CURRICULUM

RAWALPINDI MEDICAL UNIVERSITY

UNIVERSITY RESIDENCY PROGRAM- 2020 OF CRITICAL CARE

RAWALPINDI MEDICAL UNIVERSITY
UNIVERSITY RESIDENCY PROGRAM -2019 CURRICULUM FOR CRITICAL CARE

STATUTES

1.Nomenclature Of The Proposed Course

The name of degree program shall be MD Critical Care Medicine. This name is well recognized and established for the last many decades worldwide**.**

2.Course Title:

MD Critical Care Medicine

3. Training Centers

Departments of Critical Care MEDICINE (accredited by RMU) in affiliated departments of RMU.

Duration of Course

The duration of MD Critical Care Medicine course shall be five (5) years with structured training in a recognized department under the guidance of an approved supervisor

Admission Criteria

a. For admission in MD Critical Care Medicine course, the candidate shall be required to have:

- MBBS degree
- Completed one year House Job
- One year experience in Critical Care Medicine/Internal Medicine/Allied medical discipline in the given order of preference
- Registration with PMDC

- Passed Entry Test conducted by the University & aptitude interview by the Institute concerned

1 Having up to the mark credentials as per RMU rules (no. of attempts in each professional, any gold medals or distinctions, relevant work experience, Rural/ Army services, research experience in a recognized institution, any research article published in a National or International Journal) may also be considered on case to case basis.

2. Exemptions: A candidate holding FCPS/MRCP/Diplomate American Board/equivalent qualification in Internal Medicine shall be exempted from Part-I & Part-II Examinations and shall be directly admitted to Part-
3. Examinations, subject to fulfillment of requirements for the examination.

6. Registration and Enrollment

- Total number of students enrolled for the course must not exceed 02 per supervisor/year.
- The maximum number of trainees that can be attached with a supervisor at a given point of time (inclusive of trainees in all years/phases of MD training), must not exceed 08.
- Beds to trainee ratio at the approved teaching site shall be at least 5 beds per trainee.
- The University will approve supervisors for MD courses.
- Candidates selected for the courses after their enrollment at the relevant institutions shall be registered with RMU as per prescribed Registration Regulations.

Accreditation Related Issues of the Institution

1. Faculty

Properly qualified teaching staff in accordance with the requirements of Pakistan Medical and Dental Council (PMDC)

Adequate Space

Including class-rooms (with audiovisual aids), demonstration rooms, computer lab and clinical pathology lab etc.

Library

Departmental library should have latest editions of recommended books, reference books and latest journals (National and International).

- Accreditation of Critical Care training program can be suspended on temporary or permanent basis by the University, if the program does not comply with requirements for residents training as laid out in this curriculum.
- Program should be presented to the University along with a plan for implementation of curriculum for training of residents.
- Programs should have documentation of residents training activities and evaluation on monthly basis.

To ensure a uniform and standardized quality of training and availability of the training facilities, the University reserves the right to make surprise visits of the training program for monitoring purposes and may take appropriate action if deemed necessary

AIMS AND OBJECTIVES OF THE COURSE

AIM

The aim of five years MD program in Critical Care Medicine is to train residents to acquire the competency of a specialist in the field of Critical Care so that they can become good teachers, researchers and clinicians in their specialty after completion of their training.

GENERAL OBJECTIVES

MD Critical Care Medicine training should enable a student to:

Access and apply relevant knowledge to clinical practice:

- Maintain currency of knowledge
- Apply scientific knowledge in practice
- Appropriate to patient need and context
- Critically evaluate new technology

- Safely and effectively performs appropriate clinical skills & procedures:
  - Consistently demonstrate sound clinical skills
  - Demonstrate procedural knowledge and technical skill at a level appropriate to the level of training
  - Demonstrate manual dexterity required to carry out procedures
  - Adapt their skills in the context of each patient and procedure
  - Maintain and acquire new skills

- Approach and carries out procedures with due attention to safety of patient, self and others
- Critically analyze their own clinical performance for continuous improvement

- Design and implement effective management plans:
  - Recognize the clinical features, accurately diagnose and manage problems
  - Formulate a well-reasoned provisional diagnosis and management plan based on a thorough history and examination
  - Formulate a differential diagnosis based on investigative findings
  - Manage patients in ways that demonstrate sensitivity to their physical, social, cultural and psychological needs

    Effectively recognize and manage complications
  - Accurately identify the benefits, risks and mechanisms of action of current and evolving treatment modalities
  - Indicate alternatives in the process of interpreting investigations and in decision-making
  - Manage complexity and uncertainty
  - Consider all issues relevant to the patient
  - Identify risk

- ƒ Assess and implement a risk management plan
- ƒ Critically evaluate and integrate new technologies and techniques.

ƒ Organize diagnostic testing, imaging and consultation as needed:

- ƒ Select medically appropriate investigative tools and monitoring techniques in a cost-effective and useful manner
- ƒ Appraise and interpret appropriate diagnostic imaging and investigations according to patients' needs
- ƒ Critically evaluates the advantages and disadvantages of different investigative modalities

ƒ Communicate effectively:

- ƒ Communicate appropriate information to patients (and their family) about procedures, potentialities and risks associated, in ways that encourage their participation in informed decision making
- ƒ Communicate with the patient (and their family) the treatment options including benefits and risks of each
- ƒ Communicate with and co-ordinate health management teams to achieve an optimal patient management
- ƒ Initiate the resolution of misunderstandings or disputes
- ƒ Modify communication to accommodate cultural and linguistic sensitivities of the patient

ƒ Recognize the value of knowledge and research and its application to clinical practice:

- ƒ Assume responsibility for self-directed learning
- ƒ Critically appraise new trends in Critical Care
- ƒ Facilitate the learning of others

ƒ Appreciate ethical issues associated with Critical Care Medicine:

- ƒ Consistently apply ethical principles
- ƒ Identify ethical expectations that impact on medico-legal issues
- ƒ Recognize the current legal aspects of informed consent and confidentiality
- ƒ Be accountable for the management of their patients.

