

بِسْمِ اللّٰهِ الرَّحْمٰنِ الرَّحِیْمِ



CURRICULUM / STATUTES/ REGULATIONS

FOR 5 YEARS MD PULMONOLOGY

Faisalabad Medical University

Faisalabad

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Section A

VISION STATEMENT:

Faisalabad Medical University has been established since 05-05-2017 for purpose of imparting better medical education and encouraging and arranging extensive research and publication in the field of medical science. The vision of university is:

“Striving to achieve national and international stature in undergraduate and postgraduate medical education with strong emphasis on professionalism, leadership, community health services, research and bioethics”

MISSION STATEMENT

The mission of the University is:

“Educate Healthcare professionals to prevent, diagnose and treat human illnesses to practice evidence-based medicine with focus on lifelong healthcare in order to meet the challenges of community needs and competitive medical profession at the same time”

4. **Mandatory Workshops** throughout the course of programme will be conducted. The basic workshops will be attended by all trainees from all specialties and will be evenly distributed throughout the course:

1. **Communication skills**
2. **Research synopsis and thesis writing skills**
3. **Basic Biostatistics and Research Methodology**
4. **Information Technology Skills**
5. **Initial Life Support (ILS)**

At the end of each workshop, assessment will be done regarding the workshop and certificates will be issued to passing trainees only. The workshops will be conducted by the University and will be paid as in all post-graduate programmes and supervised by the department of Medical Education, FMU, Faisalabad. The trained certified coaches/teachers will be invited and they will get incentive from the university. All the interested trainers will contact the department for inclusion in trainers list.

Feedback of the facilitators will be recorded for the continuation of the process. Medical education department will issue yearly planner for these workshops in the light of curriculum document. University will certify it.

The course is structured in three parts:

Part I: Candidate will start his/her training in Pulmonology department from 1st day till 6 months. Candidate will gain basic knowledge of the selected specialty i.e., anatomy, physiology and orientation to the subject, basic principles, history taking and case presentation, inpatient and out-patient care. During this time the candidate will select a topic for synopsis, complete his/her synopsis and will attend the mandatory workshops.

Part II: From 6 months till 2 years, he/she will do a rotational training in General medicine under a supervisor allocated in medical department. The candidate shall undertake clinical training in fundamental concepts of general medicine from 6 months till 2 years. During this period, the candidate must submit the synopsis for approval. At the end of 2nd year, the Intermediate examination shall be held in fundamental concepts of General Medicine. The clinical training in Pulmonology shall be rejoined from 3rd year onwards in Pulmonology department.

Part III is structured for 3rd, 4th and 5th calendar years in MD Pulmonology. The candidate shall undergo training to achieve educational objectives of MD Pulmonology along with rotation in relevant fields.

Section B:

Admission Criteria

Central induction Policy as per Government rules

Registration and Enrollment

The number of PG Trainees and Beds to trainee ratio at the approved teaching site will be as per policy of Pakistan Medical & Dental Council

The University will approve supervisors for MD Pulmonology.

Candidates selected for the courses after their selection and enrollment shall be registered with FMU as per prescribed Registration Regulation.

Accreditation Related Issues of The Institution

A. Faculty

Properly qualified teaching staff in accordance with the requirements of Pakistan Medical and Dental Council (PMDC). Supervisors will be decided by the university according to the set standards and rules.

B. Adequate resources

The university will provide adequate resources Including class-rooms (with audiovisual aids), demonstration rooms, computer lab, clinical pathology lab, theaters, instruments

and other equipment etc. for proper Training of the residents as per their course outcomes and objectives.

C. Library

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

Freezing of Program & leave Rules:

Freezing of training, Maternity leave, Ex Pakistan Leave and Extra Ordinary Leave etc. would be allocated through the Office of Dean Postgraduate to the competent authority.

