning plan. A portfolio typically contains written documents but can include video- or audio-recordings, photographs, and other forms of information.
  - Reflecting upon what has been learned is an important part of constructing a portfolio. In addition to products of learning, the portfolio can include statements about what has been learned, its application, remaining learning needs, and how they can be met.
  - In graduate medical education, a portfolio might include a log of clinical procedures performed; a summary of the research literature reviewed when selecting a treatment option; a quality improvement project plan and report of results; ethical dilemmas faced and how they were handled; a computer program that tracks patient care outcomes; or a recording or transcript of counseling provided to patients.
  - Portfolios can be used for both formative and summative evaluation of residents. Portfolios are most useful for evaluating mastery of competencies that are difficult to evaluate in other ways such as practice-based improvement, use of scientific evidence in patient care, professional behaviors, and patient advocacy.
  - Teaching experiences, morning report, patient rounds, individualized study or research

projects are examples of learning experiences that lend themselves to using portfolios to assess residents.

- **Record Review**
  - Trained staff in an institution's medical records department or clinical department perform a review of patients' paper or electronic records.
  - The staff uses a protocol and coding form based upon predefined criteria to abstract information from the records, such as medications, tests ordered, procedures performed, and patient outcomes.
  - Record review can provide evidence about clinical decision-making, follow-through in patient management and preventive health services, and appropriate use of clinical facilities and resources (e.g., appropriate laboratory tests and consultations).
  - Often residents will confer with other clinical team members before documenting patient decisions and therefore, the documented care may not be directly attributed to a single resident but to the clinical team.
- **Simulations and Models**
  - Simulations used for assessment of clinical performance closely resemble reality and attempt to imitate but not duplicate real clinical problems.
  - Key attributes of simulations are that: they incorporate a wide array of options resembling reality, allow examinees to reason through a clinical problem with little or no cueing, permit examinees to make life-threatening errors without hurting a real patient, provide instant feedback so examinees can correct a mistaken action, and rate examinees' performance on clinical problems that are difficult or impossible to evaluate effectively in other circumstances.
  - Simulation formats have been developed as paper-and-pencil branching problems (patient management problems or PMPs), computerized versions of PMPs called clinical case simulations (CCX®), role-playing situations (e.g., standardized patients (SPs), clinical team simulations), anatomical models or mannequins, and combinations of all three formats.
  - Mannequins are imitations of body organs or anatomical body regions frequently using pathological findings to simulate patient disease. The models are constructed of vinyl or plastic sculpted to resemble human tissue with imbedded electronic circuitry to allow the mannequin to respond realistically to actions by the examinee.
  - Virtual reality simulations or environments (VR) use computers sometimes combined with anatomical models to mimic as much as feasible realistic organ and surface images and the touch sensations (computer generated haptic responses) a physician would expect in a real patient.
  - The VR environments allow assessment of procedural skills and other complex clinical tasks that are difficult to assess consistently by other assessment methods. Simulations

using VR environments have been developed to train and assess anesthesiologists managing life-threatening critical incidents during surgery and residents responding to cardio-pulmonary incidents on a full-size human mannequin.

- Written and computerized simulations have been used to assess clinical reasoning, diagnostic plans and treatment for a variety of clinical disciplines as part of licensure and certification examinations. Standardized patients as simulations are described elsewhere.

- **Standardized Oral Examination**
  - The standardized oral examination is a type of performance assessment using realistic patient cases with a trained physician examiner questioning the examinee.
  - The examiner begins by presenting to the examinee a clinical problem in the form of a patient case scenario and asks the examinee to manage the case. Questions probe the reasoning for requesting clinical findings, interpretation of findings, and treatment plans.
  - An examinee can be tested on 18 to 60 different clinical cases. These exams assess clinical decision-making and the application or use of medical knowledge with realistic patients. Multiple-choice questions are better at assessing recall or understanding of medical knowledge.
- **Written Examination (MCQ)**
  - A written or computer-based MCQ examination is composed of multiple-choice questions (MCQ) selected to sample medical knowledge and understanding of a defined body of knowledge, not just factual or easily recalled information.
  - Each question or test item contains an introductory statement followed by four or five options in outline format. The examinee selects one of the options as the presumed correct answer by marking the option on a coded answer sheet.
  - Only one option is keyed as the correct response. The introductory statement often presents a patient case, clinical findings, or displays data graphically. Medical knowledge and understanding can be measured by MCQ examinations.
  - Comparing the test scores on in-training examinations with national statistics can serve to identify strengths and limitations of individual residents to help them improve.
  - Comparing test results aggregated for residents in each year of a program can be helpful to identify residency training experiences that might be improved.
- **Mini-Clinical Evaluation Exercise (MINI-CEX**)
  - This tool evaluates a clinical encounter with a patient to provide an indication of competence in skills essential for good clinical care such as history taking, examination and clinical reasoning.
  - The trainee receives immediate feedback to aid learning. They can be used at any time and in any setting when there is a trainee and patient interaction and an assessor is available.
- **Direct Observation of Procedural Skills (DOPS)**
  - A DOPS is an assessment tool designed to evaluate the performance of a trainee in

undertaking a practical procedure, against a structured checklist. The trainee receives immediate feedback to identify strengths and areas for development.