ƒ Professionalism by:

- ƒ Employing a critically reflective approach to Critical Care
- ƒ Adhering with current regulations concerning workplace harassment
- ƒ Regularly carrying out self and peer reviewed audit
- ƒ Acknowledging and have insight into their own limitations
- ƒ Acknowledging and learning from mistakes

ƒ Work in collaboration with members of an interdisciplinary team where appropriate:

- ƒ Collaborate with other professionals in the selection and use of various types of treatments assessing and weighing the indications and contraindications associated with each type
- ƒ Develop a care plan for a patient in collaboration with members of an interdisciplinary team
- ƒ Employ a consultative approach with colleagues and other professionals
- ƒ Recognize the need to refer patients to other professionals.

ƒ Management and Leadership

- ƒ Effective use of resources to balance patient care and system resources
- ƒ Identify and differentiate between system resources and patient needs
- ƒ Prioritize needs and demands dealing with limited system resources.
- ƒ Manage and lead clinical teams
- ƒ Recognize the importance of different types of expertise which contribute to the effective functioning of clinical team
- ƒ Maintain clinically relevant and accurate contemporaneous records

ƒ Health advocacy:

- ƒ Promote health maintenance of patients
- ƒ Advocate for appropriate health resource allocation

SPECIFIC LEARNING OUTCOMES

Residents completing MD Critical Care Management training will have formal instruction, clinical experience, and will be able to demonstrate competence in the evaluation and management of adult patients and applying scientific principles for the identification, prevention, treatment and rehabilitation. The diseases unique to our region or which occur predominantly in a third world setting should be appreciated and understood.

- Organization and design of ICU settings
- Critical Care Outreach and Rapid Response Systems
- Severity scoring and Outcome Prediction
- Transport of Critically Ill Patients.
- Physiotherapy in Intensive Care
- Critical Care Nursing
- Ethics in Intensive Care
- Common Problems of ICU
- Trials
- Palliative Care
- Team based Health Care Delivery
- Genetics and Sepsis
- Overview of Shock
- Hemodynamic Monitoring
- Multiorgan Dysfunction Syndrome
- Hyperlactemia in Critical Illness

- Acute Coronary Syndrome
- Cardiopulmonary Resuscitation
- Cardiac Arrythmias and Cardiac Pacing
- Acute Heart Failure and Pulmonary Hypertension
- Echocardiography in ICU
- Oxygen Therapy
- Airway Management
- Mechanical Ventilation Support
- Acute respiratory distress syndrome
- Pneumonia
- Pulmonary Embolism
- Non invasive ventilation
- Acute kidney injury
- Renal replacement therapy
- Disorders of consciousness
- Status Epilepticus
- Brain Death
- Meningitis and Encephalomyelitis
- Tetanus and delirium
- ICU acquired Weakness
- Diabetic Emergencies
- Thyroid Emergencies

- Pre-eclampsia and Eclampsia
- Obstetric Emergencies
- Sepsis and septic shock
- Nosocomial Infections
- Severe Head Injuries
- Chest Trauma
- Spinal Injuries
- Sedation and Pain Management
- Inotropes and Vasopressors
- Vasodilators and Antihypertensives
- Acid base balance disorders
- Fluid and Electrolyte Therapy
- Enteral and Parenteral Nutrition
- Critical appraisal of scientific publications, including basic research, pertinent ne
- Understand the principles of scientific research and be able to write a basic research protocol, as well as be able to conduct a scientific study.
- Active participation in relevant:
    - Congresses
    - Organized CME's
    - Academic meetings
    - Research programs

1 *THE CANDIDATE will spend first six months of induction period in the choosen specialty, during this period the candidate shall learn orientation with the discipline and introduction of fundamental concepts in basic sciences relevant to specialty*

The candidate will attend FOUR mandatory workshops. Workshops should be completed preferably within 6 months.

The candidate will submit synopsis for approval within 6 months period, according to prescribed framework. In case of failure or any difficulty faced by the candidate to submit the synopsis, should be brought to the notice of registrar.

Registrar would issue 2 fortnightly reminders to the appropriate person/forum. And in case of failure, shall bring it to the notice of VC and report to the academic council.

The candidate in MD program will be trained in internal medicine for 18 months.

THE intermediate examination will be held on completion of 2 years training of MD program

It is the responsibility of the candidate through his/her supervisor to get this synopsis approved from AS & RB WITHIN 2 years from the date of admission into training program. In case of failure in getting the synopsis approved within this time period ,an additional grace period of 30 days may be granted at the discretion of VC.

ANY DIFFICULTY FACED BY THE CANDIDATE FOR COMPLETED SUBMISSION OF SYNOPSIS MUST BE BROUGHT TO THE NOTICE OF REGISTRAR FOR REMEDIATION BEFORE COMPLETION OF 18 MONTHS FROM THE TIME OF INDUCTION.

THE REGISTRAR WOULD ISSUE 2 FORTNIGHTLY REMINDERS TO THE APPROPRIATE PERSON OR FORUM AND IN CASE OF FAILURE SHALL SUBMIT ITS REPORT TO THE ACADEMIC COUNCIL.

AFTER THE INTERMEDIATE EXAMINATION,THE CANDIDATES OF 5 YEARS PROGRAM WILL INTIATE RESEARCH PROJECT AT THE BEGINNING OF THIRD YEAR TRAINING.