Section C:

AIMS AND OBJECTIVES OF THE COURSE

AIM

The aim of five years MD Pulmonology programme in pulmonology is to train residents to acquire the competency of a specialist in the relevant field so that they can become good clinicians, teachers, researchers and community health provider in their specialty after completion of their training according to the global standards.

LEARNING OBJECTIVES:

GENERAL OBJECTIVE

MD Pulmonology 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 perform 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 pulmonary 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
 - . Recognize disorders of the pulmonary system and differentiate those amenable to medical treatment
 - . 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
 - . Assess and implement a risk management plan
 - . Critically evaluate and integrate new technologies and techniques.
 - . Organize diagnostic testing, imaging and consultation as needed:
 - . Select medically appropriate investigative tools and monitoring techniques in a cost-effective and useful manner
 - . Appraise and interpret appropriate diagnostic imaging and investigations according to patients' needs
 - . Critically evaluates the advantages and disadvantages of different investigative modalities
- . Communicate effectively:

- . Communicate appropriate information to patients (and their family) about procedures, potentialities and risks associated with surgery in ways that encourage their participation in informed decision making
 - . Communicate with the patient (and their family) the treatment options including benefits and risks of each
 - . Communicate with and co-ordinate health management teams to achieve an optimal surgical environment
 - . Initiate the resolution of misunderstandings or disputes
 - . Modify communication to accommodate cultural and linguistic sensitivities of the patient
- .Recognize the value of knowledge and research and its application to clinical practice
 - . Assume responsibility for self-directed learning
 - . Critically appraise new trends in Pulmonology
 - . Facilitate the learning of others
 - . Appreciate ethical issues associated with Pulmonology:
 - . Consistently apply ethical principles
 - . Identify ethical expectations that impact on medico-legal issues
 - . Recognize the current legal aspects of informed consent and confidentiality
 - . Be accountable for the management of their patients. Professionalism by:
 - . Employing a critically reflective approach to Pulmonology
 - . Adhering with current regulations concerning workplace harassment
 - . Regularly carrying out self and peer reviewed audit
 - . Acknowledging and have insight into their own limitations
 - . Acknowledging and learning from mistakes
 - . Work in collaboration with members of an interdisciplinary team where appropriate:
 - . 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

- . Develop a care plan for a patient in collaboration with members of an interdisciplinary team
- . Employ a consultative approach with colleagues and other professionals
- . Recognize the need to refer patients to other professionals.
- . Management and Leadership
- . Effective use of resources to balance patient care and system resources
- . Identify and differentiate between system resources and patient needs
- . Prioritize needs and demands dealing with limited system resources.
- . Manage and lead clinical teams
- Recognize the importance of different types of expertise which contribute to the effective functioning of clinical team

SPECIFIC LEARNING OUTCOMES

Residents completing MD Pulmonology 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 of following acute and chronic pulmonary disorders:

CONTENT OUTLINE OF MD PULMONOLOGY PROGRAMME

Basic Sciences:

Student is expected to acquire comprehensive knowledge of Physiology, Pathology (Microbiology), Pharmacology relevant to the clinical practice appropriate for Pulmonology.

1.PHYSIOLOGY

Cellular organization, structure function correlations and physiological alterations in the respiratory systems of body

- . Regulation of respiration
- . Mechanics of Ventilation
- . Respiratory circulation
- . Inhalation kinetics
- . Gas transport & gas exchange
- . Respiratory adjustments in health, disease & exercise
- . Lung compliance & airway resistance
- . Physiology of oxygen therapy
- . Acid base balance, fluid & electrolytes
- . Respiratory defences
- . Metabolic functions & Surfactant
- . Respiratory changes in muscular exercise
- . Hypoxia, cyanosis, anoxia, asphyxia, dyspnea, collapse of the lung
- . Artificial respiration
- . Therapeutic uses of oxygen
- . Effects of respiration on circulation
- . ABG Interpretation