- **Case-Based Discussion (CBD)**
  - The CBD assesses the performance of a trainee in their management of a patient to provide an indication of competence in areas such as clinical reasoning, decision-making and application of medical knowledge in relation to patient care.
  - It also serves as a method to document conversations about, and presentations of, cases by trainees.
  - The CBD should focus on a written record (such as pre-op assessment, intra-op management, post-op/ recovery room discharge notes).
- **Acute Care Assessment Tool (ACAT)**
  - The ACAT is designed to assess and facilitate feedback on a doctor's performance during their practice on the Acute Medical Take.
  - Any doctor who has been responsible for the supervision of the Acute Medical Take can be the assessor for an ACAT.
- **Audit Assessment (AA)**
  - The Audit Assessment tool is designed to assess a trainee's competence in completing an audit.
  - The Audit Assessment can be based on review of audit documentation OR on a presentation of the audit at a meeting.
  - If possible, the trainee should be assessed on the same audit by more than one assessor.
- **Teaching Observation (TO)**
  - The Teaching Observation form is designed to provide structured, formative feedback to trainees on their competence at teaching.
  - The Teaching Observation can be based on any instance of formalized teaching by the trainee who has been observed by the assessor.
  - The process should be trainee-led (identifying appropriate teaching sessions and assessors).
- **Decisions on progress (ARCP)**
  - The Annual Review of Competence Progression (ARCP) is the formal method by which a trainee's progression through her/his training program is monitored and recorded.

Final Examination

- Eligibility for final examination: The candidate must have completed the required rotations at least 60 percent marks in the examination conducted in the end of first year of training. At least 60 percent marks in continuous internal assessment.
- The Vice-Chancellor shall appoint a panel of 3 examiners (2 external and 1 internal) approved by Dean.
- The degree shall be awarded on the result of an examination consisting of:
    - One written paper (MCQs and SEQs)
    - A Viva-Voce covering the entire field of the examination including the academic writing.
    - A high degree of performance will be expected from the candidate in the whole examination in order to get through. The whole examination has to be taken together and cannot be taken in parts.
    - The viva voce, clinical examination shall be conducted by the three examiners (2 external and 1 internal) appointed by the Vice-Chancellor from the panel approved by Dean.
- The Diploma of DA Anaesthesia under the seal of Rawalpindi Medical University shall be awarded to the successful candidate after the result of the theory & clinical and/or practical examinations
    - Passing marks in theory (MCQ'S & SAQ'S) aggregates 60%.
    - Passing marks in Oral & Practical aggregates 60%.
    - Passing marks in internal assessment 60%.

Candidates has to pass all the four components in final examination

Note: Logbooks should be completed and duly signed by supervisor (Please send the Name of your supervisor), and the institute to whom you are affiliated.

Research

The active research component program must ensure meaningful, supervised research experience with appropriate protected time for each resident while maintaining the essential clinical experience.

Section-2
Syllabus

Theory

- ## Applied Anatomy and Physiology
  - ### Applied Anatomy

    Candidates should be able to demonstrate a good understanding of human anatomy relevant to the practice of anesthesia.

    This will include the knowledge of anatomy as demonstrated by endoscopic and imaging techniques.
  - ### Applied Physiology

    Candidates are expected to be able to apply the basic knowledge of human physiology necessary to clinical practice of anesthesia and intensive care medicine.

    While all branches of physiology are of importance, it is recognized that clinical relevance dictates the topics selected for the examination.

- ## Hematological
  - Anemia
  - Polycythemia
  - Immunity and allergy
  - Inflammation
  - Blood groups
  - Alternative oxygen carrying solutions
  - Coagulation, hemostasis and disorders
  - Sickle cell disease –Thalassemia
- ## Muscle Function
  - Malignant hyperthermia
  - Disturbances in neuromuscular transmission
  - Myopathies and Muscle contractures
- ## Cardiovascular Physiology
  - Abnormal electrocardiogram and arrhythmias
  - Cardiomyopathy and abnormal ventricular function
  - Heart failure
  - Shock
  - Ischemic heart disease
  - Valvular defects
  - Common congenital heart defects
  - Hypertension