THE ROTATIONAL PLACEMENTS FOR MD TRAINING PROGRAM WILL BE ACCORDING TO THE SCHEDULE OF ROTATIONS FOR EACH PROGRAM AS PRESCRIBE BY THE RESPECTIVE BOARD OF STUDIES.

THE CANDIDATE WILL ROTATE TO SUBSPECIALITIES DURING THE THIRD YEAR OF TRAINING.THERE WILL BE MINIMUN OF 2 PLACEMENTS IN THE RELEVANT FIELDS AS SPECIFIED BY THE RESPECTIVE BOARD OF STUDIES,EACH OF 3 MONTHS DURATION.

ALL ROTATIONAL PLACEMENTS MUST BE COMPLETED PRIOR TO 6 MONTHS OF COMPLETION OF TRAINING.

Intermediate examination

IMM would be conducted for candidates. It will consist of following components

WRITTEN EXAM, TOTAL MARKS=300

CLINICAL & ORAL EXAM, TOTAL MARKS=200

ELIGIBILTY CRITERIA

TO APPEAR IN INTERMEDIATE EXAMINATION, THE CANDIDATE SHALL BE REQUIRED

TO HAVE SUBMITTED CERTIFICATE OF COMPLETION OF MANDATORY WORKSHOPS

TO HAVE SUBMITTED CERTIFICATE OF COMPLETION OF FIRST TWO YEARS, TRAINING FROM SUOERVISORS DURING ROTATIONS

TO HAVE SUBMITTED CERTIFICATE OF APPROVAL OF SYNOPSIS OR UNDERTAKING OF AFFIDAVIT,THAT IF SYNOPSIS NOT APPROVED 30 DAYS OF SUBMISSION OF APPLICATION FOR INTERMEDIATE EXAMINATIONS.THE CANDIDATE WILL NOT BE ALLOWED TO TAKE EXAMINATIONS.

WRITTEN PART OF EXAMINATION

TOTAL MARKS OF WRITTEN EXAMINATION WILL BE 300 and to be divided as follows.

MCQ'S TOTAL MARKS =200

MCQ'S will be derived from different subjects as follows

For IMM in medicine and allied specialties

PRINCIPLES OF GENERAL MEDICINE=70 %

SPECIALITY SPECIFIC=10 %

BASIC SCIENCES=20%

CANDIDATE SCORING 50% MARKS IN MCQ'S PAPER WILL PASS THE WRITTEN EXAMINATION AND WILL THEN BE ELIGIBLE TO APPEAR IN THE CLINICAL AND ORAL EXAMINATION.

CLINICAL AND ORAL PART OF EXAMINATION

The clinical examination will evaluate patient care competency in detail

A panel of four examiners will be appointed by the VC.

EXAMINATION WILL BE OF 200 MARKS CONSISTING OF THE FOLLOWING COMPONENTS

A. *FOUR SHORT CASES,TOTAL MARKS=100*
B. *ONE LONG CASE,TOTAL MARKS=50*
C. *ORAL EXAMINATION,TOTAL MARKS=50*

EACH SHORT CASE WILL BE OF 7 MIN DURATION,5 MIN FOR EXAMINING THE PATIENT AND 2 MIN FOR DISCUSSION.

LONG CASE AND ORAL EXAMINATION WILL EACH BE OF 15 MIN DURATION.

THE CANDIDATE SCORING 50% MARKS IN EACH COMPONENT OF THE CLINICAL AND ORAL EXAMINATION WILL PASS THIS PART OF IMM EXAMINATION.

3. Submission / Evaluation of Synopsis

1. The candidates shall prepare their synopsis as per guidelines provided by the Advanced Studies & Research Board, available on RMU website.
2. The research topic in clinical subject should have 30% component related to basic sciences and 70% component related to applied clinical sciences. The research topic must consist of a reasonable sample size and sufficient numbers of variables to give training to the candidate to conduct research, to collect & analyze the data.
3. Synopsis of research project shall be submitted by the end of the 3rd year of MD program. The synopsis after review by an Institutional Review Committee shall be submitted to the University for consideration by the Advanced Studies & Research Board, through the Principal / Dean /Head of the institution.

4. Submission of Thesis

1. Thesis shall be submitted by the candidate duly recommended by the Supervisor.
2. The minimum duration between approval of synopsis and submission of thesis shall be one year, but the thesis cannot be submitted later than

   8 years of enrolment.
3. The research thesis must be compiled and bound in accordance with the Thesis Format Guidelines approved by the University and available on website.

4. The research thesis will be submitted along with the fee prescribed by the University.

5. Thesis Examination

1. The examination shall include thesis evaluation with defense.
2. The Vice Chancellor shall appoint three external examiners for thesis evaluation, preferably from other universities and from abroad, out of the panel of examiners approved by the Advanced Studies & Research Board. The examiners shall be appointed from respective specialty. Specialists from Internal Medicine and related fields may also be appointed/co-opted, where deemed necessary.

3. The theses shall be sent to the external examiners for evaluation, well in time before the date of defense examination and should be approved by all the examiners.

4. After the approval of thesis by the evaluators, the thesis defense examination shall be held within the University on such date as may be notified by the Controller of Examinations. The Controller of Examinations shall make appropriate arrangements for the conduct of thesis defense examination in consultation with the Supervisor, who will co-ordinate the defense examination.

5. The thesis defense examination shall be conducted by two External Examiners who shall submit a report on the suitability of the candidate for the award of degree. The supervisor shall act as coordinator.

6. Award of MD Critical Care Medicine Degree

After successful completion of the structured courses of MD Critical Care Medicine and qualifying examinations, the degree with title MD Critical Care Medicine shall be awarded.