- . Pulmonary function tests. Basic Principles
- . Advanced Principles & Clinical Application
- . Cardiac physiology for pulmonologists
- . Properties of cardiac muscle
- . Origin and propagation of cardiac impulse
- . The cardiac cycle
- . The heart sounds.
- . Regulation of cardiac function.
- . The special excitatory and conductive system of the heart and abnormalities of the cardiac rhythms
- . Brief description of normal and abnormal ECG
- . 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
- 2. Pharmacology**
- . 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

- . The Evolution of Medical Drugs
- . British Pharmacopia
- . Pharmacokinetic Processes
- . Pharmacodynamic Process
- . Drug Effect
- . Beneficial Responses
- . Harmful Responses
- . Allergic Responses
- . Drug Dependence, Addiction, Abuse and Tolerance
- . Drug Interactions
- . Drugs used in cardio-respiratory diseases
- . Oxygen therapy
- . Inhalation kinetics & Aerosol / medical gases / humidification therapy
(includes their physical, chemical & pharmacological aspects)
- . Steroids therapy
- . Antibiotics therapy
- . Bronchodilator therapy. Anti tuberculosis therapy
- . Cancer chemotherapy

3. Pathology

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

Cell Injury and adaptation

- . Reversible and Irreversible Injury
- . Fatty change, Pathologic calcification
- . Necrosis and Gangrene
- . Cellular adaptation
- . Atrophy, Hypertrophy,
- . Hyperplasia, Metaplasia, Aplasia

Inflammation

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

Haemodynamic disorders

- . Etiology, pathogenesis, classification and morphological and clinical manifestations of Edema, Hemorrhage, Thrombosis, Embolism, Infarction & Hyperemia

- . Shock; classification etiology, and pathogenesis, manifestations.

- . Compensatory mechanisms involved in shock

- . Pathogenesis and possible consequences of thrombosis

- . 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

- . Immunoprophylaxis & Immunotherapy

Related Microbiology

- . Role of microbes in various respiratory disorders

- . Infection source
- . Nosocomial infections
- . Bacterial growth and death
- . Pathogenic bacteria
- . Vegetative organisms
- . Spores
- . Important viruses
- . Important parasites
- . **Sources of infection**
- . Asepsis and antisepsis
- . Infection prevention
- . Immunization
- . Personnel protection from communicable diseases
- . Use of investigation and procedures in laboratory
- . Basics in allergy and immunology

- . Intrathoracic airways obstruction (asthma, chronic bronchitis, emphysema)
- . Extra-thoracic airways obstruction (fixed, variable)
- . Restrictive ventilatory defects (pulmonary fibrosis, diseases of the chest wall, neuromuscular disorders)
- . Allergy & lung
- . Bronchial asthma
- . Chronic obstructive pulmonary diseases
- . Lung injury
- . Adult respiratory distress syndrome (ARDS)
- . Systemic diseases & lung
- . Congenital anomalies in lung

- . Tumors
- . Pulmonary tuberculosis
- . Pulmonary embolism and infarction
- . Bronchiectasis
- . Occupational lung disease (pneumoconioses, asbestosis, farmers lung, asthma, extrinsic allergic alveolitis)
- . Pleural tumours
- . Pleural infection
- . Empyema
- . SARS and other infectious pulmonary disorders
- . Congenital anomalies and esophageal cancers
- . Stricture esophagus
- . Achalasia cardia
- . Mediastinal infections
- . Tumors in mediastinum
- . Thymus tumors
- . Cardiac disease (secondary to lung disease and hypertension; secondary to left ventricular failure or mitral stenosis)
- . Pericardial infections and tamponade.
- . Hypoxemia (ventilatory failure, v/q inequality, anatomical shunts)
- . Hypercapnia (disorders of the respiratory center, respiratory nerves and muscles, disorders of the chest wall, airways and lung parenchyma)
- . Hyperventilation (acidemia, psychogenic)

Basic Principles of Internal Medicine

After initial 6 months of Induction, the resident will start training in basic Principles of Internal Medicine for 18 months. Resident should get exposure in the following organ and system competencies (listed below) while considering and practicing each system in terms of: -