- **Kidney and Body Fluids**
  - Disturbances of fluid balance, oedema and dehydration
  - Management of acid-base abnormalities
  - Assessment of renal function
  - Renal failure and its management
  - Serum electrolyte disturbances
- **Liver**
  - Liver function tests
  - Hepatic failure
  - Jaundice causes and pathophysiology
- **Respiration**
  - Disorders of respiratory mechanics, gas exchange and transport
  - Disorders of the pulmonary circulation
  - Respiratory failure and ventilatory support
  - Effects of high and low atmospheric pressure
- **Nervous System**
  - Consciousness and coma
  - Phases of sleep
  - Depth of anesthesia
  - Consequences of spinal cord injury
  - Monitoring of spinal cord function under general anesthesia
  - Mechanisms of pain; somatic, visceral, neuropathic
  - Control of cerebral circulation, intracranial and intraocular pressures
  - Disorders of the autonomic nervous system
- **Gastrointestinal Tract**
  - Nausea and vomiting
  - Esophageal reflux
  - Obstruction
  - Swallowing disorders
- **Metabolism and Body Temperature**
  - Hormonal and metabolic response to surgery and other trauma
  - Hyperthermia and hypothermia
  - Starvation/obesity

- **Endocrinology**
  - Endocrine diseases of significance in anesthesia (Thyroid, parathyroid, pancreas, adrenal etc.)
- **Obstetrics and Pediatrics**
  - Principles of neonatal physiology
  - Effects of prematurity
  - Development in infancy and childhood
  - Physiology of normal and abnormal pregnancy
- **Applied Clinical Pharmacology**
  - For drugs used in Anaesthesia and intensive care medicine, candidates will also be expected to be aware of new drugs which are undergoing evaluation and whose human application has been reported in the mainstream anesthetic journals.
  - There will be emphasis on the practical application of pharmacological and pharmacokinetic knowledge, and upon an appreciation of the hazards and limitation of individual techniques.
- **General Therapeutics**
  - Pharmacological management of: Heart failure, coronary insufficiency and arrhythmias
  - Hypertension, including hypertension in pregnancy
  - Acute and chronic respiratory diseases
  - Hepatic and renal failure
  - Gastrointestinal disorders including modification of gastric contents
  - Musculo-skeletal problems such as rheumatoid and osteoarthritis
  - Myasthenia and muscle diseases
  - Pituitary, adrenal and thyroid dysfunction
  - Antipsychotic drugs
  - Epilepsy and anticonvulsants
  - Bacterial, fungal and viral infections
  - Malignant disease
  - Adverse reactions: Types of reactions
- **Application of pharmacological principles for the management of General Anesthesia**
  - Premedication: anxiolytics, sedatives and antisialogogues.
  - Pro-kinetic and anti- emetic drugs.
  - H2and proton pump antagonists
  - Inhalational Anaesthesia
  - Intravenous Anaesthesia, TIVA
  - Control of alveolar tension during induction and recovery

- Control of an aesthetic depth and prevention of awareness
- Control of autonomic response to laryngoscopy
- Methods for achieving specified plasma concentrations.
- Bolus, infusion, and profiled administration
- Management of neuromuscular blockade and reversal

- **Regional Anesthesia**
  - Choice of agent and technique.
  - Additives
  - Systemic effects
  - Avoidance of toxicity
- **Control of Acute Pain (including intraoperative analgesia and postoperative pain management) and Chronic Pain**
  - Opioid and non-opioid drugs
  - Opioid infusions
  - Patient-controlled analgesia
  - Regional techniques
  - Inhalational techniques
  - Other drugs used to manage chronic pain - antidepressants, anticonvulsants, antiarrhythmics, etc.
  - Management of severe pain and associated symptoms in terminal care
  - Non-pharmacological methods (e.g., T.E.N.S., acupuncture)
- **Application of Pharmacological Principles for the Management of Neurosurgery and Management of Head Injuries: -**
  - Effect of drugs on cerebral blood flow
  - Control of intracranial pressure
  - Control of convulsions
  - Management of cerebral ischemia
- **Cardiovascular Surgery**
  - Inotropes and Vasopressors
  - Vasodilators
  - Anticoagulant and thrombolytic therapies.
  - Management of coagulopathies
  - Pharmacological control of blood sugar
  - Pharmacological problems in cardiopulmonary bypass.
  - Cardioplegia

- **Other Therapeutic Drug groups**
  - Management of malignant hyperthermia
  - Pharmacological considerations in cardiopulmonary resuscitation, major trauma and exsanguination
  - Pharmacological control of severe infections
  - Pharmacological treatment of severe asthma
  - Effects of renal or hepatic impairment on drug disposition
- Knowledge of Basic Computer Application including MS office
- **Principles of Anesthesia**
  - **General Anesthesia**
    - Anesthetic equipment
    - Preoperative assessment and investigations
    - Perioperative management of Anaesthesia
    - Anaesthesia for patients with coexisting disease including diabetes and cardiovascular disorders
    - Regional Anaesthesia
    - Audit and quality control
    - Ethics, relevant legislation and the duty of care, consent, and information given to patients before Anaesthesia
    - Anaesthesia for particular disciplines – general surgery and subspecialities, obstetric, ENT, dental/ maxillofacial, orthopedic, trauma, ophthalmic, pediatric, day care, Anaesthesia and sedation for remote procedures such as radiology, endoscopy
  - **Regional Anesthesia**
    - Basic sciences applied to regional anesthesia: anatomy, physiology and pharmacology.
    - Principles and practice of spinal and epidural anesthesia, intravenous regional anesthesia and nerve blocks.
    - Recognition and management of adverse effects
    - In addition, candidates will be assessed on their understanding of principles in the following areas:

- **Anaesthesia for Specialties**
  - **Obstetrics**
    - Physiological changes of pregnancy
    - Anesthesia in early pregnancy
    - Antenatal assessment of the pregnant woman
    - Medical diseases complicating pregnancy
    - Pain relief in Labour
    - Anaesthesia for operative obstetrics
    - Emergencies in obstetrics
    - Neonatal resuscitation
  - **ENT**
    - Preoperative assessment, particularly prediction of a difficult intubation.
    - Management of patients of all ages to include patients with: -stridor -intubation difficulties -sleep apnea -concomitant diseases Local techniques and surface analgesia.
    - Acute ENT emergencies (e.g., bleeding tonsils, croup, epiglottitis, foreign bodies)
    - Laryngoscopy and bronchoscopy
    - Knowledge of special tubes, gags and equipment for micro laryngoscopy, bronchoscopy, laser surgery (e.g., Venturi devices, ventilating bronchoscope and fiber-optic bronchoscopy).
    - Middle ear surgery including hypotensive techniques.
    - Neck surgery
    - Emergency airway management including tracheostomy.
    - Postoperative management.
  - **Dental/ Maxillofacial**
    - Preoperative assessment
    - Day case/inpatient requirements
    - Resuscitation facilities
    - Dental chair Anaesthesia
    - Sedative, an aesthetic and analgesic techniques for dental extractions.
    - Assessment and management of the difficult airway including fiberoptic intubation
    - Anaesthesia for maxillofacial surgery including the perioperative management of the fractured jaw and other major facial injuries.
    - Postoperative management

- **Orthopedics**
  - Preoperative assessment with particular reference to the problems of children, the elderly and the patient with rheumatoid arthritis.
  - Emergency anesthesia for fractures
  - Routine anesthesia for joint replacement surgery, arthroscopy, fractured bones, dislocations and tendon repair Procedures under tourniquet.
  - Anesthesia for spinal surgery.
  - Regional blocks.
  - Perioperative analgesia
  - Prevention, diagnosis and management of fat emboli, deep vein thrombosis and pulmonary emboli
- **Trauma**
  - Management of head injury, spinal injury and multiple traumata with major blood loss
  - Major incident management, triage and anesthesia in situations outside the hospital transfer of the traumatized patient.
  - Management of the burned patient
  - Management of major vascular accidents Postoperative management Perioperative analgesia.
- **Ophthalmic**
  - Preoperative assessment with particular reference to patients with underlying disease Strabismus, cataract and detached retina surgery
  - Penetrating eye injury
  - Control of intraocular pressure
  - Anatomy relevant to local anesthetic blocks
  - Peribulbar and retrobulbar techniques of local anesthesia Postoperative care
- **Pediatric**
  - Preoperative assessment and psychological preparation for surgery
  - Anesthetic management of children for major elective and emergency surgery.
  - The anesthetic implications of major congenital anomalies including congenital heart disease
  - Management of recovery.
  - Management of postoperative pain in children
  - Management of acute airway obstruction including croup and epiglottitis

- **Anesthesia for Day Care Surgery**
- **Anesthesia in Remote Areas**
    - Selection criteria and preoperative evaluation
    - Instructions to patients
    - Regional and general anesthesia
    - Appropriate drugs
    - Postoperative analgesia
    - Recovery assessment and discharge criteria
    - Diagnostic imaging - Anesthesia and Sedation
    - Preanesthetic preparation
    - Techniques appropriate for adults and children for CT scanning MR imaging and angiography
    - Post-investigation care
    - Preoperative assessment and management of patients with cardiac disease. Anesthesia for cardiovascular imaging.
    - Pacemakers
    - Non-invasive and invasive vascular and non-vascular monitoring appropriate to the cardiovascular system
    - anesthesia for cardiac surgery.
    - Principles of cardiopulmonary bypass and cardiac surgery Postoperative management
- **Cardiac Anesthesia**
    - **Thoracic Anaesthesia**
    - Preoperative lung function tests
    - Local and general anesthesia for bronchoscopy to include techniques of ventilation.
    - Familiarity with fiberoptic bronchoscopy techniques for airway management and diagnostic procedures
    - Techniques of one-lung anesthesia to include single and double lumen endobronchial tubes
    - Principles of thoracic anesthesia to include management of pneumothorax
    - Principles of underwater seals on chest drains
    - Tracheostomy and other techniques of emergency airway management