CONTENT OUTLINE

Basic Sciences:

Student is expected to acquire comprehensive knowledge of Anatomy, Physiology, Pathology (Microbiology), Biochemistry, Pharmacology relevant to the clinical practice appropriate for Critical Care Medicine

1. Anatomy

- Cell Biology: Cytoplasm – Cytoplasmic matrix, cell membrane, cell organelles, cytoskeleton, cell inclusions, cilia and flagella.
- Nucleus – nuclear envelope, nuclear matrix, DNA and other components of chromatin, protein synthesis, nucleolus, nuclear changes indicating cell death.
- Cell cycle, mitosis, meiosis, cell renewal.
- Cellular differentiation and proliferation.
- Tissues of Body: Light and electron microscopic details and structural basis of function, regeneration and degeneration. Confocal microscopy.

The systems/organs of body – Cellular organization, light and electron microscopic features, structure function correlations, and cellular organization

Embryology

- General Features of Human Development
- Features of mitotic and meiotic modes of cell division. Genetic consequences of meiotic division.
- Abnormal mitotic and meiotic divisions of clinical importance Early Embryonic Development
- Cleavage, morula and blastocyst formation and implantation.

- Formation of the three primary germ layers.
- List of the derivatives of the respective germ layers. Period of the Growing Fetus.
- Various stages and salient features of the fetus development Extraembryonic Membranes:
- Development, functions and anomalies of yolk sac, amnion, chorion, allantois, umbilical cord and placenta.
- Development of kidney
- Urogenital sinus & its transformation
- Origin of Mullerian system
- Development/ Descent of Testis
- Endocrinological influences on male & female genitalia
- Development of adrenals
- Embryology of exstrophy, hypo / epispadias
- Teratogenesis: Factors known to be involved in the development of congenital anomalies especially related to the urological system.

Concept of critical periods

Histology:

Structural and Functional Organization of the Tissues of Body

- Classification of tissues and identification of various tissues, in routine histological preparations under the light microscope.
- The Epithelial Tissue General structure, functions and classification of epithelia
- Their location in the body
- The Connective Tissue

2. Biochemistry

- Membrane biochemistry and signal transduction
- Gene expression and the synthesis of proteins
- Bioenergetics; fuel oxidation and the generation of ATP
- Carbohydrate metabolism
- Lipid metabolism
- Nitrogen metabolism
- Enzymes and biologic catalysis
- Tissue metabolism
- Biotechnology and concepts of molecular biology with special emphasis on use of recombinant DNA techniques in medicine and the molecular biology of cancer
- General principles of biochemical investigations
- Basic techniques in molecular biology
- Cloning and gene analysis
- Immunochemical techniques
- Protein chemistry and enzymology
- Cloning & PCR
- Protein chemistry and quantification
- Electrophoretic techniques; PAGE
- Immunoblotting
- Raising and purifying antibodies
- ELISA
- Composition of intracellular and extracellular compartment fluids.
- Water and sodium balance. Role of kidney in its maintenance.
- Renal mechanism for pH regulation.

3. **Pharmacology**

- *f* The evolution of medical drugs
- *f* British pharmacopeia
- *f* Introduction to pharmacology
- *f* Receptors
- *f* Mechanisms of drug action
- *f* Pharmacokinetics
- *f* Pharmacokinetic process
- *f* Absorption
- *f* Distribution
- *f* Metabolism
- *f* Desired plasma concentration
- *f* Volume of distribution
- *f* Elimination
- *f* Elimination rate constant and half life
- *f* Creatinine clearance
- *f* Drug effect
- *f* Beneficial responses
- *f* Harmful responses
- *f* Allergic responses
- *f* Drug dependence, addiction, abuse and tolerance
- *f* Applied aspects related to pharmacokinetics
- *f* Drug therapies (including drug interactions)
- *f* Commonly used drugs
- *f* Principals and use of anti microbial therapy
- *f* Antiseptics
- *f* Drug interactions
- *f* Drug use in pregnancy and in children

5. **Pathology**

Pathological alterations at cellular and structural level in infection, inflammation, ischaemia, neoplasia and trauma affecting the ear, nose and upper respiratory tract

Cell Injury and adaptation

- *f* Reversible and Irreversible Injury
- *f* Fatty change, Pathologic calcification
- *f* Necrosis and Gangrene
- *f* Cellular adaptation
- *f* Atrophy, Hypertrophy,

Inflammation

- *f* Hyperplasia, Metaplasia, Aplasia Inflammation
- *f* Acute inflammation
- *f* Cellular components and chemical mediators of acute inflammation
- *f* Exudates and transudate
- *f* Sequelae of acute inflammation
- *f* Chronic inflammation
- *f* Etiological factors and pathogenesis
- *f* Distinction between acute and chronic (duration) inflammation
- *f* Histologic hallmarks
- *f* Types and causes of chronic inflammation, non-granulomatous & granulomatous,

Hemodynamic disorders

- *f* Etiology, pathogenesis, classification and morphological and clinical manifestations of Edema, Hemorrhage, Thrombosis, Embolism, Infarction & Hyperemia
- *f* Shock; classification etiology, and pathogenesis, manifestations.
- *f* Compensatory mechanisms involved in shock
- *f* Pathogenesis and possible consequences of thrombosis
- *f* Difference between arterial and venous emboli

Neoplasia

- Dysplasia and Neoplasia
- Benign and malignant neoplasms
- Etiological factors for neoplasia
- Different modes of metastasis
- Tumor staging system and tumor grade Immunity and Hypersensitivity
- Immunity
    - Immune response
    - Diagnostic procedures in a clinical Immunology laboratory
    - Protective immunity to microbial diseases
    - Tumor immunology
    - Immunological tolerance, autoimmunity and autoimmune diseases.
    - Transplantation immunology
    - Hypersensitivity