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

Course Contents:

. Cardiovascular Medicine

Common and / or important Cardiac Problems:

- . Arrhythmias

- . Ischaemic 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
- . **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 tumours
- . Skin infestations
- . Dermatomyositis
- . Scleroderma
- . Lymphoedema

Clinical Science:

- . Pharmacology of major drug classes: topicalsteroid immunosuppressants

. Diabetes & Endocrine Medicine

Common and / or Important Diabetes Problems:

- . Diabetic ketoacidosis
- . Non-acidotic hyperosmolar coma / severe hyperglycaemia
- . Hypoglycaemia
- . Care of the acutely ill diabetic

- . Peri-operative diabetes care

Common or Important Endocrine Problems:

- . Hyper/Hypocalcaemia
- . Adrenocortical insufficiency
- . Hyper/Hyponatraemia
- . Thyroid dysfunction
- . Dyslipidemia.

Endocrine emergencies: myxedemic coma, thyrotoxic crisis, Addisonian crisis, hypopituitary coma, pheochromocytoma 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

. **Gastroenterology and Hepatology**

Common or Important Problems:

- . Peptic Ulceration and Gastritis
- . Gastroenteritis
- . GI malignancy (oesophagus, gastric, hepatic, pancreatic, colonic)
- . Inflammatory bowel disease
- . Iron Deficiency anaemia
- . Acute GI bleeding

- . Acute abdominal pathologies: pancreatitis, cholecystitis, appendicitis, leaking abdominal aortic aneurysm
- . Functional disease: irritable bowel syndrome, non-ulcer dyspepsia
- . Coeliac disease
- . Alcoholic liver disease
- . Alcohol withdrawal syndrome
- . Acute liver dysfunction: jaundice, ascites, encephalopathy
- . Liver cirrhosis
- . Gastro-oesophageal reflux disease
- . Nutrition: indications, contraindications and ethical dilemmas of nasogastric feeding and EG tubes, IV nutrition, re-feeding syndrome
- . Gall stones
- . Viral hepatitis
- . Auto-immune liver disease
- . Pancreatic cancer

Clinical Science:

- . Laboratory markers of liver, pancreas and gut dysfunction
- . Pharmacology of major drug classes: acid suppressants, anti-spasmodic, laxatives, anti-diarrhea drugs, amino salicylates, corticosteroids, immunosuppressants, infliximab, pancreatic enzyme supplement

. Renal Medicine

Common and / or Important Problems:

- . Acute renal failure
- . Chronic renal failure
- . Glomerulonephritis
- . Nephrotic syndrome
- . Urinary tract infections
- . Urinary Calculus
- . Renal replacement therapy
- . Disturbances of potassium, acid/base, and fluid balance (and appropriate acute interventions)

Clinical Science:

- . Measurement of renal function
- . Metabolic perturbations of acute, chronic, and end-stage renal failure and associated treatments

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, immunosuppressant

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

Haematology

Common and / or Important Problems:

- . Bone marrow failure: causes and complications
- . Bleeding disorders: DIC, haemophilia
- . Thrombocytopenia
- . anticoagulation treatment: indications, monitoring, management of over-treatment
- . Transfusion reactions
- . Anaemia: iron deficient, megaloblastic, haemolysis, sickle cell,
- . Thrombophilia: classification; indications and implications of screening
- . Haemolytic disease
- . Myelodysplastic syndromes
- . Leukaemia
- . Lymphoma
- . Myeloma
- . Myeloproliferative disease
- . Inherited disorders of haemoglobin (sickle cell disease, thalassaemias)
- . Amyloid

Clinical Science:

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

Immunology

Common or Important Problems:

- . Anaphylaxis (see also 'Allergy')

Clinical Science: Innate and adaptive immune responses

- . Principles of Hypersensitivity and transplantation

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
gonorrhoea, syphilis

Clinical Science:

- . Principles of vaccination
- . Pharmacology of major drug classes: penicillins, cephalosporins, tetracyclines, aminoglycosides, macrolides, sulphonamides, quinolones, metronidazole, anti-tuberculous drugs, anti-fungals, anti-malarials, anti-helminthics, anti-virals

Medicine in the Elderly

Common or Important Problems:

- . Deterioration in mobility
- . Acute confusion
- . Stroke and transient ischaemic attack
- . Falls
- . Age related pharmacology

- . Hypothermia
- . Contenance problems
- . Dementia
- . Movement disorders including Parkinson's disease
- . Depression in the elderly
- . Osteoporosis
- . Malnutrition. Osteoarthritis

Clinical Science:

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

Musculoskeletal System

Common or Important Problems:

- . Septic arthritis
- . Rheumatoid arthritis
- . Osteoarthritis

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

Clinical Science:

- . Pharmacology of major drug classes: NSAIDS, corticosteroids, immunosuppressants, colchicines, allopurinol, bisphosphonates

Neurology

Common or Important Problems:

- . Acute new headache
- . Stroke and transient ischaemic attack
- . Subarachnoid haemorrhage

- . Coma
- . Central Nervous System infection: encephalitis, meningitis, brain abscess
- . Raised intra-cranial pressure
- . Sudden loss of consciousness including seizure disorders (see also above syncope etc)
- . Acute paralysis: Guillian-Barré, myasthenia gravis, spinal cord lesion
- . Multiple sclerosis
- . Motor neuron disease

Clinical Science:

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

Psychiatry

Common and /or Important Problems:

- . Suicide and parasuicide

- . Acute psychosis
- . Substance dependence
- . Depression

Clinical Science:

- . Principles of substance addiction, and tolerance
- . 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)

Cancer and Palliative Care

Common or Important Oncology Problems:

- . Hypercalcemia
- . SVC obstruction
- . Spinal cord compression
- . Neutropenic sepsis
- . Common cancers (presentation, diagnosis, staging, treatment principles): lung, bowel, breast, prostate, stomach, oesophagus, bladder)

Common or Important Palliative Care Problems:

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

Clinical Genetics

Common and / or Important problems:

- . Down's syndrome
- . Turner's syndrome
- . Huntington's disease
- . Haemochromatosis
- . Marfan's syndrome
- . Klinefelter's syndrome
- . Familial cancer syndromes
- . Familial cardiovascular disorders

Clinical Science:

- . Structure and function of human cells, chromosomes, DNA, RNA and cellular proteins
- . Principles of inheritance: Mendelian, sex-linked, mitochondrial
- . Principles of pharmacogenetics
- . Principles of mutation, polymorphism, trinucleotide repeat disorders
- . Principles of genetic testing including metabolite assays, clinical examination and analysis of nucleic acid (e.g. PCR)

Clinical Pharmacology

Common and / or Important problems:

. Corticosteroid treatment: short and long-term complications, bone protection, safe withdrawal of corticosteroids, patient counselling regarding avoid adrenal crises

. Specific treatment of poisoning with:

. Aspirin,

. Paracetamol

. Tricyclic anti-depressants

. Beta-blockers

. Carbon monoxide

. Opiates

Digoxin

Benzodiazepines

Clinical Science:

- . Drug actions at receptor and intracellular level
- . Principles of absorption, distribution, metabolism and excretion of drugs
- . Effects of genetics on drug metabolism
- . Pharmacological principles of drug interaction
- . Outline the effects on drug metabolism of: pregnancy, age, renal and liver impairment

Investigation Competencies

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Outline the Indications for, and Interpret the Following Investigations:

- . Basic blood biochemistry: urea and electrolytes, liver function tests, bone biochemistry, glucose, magnesium
- . Cardiac biomarkers and cardiac-specific troponin
- . Creatine kinase
- . Thyroid function tests
- . Inflammatory markers: CRP / ESR
- . Arterial Blood Gas analysis