- **Neurosurgical Anaesthesia**
  - Preoperative assessment and management of patients with neurological disease
  - Anaesthesia for imaging relevant to the CNS
  - Principles of Anaesthesia for craniotomy, to include vascular disease, cerebral tumors and posterior fossa lesions
  - Perioperative management of interventional neuroradiological procedures
  - Anaesthesia for spinal column surgery
  - Principles of immediate postoperative management.
  - Neurological monitoring.
- **Neonatal and other specialized areas**
  - Preoperative assessment
  - Recognition of common congenital anomalies requiring surgical correction at birth and their anesthetic implications (including esophageal atresia, diaphragmatic hernia, exomphalos, intestinal obstruction)
  - Principles of anesthetic management in the neonate undergoing major surgery
  - Congenital pyloric stenosis
  - Postoperative pain management
  - Transport of the critically ill neonate
- **Other specialized areas**
  - Transplantation, Principles and complications of immunosuppression
  - Specific anesthetic problems associated with renal transplantation
  - Anesthetic management of patients with transplanted organs
  - Anaesthesia for: Electro-convulsive therapy (ECT)
  - Radiotherapy
  - Minimal access surgery
  - Plastic surgery Burns
- **Intensive Care Medicine**
- **Intensive Care Unit, transport of the critically ill, nutrition and trauma**
  - Candidates should have a good understanding of the diagnosis and management of the critically ill patient and should be skilled in resuscitation to an advanced standard.
  - An understanding of the particular problems associated with the critically ill child (excluding neonates) will be expected.

- All candidates should be familiar with the monitoring and life support equipment used in the treatment of critically ill patients.
- Candidates must be able to demonstrate their knowledge of practical invasive procedures, with an understanding of the principles and hazards involved. Interpretation of data from such procedures.
- An awareness of the importance of communication skills and interpersonal relationships will be expected.

- **Candidate should be familiar with following:**
  - Infection, sepsis, and endotoxemia
  - Multiple Organ Dysfunction Syndrome
  - Nosocomial infections
  - Assessment and management of oxygen delivery
  - Antibiotics and immunotherapy
  - Reperfusion injury and antioxidants
  - Shock
  - DVT and Pulmonary embolism
  - Investigation and management of cardiac failure
  - Investigation and management of arrhythmias
  - Airway management and care
  - Ventilator's modes and care of patient on ventilation
  - Management of acute and chronic respiratory failure
  - Cerebrovascular Accidents
  - Acute polyneuropathy
  - Traumatic and non-traumatic coma
  - Status epilepticus
  - Brain stem death
  - Renal, Electrolyte and Metabolic Disorders to include Diagnosis, prevention and management of acute renal failure
  - Fluid, electrolyte and acid-base disorders
  - Body temperature
  - Hematological disorders Coagulopathies
  - immunocompromised patients
  - Gastrointestinal Disorders
  - Acute liver failure - diagnosis and management
  - Acute pancreatitis
  - Gut ischemia, gastrointestinal ulceration and bleeding

- **Nutrition**

  Requirements for enteral and parenteral nutrition

- **Analgesia, Anxiolysis and Sedation**

- **Trauma**
  - Management of multiple injuries
  - Near-drowning
  - Burns and smoke inhalation
  - Management of Acute Poisoning
  - Organ Donation
  - Scoring Systems
  - Audit Ethics

- **Pain Management**
  - A detailed knowledge of the control of acute pain in the context of postoperative and post-traumatic conditions will be expected, as will an understanding of the principles of chronic pain management in the pain clinic setting.
  - Anatomy, physiology, pharmacology and basic psychology relevant to pain management
  - Assessment and measurement of acute pain - including special problems with children, the elderly, and patients who are unconscious or in intensive care
  - Assessment of patients with chronic pain and pain in patients with cancer
  - Use of medication for pain management; conventional analgesics and adjuvant analgesics; side effects; problems of drug dependency and addiction
  - The role of and indications for neural blockade: peripheral nerve, plexus, epidural and subarachnoid blocks, techniques of sympathetic blockade, neurolytic agents and procedures, implanted catheters and pumps for drug delivery
  - Stimulation produced analgesia including transcutaneous techniques and acupuncture
  - Other treatment modalities; physical therapy, surgery, psychological approaches, rehabilitation approaches, pain management programmes
  - Pain relief and palliation in terminal illness

Practical

Candidate should be able to perform following skills at the end of tenure.

Perform paranesthesia checkup of patients taking detailed history, through physical examination, examining the reports of relevant laboratory tests.

Categories patients according to ASA (American Society of Anesthesiologists) physical status risk grading.

Recognize an aesthetic problem in high-risk patients and select further investigations and referral for expert opinion for dealing with specific problems.

Advise preanesthetic medication and preparation, including advice for withholding food and fluids.

Obtain patient/ guardian consent for Anaesthesia.

Conduct complete check for oxygen supply, other gases supply.