Immunodeficiency disorders

- Monoprophylaxis & Immunotherapy

Related Microbiology

- Role of microbes in various disorders
- Infection source
- Nosocomial infections
- Bacterial growth and death
- Pathogenic bacteria
- Vegetative organisms
- Spores
- Important viruses
- Important parasites
- Surgically important microorganisms
- Sources of infection
- Asepsis and antisepsis

- Sterilization and disinfection
- Infection prevention
- Immunization
- Personnel protection from communicable diseases
- Use of investigation and procedures in laboratory
- Basics in allergy and immunology

6. Biostatistics & Research Methodology

- Introduction to bio-statistics
- Introduction to bio- medical research
- Why research is important?
- What research to do?
  i. Selecting a field for research
  ii. Drivers for health research
  iii. Participation in national and international research
  iv. Participation in pharmaceutical company research
  v. Where do research ideas come from
  vi. Criteria for a good research topic
- Ethics in health research
- Writing a scientific paper
- Making a scientific presentation
- Searching the literature

7. Behavioral Sciences

- Bio-psycho-social (BPS) model of health care
- Use of non-medicinal interventions in clinical practice
  - Communication skills
  - Counselling
  - Informational skills
- Crisis intervention/disaster management
- Conflict resolution
- Breaking bad news

- ƒ Medical ethics, professionalism and doctor-patient relationship
  - Hippocratic oath
  - Four pillars of medical ethics (autonomy, beneficence, non-malficence and justice)
  - Informed consent and confidentiality
  - Ethical dilemmas in a doctor's life
- ƒ Delivery of culturally relevant care and cultural sensitivity
- ƒ Psychological aspects of health and disease
  - Psychological aspect of health
  - Psychological aspect of disease
  - Stress and its management
  - Psychological aspect of pain
  - Psychological aspect of aging

MD Critical Care Medicine(IMM EXAMINATION)

Resident should get exposure in the following organ and system competencies (listed below) while considering and practicing each system in terms of:-

- ƒ Medical ethics
- ƒ Professional values, student teachers relationship
- ƒ Orientation of in-patient, out-patients and Nephrological labs
- ƒ Approach to the patient
- ƒ History taking
- ƒ General physical examination
- ƒ Systemic examination
- ƒ Routine investigations
- ƒ Special investigations
- ƒ Diagnostic and therapeutic procedures

Course Contents:

1. Cardiovascular Medicine

Common and / or important Cardiac Problems:

- Arrhythmias
- Ischemic Heart Disease: acute coronary syndromes, stable angina, atherosclerosis
- Heart Failure
- Hypertension – including investigation and management of accelerated hypertension
- Valvular Heart Disease
- Endocarditis
- Aortic dissection
- Syncope
- Dyslipidemia

Clinical Science:

- Physiological principles of cardiac cycle and cardiac conduction
- Pharmacology of major drug classes: beta blockers, alpha blockers, ACE inhibitors, Angiotensin receptor blockers (ARBs), anti-platelet agents, thrombolysis, inotropes, calcium channel antagonists, potassium channel activators, diuretics, anti-arrhythmics, anticoagulants, lipid modifying drugs, nitrates, centrally acting anti-hypertensives

2. Dermatology;

Common and / or Important Problems:

- Cellulitis
- Cutaneous drug reactions
- Psoriasis and eczema
- Skin failure: e.g. erythroderma, toxic epidermal necrolysis
- Urticaria and angio-oedema

- Cutaneous vasculitis
- Herpes zoster and Herpes Simplex infections
- Skin tumors
- Skin infestations
- Dermatomyositis
- Scleroderma
- Lymphoedema

Clinical Science:

- Pharmacology of major drug classes: topical steroids, immunosuppressants

3. Diabetes & Endocrine Medicine

Common and / or Important Diabetes Problems:

- Diabetic ketoacidosis
- Non-acidotic hyperosmolar coma / severe hyperglycemia
- Hypoglycemia
- Care of the acutely ill diabetic
- Peri-operative diabetes care

Common or Important Endocrine Problems:

- Hyper/Hypocalcemia
- Adrenocortical insufficiency
- Hyper/Hyponatremia
- Thyroid dysfunction
- Dyslipidemia
- Endocrine emergencies: myxedemic coma, thyrotoxic crisis, Addisonian crisis, hypopituitary coma, phaeochromocytoma crisis

Clinical Science:

- Outline the function, receptors, action, secondary messengers and feedback of hormones
- Pharmacology of major drug classes: insulin, oral anti-diabetics, thyroxine, anti-thyroid drugs, corticosteroids, sex hormones, drugs affecting bone metabolism

4. Respiratory Medicine

Common and / or Important Respiratory Problems:

- COPD
- Asthma
- Pneumonia
- Pleural disease: Pneumothorax, pleural effusion, mesothelioma
- Lung Cancer
- Respiratory failure and methods of respiratory support
- Pulmonary embolism and DVT
- Tuberculosis
- Interstitial lung disease
- Bronchiectasis
- Respiratory failure and cor-pulmonale
- Pulmonary hypertension

Clinical Science:

- Principles of lung function measurement
- Pharmacology of major drug classes: bronchodilators, inhaled corticosteroids, leukotriene receptor antagonists, immunosuppressants

5. Allergy

Common or Important Allergy Problems

- Anaphylaxis
- Recognition of common allergies; introducing occupation associated allergies
- Food, drug, latex, insect venom allergies
- Urticaria and angioedema

Clinical Science

- Mechanisms of allergic sensitization: primary and secondary prophylaxis
- Natural history of allergic diseases
- Mechanisms of action of anti-allergic drugs and immunotherapy

- Principles and limitations of allergen avoidance

6. Hematology

Common and / or Important Problems:

- Bone marrow failure: causes and complications
- Bleeding disorders: DIC, hemophilia
- Thrombocytopenia
- Anticoagulation treatment: indications, monitoring, management of over-treatment
- Transfusion reactions
- Anemia: iron deficient, megaloblastic, hemolysis, sickle cell,
- Thrombophilia: classification; indications and implications of screening
- Hemolytic disease
- Myelodysplastic syndromes
- Leukemia
- Lymphoma
- Myeloma
- Myeloproliferative disease
- Inherited disorders of hemoglobin (sickle cell disease, thalassemia)
- Amyloid

Clinical Science:

- Structure and function of blood, reticuloendothelial system, erythropoietic tissues

7. Immunology

Common or Important Problems:

- Anaphylaxis (see also 'Allergy')

Clinical Science:

- Innate and adaptive immune responses
- Principles of Hypersensitivity and transplantation

8. Infectious Diseases

Common and / or Important Problems:

- Fever of Unknown origin
- Complications of sepsis: shock, DIC, ARDS
- Common community acquired infection: LRTI, UTI, skin and soft tissue infections, viral exanthema, gastroenteritis
- CNS infection: meningitis, encephalitis, brain abscess
- HIV and AIDS including ethical considerations of testing
- Infections in immuno-compromised host
- Tuberculosis
- Anti-microbial drug monitoring
- Endocarditis
- Common Genito-urinary conditions: non-gonococcal urethritis, gonorrhea syphilis

Clinical Science:

- Principles of vaccination
- Pharmacology of major drug classes: penicillin's, cephalosporins, tetracyclines, aminoglycosides, macrolides, sulphonamides, quinolones, metronidazole, anti-tuberculous drugs, anti-fungal, anti-malarial, anti-helminthics, anti-virials

9 Medicine in the Elderly

Common or Important Problems:

Deterioration in mobility ƒ Acute confusion

ƒ Stroke and transient ischemic attack ƒ Falls

ƒ Age related pharmacology ƒ Hypothermia

ƒ Continence problems ƒ Dementia

ƒ Movement disorders including Parkinson's disease ƒ Depression in the elderly

ƒ Osteoporosis ƒ Malnutrition ƒ Osteoarthritis *Clinical Science:*

ƒ Effects of ageing on the major organ systems ƒ Normal laboratory values in older people

9. Musculoskeletal System

Common or Important Problems:

- ƒ Septic arthritis
- ƒ Rheumatoid arthritis
- ƒ Osteoarthritis
- ƒ Seronegative arthritis's
- ƒ Crystal arthropathy
- ƒ Osteoporosis – risk factors, and primary and secondary prevention of complications of osteoporosis
- ƒ Polymyalgia and temporal arteritis
- ƒ Acute connective tissue disease: systemic lupus erythematosus, scleroderma, poly- and dermatomyositis, Sjogren's syndrome, vasculitis's

Clinical Science:

- ƒ Pharmacology of major drug classes: NSAIDS, corticosteroids, immunosuppressants, colchicine's, allopurinol, bisphosphonates

11. Neurology

Common or Important Problems:

- ƒ Acute new headache
- ƒ Stroke and transient ischemic attack
- ƒ Subarachnoid hemorrhage
- ƒ Coma
- ƒ Central Nervous System infection: encephalitis, meningitis, brain abscess
- ƒ Raised intra-cranial pressure

- ƒ Sudden loss of consciousness including seizure disorders (see also above syncope etc)
- ƒ Acute paralysis: Guillain-Barré, myasthenia gravis, spinal cord lesion
- ƒ Multiple sclerosis
- ƒ Motor neuron disease

Clinical Science:

- ƒ Pathophysiology of pain, speech and language
- ƒ Pharmacology of major drug classes: anxiolytics, hypnotics inc. benzodiazepines, antiepileptics, anti-Parkinson's drugs (anti-muscarinic, dopaminergic)

12. Psychiatry

Common and / or Important Problems:

- ƒ Suicide and parasuicide
- ƒ Acute psychosis
- ƒ Substance dependence

Depression

Clinical Science:

- ƒ Principles of substance addiction, and tolerance
- ƒ Pharmacology of major drug classes: anti-psychotics, lithium, tricyclic antidepressants, mono-amine oxidase inhibitors, SSRIs, venlafaxine,

donepezil, drugs used in treatment of addiction (bupropion, disulphiram, acamprosate, methadone)

13. Cancer and Palliative Care

Common or Important Nephrology Problems:

- ƒ Pain: appropriate use, analgesic ladder, side effects, role of radiotherapy
- ƒ Constipation

- Breathlessness
- Nausea and vomiting
- Anxiety and depressed mood

Clinical Science:

- Principles of oncogenesis and metastatic spread
- Apoptosis
- Principles of staging
- Principles of screening
- Pharmacology of major drug classes in palliative care: anti-emetics, opioids, NSAIDS, agents for neuropathic pain, bisphosphonates, laxatives, anxiolytics

Investigation Competencies

Outline the Indications for, and Interpret the Following Investigations:

- Basic blood biochemistry: urea and electrolytes, liver function tests, bone biochemistry, glucose, magnesium
- Inflammatory markers: CRP / ESR

Procedural Competencies

- The trainee is expected to be competent in performing the following procedures by the end of core training. The trainee must be able to outline the indications for these interventions. For invasive procedures, the trainee must recognize the indications for the procedure, the importance of valid consent, aseptic technique, safe use of local anesthetics and minimization of patient discomfort.
- Airway Management and Endotracheal Intubation.
- Central Venous Catheters
- Pulmonary Artery Catheters.
- Cardioversion and Defibrillation.
- Pericardiocentesis.
- Chest tube insertion and care.