Conduct complete check of Anaesthesia machine for its proper functioning, including oxygen' fail safe alarms/ devices, detect leaks in the flow meter assembly and Anaesthesia circuits/ delivery systems, malfunctioning of vaporizers.

Disconnect and reassemble correctly various an aesthetic circuit.

Ensure Anaesthesia ancillary equipment in good order and availability of emergency kit/ drug tray.

Administer an aesthetic and undertake complete peri-operative management for surgical procedures.

i. General surgery

ii. Obstetric and Gynecological surgeries.

iii. Ophthalmic-Extra/intraocular surgeries.

iii. Ear, Nose and Throat surgeries.

iv. Orthopedic procedures.

v. Pediatric surgery.

vi. Other surgical subspecialities

Administer Anaesthesia to patients for emergency surgery, recognize perioperative complication and institute therapy.

Anticipate problems encountered during Anaesthesia and undertake preventive measures.

Perform the following procedures related to general anesthetic independently Endotracheal intubation, nasal and oral under difficult situations *e.g.* awake intubation, under local Anaesthesia without the use of muscle relaxants,

To obtund response to laryngoscopy.

Prevent rise in intraocular Pressure/Intracranial pressure.

Prevent hypoxia during one lung ventilation. .

Assist/ Perform

i. Blind nasal intubation.

ii. Intubation with double lumen tube.

iii. laryngoscopy and bronchoscopy using malleable fiberoptic Laryngoscope/ Bronchoscope

- Maintain airway by using Laryngeal mask airway.
- Maintain airway by using mask ventilation.
- Undertake the regional anesthesia techniques
- Assist/ Perform

  i. Recognize chronic pain syndromes and manage them.
  ii. Maintain nutrition of critically ill patients by parenteral nutrition
  iii. Central venous cannulations. iv. Cricothyroidotomy and Jet Ventilation.
  iv. Carry out cardiopulmonary cerebral resuscitation.

Knowledge and understanding of sophisticated equipment's and measurements.

An emphasis on clinical applications of clinical measurement, such as indications, practical techniques and interpretation of acquired data.

Candidates will be expected to understand the sources of error and the limitations of individual measurements.

Assessment of respiratory function including Pulmonary function tests

Assessment of cardiac function, including EKG and echocardiography

The electroencephalograph (EEG), BIS, Entropy and evoked potentials. The electromyograph (EMG) and measurement of nerve conduction Principles and practice of in vitro blood-gas measurements.

Interpretation of biochemical data

Plan anesthetic management taking into account patients' condition, surgical requirements and options available.

Manage fluid and electrolyte administration in peri-operative period.

Maintain acid-base balance in perioperative period.

Understand the indications, contraindications and complications of general Anaesthesia.

Understand the indications, contraindications and complications of subarachnoid and epidural blocks.

Recognize 'Difficult Intubation' situations and manage them.

Understand special requirements of Endoscopic / Minimal invasive surgery and meet them.

Understand the special requirements of Anaesthesia for laser surgery on the airway.

Interpretation and errors of dynamic pressure measurements including systemic, pulmonary arterial and venous pressures, intracranial, intrathoracic and intra- abdominal pressures

Methods of measurement of cardiac output and derived indices; limitations and interpretation

Principles of imaging techniques including CT, MRI and ultrasound

Interpretation and errors of capnography, oximetry and ventilatory gas analysis.

Section-3

Research and Article Writing

Section-4

Evaluation and Assessment Strategies

The purpose of the Assessment system:

The purpose of the assessment system is to:

- Enhance learning by providing formative assessment, enabling trainees to receive immediate feedback, measure their own performance and identify areas for development;
- Drive learning and enhance the training process by making it clear what is required of trainees and motivating them to ensure they receive suitable training and experience;
- Provide robust, summative evidence that trainees are meeting the curriculum standards during the training program;
- Ensure trainees are acquiring competencies within the domains of Good Medical Practice*;*
- assess trainees' actual performance in the workplace;
- Ensure that trainees possess the essential underlying knowledge required for their specialty;
- Inform the Annual Review of Competence Progression (ARCP), identifying any requirements for targeted or additional training where necessary and facilitating decisions regarding progression through the training program;
- Identify trainees who should be advised to consider changes of career direction.

The integrated assessment system

The integrated assessment system comprises a mixture of workplace-based assessments and knowledge-based assessments. Individual assessment methods are described in more detail below. The assessments will be supported by structured feedback for trainees within the training program of General Internal Medicine. Assessment tools will be both formative and summative and will be selected on the basis of their fitness for purpose. Workplace-based assessments will take place throughout the training program to allow trainees to continually gather evidence of learning and to provide formative feedback. They are not individually summative but overall outcomes from a number of such assessments provide evidence for summative decision making. The number and range of these will ensure a reliable assessment of the training relevant to their stage of training and achieve coverage of the curriculum.

Model of Assessment in DA

Rotations/placements (as given in schedule)
Multiple workplace-based assessments /360 evaluation
(Formative assessment)
End of year - continuous internal assessment (aggregates of rotations assessments)
End of year –in training theory exam (summative assessment)

Rotations/placements (as given in schedule)
Multiple workplace-based assessments /360 evaluation
(Formative assessment)
End of year - continuous internal assessment
(Aggregates of rotations assessments)
Final examination (summative assessment)

General principles

The assessment is valid, objective, and reliable.

It covers cognitive, psychomotor and affective domains.

Formative, continuing and summative (final) assessment is also conducted in theory as well as practical's/clinicals.

Formative Assessment

The formative assessment is continuous as well as end-of-term. The former is to be based on the feedback from the senior residents and the consultants concerned. End of-term assessment is held at the end of each semester (up to the 5th semester). Formative assessment will not count towards pass/fail at the end of the program, but will provide feedback to the candidate.

Internal Assessment

The performance of the Postgraduate student during the training period should be monitored throughout the course and duly recorded in the log books as evidence of the ability and daily work of the student. Marks should be allotted out of 100 as followed.

Sr. No.	Items	Marks
1.	Personal Attributes	20
2.	Clinical Work	20
3.	Academic activities	20
4.	End of term theory examination	20
5.	End of term practical examination	20

1. Personal attributes

Behavior and Emotional Stability: Dependable, disciplined, dedicated, stable in emergency situations shows positive approach.

Motivation and Initiative: Takes on responsibility, innovative, enterprising, does not shirk duties or leave any work pending.

Honesty and Integrity: Truthful, admits mistakes, does not cook up information, has ethical conduct, exhibits good moral values, loyal to the institution.

Interpersonal Skills and Leadership Quality: Has compassionate attitude towards patients and attendants, gets on well with colleagues and paramedical staff, is respectful to seniors, has good communication skills.

2. Clinical Work:

Availability: Punctual, available continuously on duty, responds promptly on calls and takes proper permission for leave.

Diligence: Dedicated, hardworking, does not shirk duties, leaves no work pending, does not sit idle, competent in clinical case work up and management.

Academic ability: Intelligent, shows sound knowledge and skills, participates adequately in academic activities, and performs well in oral presentation and departmental tests.

Clinical Performance: Proficient in clinical presentations and case discussion during rounds and OPD work up. Preparing Documents of the case history/examination and progress notes in the

file (daily notes, round discussion, investigations and management) Skill of performing bed side procedures and handling emergencies.

3. **Academic Activity:** Performance during presentation at Journal club/ Seminar/ Case discussion/ Stat meeting and other academic sessions. Proficiency in skills as mentioned in job responsibilities.

4. **End of term theory examination** conducted at end of 1st and after 9 months.

5. **End of term practical/oral examinations** after 1 year 9 months.

Marks for personal attributes and clinical work should be given annually by all the consultants under whom the resident was posted during the year. Average of the two years should be put as the final marks out of 20.

Marks for **academic activity** should be given by the all consultants who have attended the session presented by the student.

The Internal assessment should be presented to the Board of examiners for due consideration at the time of Final Examinations.

1.1 Summative Assessment

Ratio of marks in theory and practical's will be equal.

The pass percentage will be 50%

Candidate will have to pass theory and practical examinations separately.

A. Theory Examination

Title		Marks
Paper-I	Basic Sciences, Principles and practice as applied to Anesthesiology	100
Paper-ll	Clinical Sciences as applied to Anesthesiology	100
Paper-III	Recent advances in Anesthesiology, Pain, Intensive Care and Resuscitation	100
	Total	**300**

B. Practical Examination

1.	Long Case (1)	100
2.	Short Cases (2) 50 marks each	100
3.	Viva Voce	100
	Total	**300**

Stations and related oral viva (Mark 10 for each station)

1. Anaesthesia machine (knowledge of parts, 10
2. Paranesthesia checking, safety devices etc.) 10
3. Identification and checking of Breathing Circuits 10
4. Instruments 10
5. Cardiopulmonary resuscitation 10
6. Anesthetic drugs 10
7. Non-anesthetic drugs 10
8. EKG interpretation 10
9. X-rays (Chest, neck etc.) interpretation 10
10. Interpretation of Pulmonary function Tests 10
11. ABG interpretation 10

2. Job Responsibilities:

To administer Anaesthesia under supervision for surgical patients.

To assess the patients pre-operatively and advise appropriate investigations.

To look after the patients in PACU.

To provide pain relief for acute pain and chronic pain syndromes.

To provide monitoring & ventilatory care for patients in ICUs.

To provide Anaesthesia services outside the operation theatres like Endoscopy and MRI etc.

To provide resuscitation services outside the Operation Theatre**.**

Suggested Books

Wylie: - A practice of Anesthesia

Miller's Anesthesia / ed. by R D Miller New York: Churchill Livingstone, 2004 Dorsch: - Understanding Anaesthesia Equipment.