- Bronchoscopy
- Thoracentesis

Tracheostomy

Diagnostic Peritoneal Lavage

Placement of Feeding Tube

Cerebrospinal Fluid Aspiration

Neurological and Intracranial Pressure Monitoring

Anesthesia For Bedside Procedures.

Routine and Cardiorespiratory Monitoring in ICU Settings

Interventional Ultrasound in ICU

Echocardiography in ICU

Arterial Puncture for Blood Gas Analysis

Percutaneous Suprapubic Cystostomy

Specialty training in Critical Care Medicine

Specific Program Content

1. Specialized training in Critical Care Medicine
2. Compulsory rotations
3. Research & thesis writing
4. Maintaining of Log-book

METHODS OF INSTRUCTION/COURSE CONDUCTION

As a policy, active participation of students at all levels will be encouraged.

Following teaching modalities will be employed:

1. Lectures
2. Seminar Presentation and Journal Club Presentations
3. Group Discussions
4. Grand Rounds
5. Clinic-pathological Conferences
6. SEQ as assignments on the content areas
7. Skill teaching in ICU settings
8. Attend genetic clinics and rounds for at least one month.
9. Attend sessions of genetic counseling
10. Self study, assignments and use of internet.
    Long and short case presentations

In addition to the conventional teaching methodologies interactive strategies like conferences will also be introduced to improve both communication and clinical skills in the upcoming consultants. Conferences must be conducted regularly as scheduled and attended by all available faculty and residents. Residents must actively request autopsies and participate in formal review of gross and microscopic pathological material from patients who have been under their care. It is essential that residents participate in planning and in conducting conferences.

1. Clinical Case Conference

Each resident will be responsible for at least one clinical case conference each month. The cases discussed may be those seen on either the consultation or clinic service or during rotations in specialty areas. The resident, with the advice of the Attending Physician on the Consultation Service, will prepare and present the case(s) and review the relevant literature.

2. Monthly Student Meetings

Each affiliated medical college approved to conduct training for MD Nephrology will provide a room for student meetings/discussions such as:

a. Journal Club Meeting
b. Core Curriculum Meetings
c. Skill Development

a. Journal Club Meeting

A resident will be assigned to present, in depth, a research article or topic of his/her choice of actual or potential broad interest and/or application.

Two hours per month should be allocated to discussion of any current articles or topics introduced by any participant. Faculty or outside researchers will be invited to present outlines or results of current research activities. The article should be critically evaluated and its applicable results should be highlighted, which can be incorporated in clinical practice. Record of all such articles should be maintained in the relevant department.

b. Core Curriculum Meetings

All the core topics of Nephrology should be thoroughly discussed during these sessions. The duration of each session should be at least two hours once a month. It should be chaired by the chief resident (elected by the residents of the relevant discipline). Each resident should be given an opportunity to brainstorm all topics included in the course and to generate new ideas regarding the improvement of the course structure

c. Skill Development

Two hours twice a month should be assigned for learning and practicing clinical skills.

List of skills to be learnt during these sessions is as follows:

1. Residents must develop a comprehensive understanding of the indications, contraindications, limitations, complications, techniques, and interpretation of results of those technical procedures integral to the discipline (mentioned in pg. 34-35).
2. Residents must acquire knowledge of and skill in educating patients about the technique, rationale and ramifications of procedures and in obtaining procedure-specific informed consent. Faculty supervision of residents in their performance is required, and each resident's experience in such procedures must be documented by the program director.

3. Residents must have instruction in the evaluation of medical literature, clinical epidemiology, clinical study design, relative and absolute risks of disease, medical statistics and medical decision-making.
4. Training must include cultural, social, family, behavioral and economic issues, such as confidentiality of information, indications for life support systems, and allocation of limited resources.
5. Residents must be taught the social and economic impact of their decisions on patients, the primary care physician and society. This can be achieved by attending the bioethics lectures and becoming familiar with Project Professionalism Manual such as that of the American Board of Internal Medicine.
6. Residents should have instruction and experience with patient counseling skills and community education.
7. This training should emphasize effective communication techniques for diverse populations, as well as organizational resources useful for patient and community education.
8. Residents may attend the series of lectures on Nuclear Medicine procedures (radionuclide scanning and localization tests and therapy)
9. Residents should have experience in the performance of clinical laboratory and radionuclide studies and basic laboratory techniques, including quality control, quality assurance and proficiency standards.
10. Each resident will observe and participate in each of the procedures (pg.34-35) , preferably done on patients firstly under supervision and then independently.

3. Annual Grand Meeting

Once a year all residents enrolled for MD Nephrology should be invited to the annual meeting at RMU .

One full day will be allocated to this event. All the chief residents from affiliated institutes will present their annual reports. Issues and concerns related to their relevant courses will be

discussed. Feedback should be collected and suggestions should be sought in order to involve residents in decision making.

The research work done by residents and their literary work may be displayed.

In the evening an informal gathering and dinner can be arranged. This will help in creating a sense of belonging and ownership among students and the faculty.

LOG BOOK

The residents must maintain a log book and get it signed regularly by the supervisor. A complete and duly certified log book should be part of the requirement to sit for MD examination. Log book should include adequate number of diagnostic and therapeutic procedures observed and performed, the indications for the procedure, any complications and the interpretation of the results, routine and emergency management of patients, case presentations in CPCs, journal club meetings and literature review.