Stoelting: -Anaesthesia & Co- Existing Disease.

Lee: - A synopsis of Anaesthesia.

Recent Advances in Anaesthesia and intensive care

Oh's Intensive Care Manual / ed by A D Bersten, N Soni and T E Oh - 5 ed: Butterworth Heinemann, 2003

Nunn's Applied Respiratory Physiology / A B Lumb and J F Nunn - 6th ed - Oxford: Elsevier-Butterworth Heinemann, 2005

Pharmacology and Physiology in Anesthetic Practice / R K Stoelting and S C Hillier – 4th ed - Philadelphia: Lippincott-Raven, 2006

Textbook of Medical Physiology / A C Guyton & J E Hall - 11th ed - Philadelphia: Elsevier-Saunders, 2005

Review of Medical Physiology / W F Ganong- 22nd ed: Lange Medical Books,

2005Collins, V.J: - Physiological & Pharmacological Bases of Anaesthesia Cardiac Anaesthesia by Kaplan JA.

Scientific foundation of Anaesthesia by Scure

Intravenous Anaesthesia by Dundee Anaesthesia for the Infants by Smith.

Clinical practice of Cardiac Anaesthesia by Temple DK.

General Anaesthesia by Frankis T. Gray

Anaesthesia Equipment by Ward

Principles of Clinical Measurement by M.K. Sykes

Physics for Anesthetists by James Duffin

Anaesthesia & Uncommon Disease by Benimon JL.

Textbook of Trauma Anaesthesia & Critical Care by Grande C.M.

Neural blockade: in clinical Anaesthesia and management of pain / M J Cousins and P O Bride Baugh - 3rd ed - Philadelphia: Lippincott, 1998

Basic and Clinical Biostatistics / B Dawson-Saunders and R G Trapp – 4th ed – New York: McGraw-Hill, 2004

Statistical methods for Anaesthesia and intensive care / P S Myles and T Gin - Oxford: Butterworth-Heinemann, 2001

Anaesthesia – Analgesia

Anaesthesia -Anesthesiology

Indian Journal of Anaesthesia - British Journal of Anaesthesia

Section-6

Annexure

Annexure

Behavior and attitudes evidenced by behavior	Areas of concern			Comments • If you cannot give an opinion due to lack of knowledge of the trainee, say so here. • Comment on anything especially good. • **You must specifically comment on any concern about attitudes and/or behaviour**, and this should reflect the trainee's behaviour over time - not usually just a single incident.
Maintaining trust / professional relationships with patients • Listens. • Is polite and caring. • Shows respect for patients' opinions, dignity and confidentiality. • Is unprejudiced and dresses appropriately.				
Verbal communication skills • Gives understandable information. • Speaks good English, at the appropriate level for patients.				
Team working/working with colleagues • Respects others' roles and works constructively in the team. • Hands over effectively and communicates well. Is unprejudiced, supportive and fair.				
Accessibility • Is accessible. • Takes proper responsibility. • Only delegates appropriately. • Does not shirk duty. • Responds when called. • Arranges cover for absence.				

Anaesthetic-Clinical Evaluation Exercise (anaes-CEX)

Please complete the questions using a cross: [X] Please use CAPITAL LETTERS

Clinical setting: Theatre ☐ ICU ☐ Emergency ☐ Delivery suite ☐ Pain Clinic ☐ Other ☐

Case Category: Elective ☐ Scheduled ☐ Urgent ☐ Emergency ☐ Other ☐ ASA Class: 1 2 3 4 5 ☐☐☐☐☐

Case:

Focus of clinical encounter: History ☐ Diagnosis ☐ Management ☐ Explanation ☐

Assessor's Position: Professor ☐ Associate Professor ☐ Assistant Professor ☐ Senior Registrar ☐ Other ☐

Number of previous anaes-CEX observed by assessor with <u>any</u> trainee: 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5-9 ☐ >9 ☐

	Please grade the following areas using the scale below:	Below Expectations		Borderline	Meets Expectations	Above Expectations	
		1	**2**	**3**	**4**	**5**	**6**
1	Pre-operative assessment						
2	Patient safety						
3	Professionalism						
4	Clinical judgement						
5	Communication and generic skills						
6	Organisation and efficiency						
7	Overall clinical care						

Evidence of good practice?	**Suggestions for development**
Agreed action:	

Trainee satisfaction with aCEX 1☐ 2☐ 3☐ 4☐ 5☐ 6☐ 7☐ 8☐ 9☐ 10☐ **1** = Not at all, **10** = Highly

Assessor satisfaction with aCEX 1☐ 2☐ 3☐ 4☐ 5☐ 6☐ 7☐ 8☐ 9☐ 10☐ **1** = Not at all, **10** = Highly

Assessor's signature:

Time taken for observation (min) ☐☐

Time taken for feedback (min) ☐☐