Proposed Format of Log Book is as follows:

Candidate's Name: ----------

Supervisor ----------

Roll No. ----------

The procedures shall be entered in the log book as per format

Residents should become proficient in performing the related procedures (pg.12,13,46,47). After observing the technique, they will be observed while performing the procedure and, when deemed competent by the supervising physician, will perform it independently. They will be responsible for obtaining informed consent, performing the procedure, reviewing the results with the pathologist and the attending physician and informing the patient and, where appropriate, the referring physician of the results.

Procedures Performed

Sr.#	Date	Name of Patient, Age, Sex & admission no	Diagnosis	Procedure performed	Supervisor's signature
1.					
2.					
3.					
4.					

Nephrological Emergencies Handled

Sr.#	Date	Name of Patient, Age, Sex & admission no	Diagnosis	Procedure performed	Supervisor's signature
1.					
2.					
3.					
4.					

Case Presented

Sr.#	Date	Name of Patient, Age, Sex & admission no	Diagnosis	Procedure performed	Supervisor's signature
1.					
2.					
3.					
4.					

Seminar/Journal Club Presentation

Sr#	Date	Topic	Supervisor's Signature
1.			
2.			
3.			
4.			

Evaluation Record

(Excellent, Good, Adequate, Inadequate, Poor)

At the end of the rotation, each faculty member will provide an evaluation of the clinical performance of the fellow.

Sr #	Date	Method of Evaluation (Oral, Practical, Theory)	Rating	Supervisor's Signature
1.				
2.				
3.				
4.				

EVALUATION & ASSESSMENT STRATEGIES

Assessment

It will consist of action and professional growth oriented ***student-centered integrated assessment*** with an additional component of ***informal internal assessment, formative assessment*** and measurement-based ***summative assessment.***

Student-Centered Integrated Assessment

It views students as decision-makers in need of information about their own performance. Integrated Assessment is meant to give students responsibility for deciding what to evaluate, as well as how to evaluate it, encourages students to **'own'** the evaluation and to use it as a basis for self-improvement. Therefore, it tends to be growth-oriented, student-controlled, collaborative, dynamic, contextualized, informal, flexible and action-oriented.

In the proposed curriculum, it will be based on:

- Self-Assessment by the student
- Peer Assessment
- Informal Internal Assessment by the Faculty

Self Assessment by the Student

Each student will be provided with a pre-designed self-assessment form to evaluate his/her level of comfort and competency in dealing with different relevant clinical situations. It will be the responsibility of the student to correctly identify his/her areas of weakness and to take appropriate measures to address those weaknesses.

Peer Assessment

The students will also be expected to evaluate their peers after the monthly small group meeting. These should be followed by a constructive feedback according to the prescribed guidelines and should be non-judgmental in nature. This will enable students to become good mentors in future.

Informal Internal Assessment by the Faculty

There will be no formal allocation of marks for the component of Internal Assessment so that students are willing to confront their weaknesses rather than hiding them from their instructors.

It will include:

a. Punctuality
b. Ward work
c. Monthly assessment (written tests to indicate particular areas of weaknesses)
d. Participation in interactive sessions

Formative Assessment

Will help to improve the existing instructional methods and the curriculum in use

Feedback to the faculty by the students:

After every three months students will be providing a written feedback regarding their course components and teaching methods. This will help to identify strengths and weaknesses of the relevant course, faculty members and to ascertain areas for further improvement.

Summative Assessment

It will be carried out at the end of the program to empirically evaluate **cognitive, psychomotor** and **affective domains** in order to award degrees for successful completion of course.

MD Critical Care Medicine EXAMINATION

Thesis Examination **200 Marks**

All candidates admitted in MD courses shall appear in Part-III thesis examination at the end of 5th calendar year of the MD program and not later than 8th calendar year of enrolment. The examination shall include thesis evaluation with defense

Suggested Reading and Methods of Teaching

- Oh's Intensive Care Manual
  8th Edition

  Andrew D.Breten

  Jonathan M.Handy

- The Washington Manual Of Critical Care
  3rd Edition

  Marin H.Kollef

  Warren Isakow

- The ICU Book
  4th Edition

  P.Marino

- Manual of Critical Care
  Irvin and Ripple

- Fimk Textbook of Critical Care Medicine

- Self Assessment in Adults Multi professional Critical Care
  7th Edition

  Sergio L. Zanotti-Cavazzoni

- M.C.Q's in Intensive Care Management
  Steve Benington
- Up-To-Date as Reference

FORMATS

To achieve the Training Program's overall goals in providing quality training in patient care, teaching and research, several venues are utilized.

A. One-on-one teaching

This is traditionally the core of the learning process. It is carried out on a daily basis both in the clinical and research settings.

B. Guided readings

These include the following standard texts of Critical Care Medicine;

C Independent reading

Other texts and journals, as well as bibliographic search capabilities is available in the RMU, the department of Critical Care Medicine Library and the individual Medical College Libraries.

D. Teaching

Teaching is a very effective way of learning. As such, the trainees have ample opportunities to teach in the training Program. The trainees are responsible for the daily bedside teaching of medical students and residents attending Intensive Care Units Rotations.

Evaluation

Learning goals are established by the attending at the beginning of the rotation and reviewed on a monthly or as needed basis. Face-to-face feedback by the consultant provided at middle of each rotation i. e. at 3 monthly intervals.

Written evaluations:

Written evaluations, forms provided by the RMU, of each trainee should be done at the end of each rotation and discussed by the evaluating

Consultant. This will provide an opportunity to identify weaknesses and strengths. A copy of these evaluations should be provided to the trainee as well as the RMU Education Department.

Attendance of the weekly conferences should be provided to the RMU each month.

Log Book:

A log book should be filled by the trainee and duly signed by the consultant authorizing the performance of the procedure. The log should include the name of the patient, Date of the Procedure, complications and name of the consultant Physician.