- . Cortisol and short Synacthen test
- . HbA1C
- . Lipid profile
- . Amylase
- . Full blood count
- . Coagulation studies
- . Haemolysis studies
- . D dimer
- . Blood film report
- . Blood / Sputum / urine culture
- . Fluid analysis: pleural, cerebro-spinal fluid, ascitic
- . Urinalysis and urine microscopy
- . Auto-antibodies
- . Chest radiograph
- . Abdominal radiograph

- . Joint radiographs (knee, hip, hands, shoulder, elbow, dorsal spine, ankle)
- . ECG
- . Peak flow tests
- . Full lung function tests

More Advanced Competencies;

- . Viral hepatitis serology
- . Stool testing
- . HIV testing
- . Ultrasound
- . Detailed imaging: Barium studies, CT, CT pulmonary angiography, high resolution CT, MRI
- . Echocardiogram
- . 24-hour ECG monitoring
- . Ambulatory blood pressure monitoring
- . Exercise tolerance test
- . Cardiac perfusion scintigraphy

- . Tilt testing
- . Neurophysiological studies: EMG, nerve conduction studies, visual and auditory evoked potentials
- . Bone scan

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.

- . Venipuncture
- . Cannula insertion, including large bore
- . Arterial blood gas sampling
- . Lumbar Puncture
- . Pleural tap and aspiration
- . Intercostal drain insertion: Seldinger technique
- . Ascitic tap
- . Abdominal paracentesis

- . Central venous cannulation
- . Initial airway protection: chin lift, Guedel airway, nasal airway, laryngeal mask
- . Basic and, subsequently, advanced cardiorespiratory resuscitation
- . Bronchoscopy
- . Cytology: pleural fluid, ascitic fluid, cerebro-spinal fluid, sputum
- . DC cardioversion
- . Urethral catheterization
- . Nasogastric tube placement and checking
- . Electrocardiogram
- . Temporary cardiac pacing by internal wire or external pacemaker

Specialty training in Pulmonology

Specialized training in Pulmonology

- . Diagnosis & evaluation
- . History & examination
- . Symptoms & signs in respiratory medicine

. Diagnostic approach to common respiratory problems (dyspnea, hemoptysis, chest pain, etc)

. Imaging in respiratory diseases e.g. chest x-ray, CT scan & ultrasound, MRI, PET scan & nuclear medicine

. **Pulmonary function tests and Spirometry**

Static lung volumes

Diffusion capacity

Bronchoprovocation Tests

Cardiopulmonary exercise testing

Six minutes' walk test

Impairment & disability assessment

. **Pleural procedures**

Pleural aspiration

Pleural biopsy

Intercostal drainage

Pleuroscopy

.Bronchoscopy & associated procedures

Obstructive lung diseases

- . Approach to a patient with obstructive &/ or bullous diseases
- . COPD
- . Chronic bronchitis. Emphysema
- . Asthma (Incl. Occupational / exercise / drug induced, ABPA)
- . Bronchiectasis & cystic fibrosis
- . Upper & central airways diseases

Occupational disorders

- . General principles
- . Asbestos-related lung disease
- . Coal workers lung disease
- . Occupational asthma
- . Byssinosis
- . Industrial bronchitis

- . Chronic beryllium and hard metal lung disease
- . Toxic inhalation
- . Miscellaneous

Environmental disorders

- . Air pollution
- . Pulmonary disorders related to high altitude
- . Diving injuries
- . Air embolism
- . Thermal lung injury
- . Acute smoke inhalation

Drug induced lung disorders

- . Diseases due to non-chemotherapeutic agents
- . Diseases due to chemotherapeutic agents

Interstitial & inflammatory lung diseases

- . An overview of interstitial lung diseases

- . Systemic sarcoidosis
- . Idiopathic pulmonary fibrosis
- . Hypersensitivity pneumonitis
- . Radiation pneumonitis
- . Eosinophilic pneumonias
- . Pulmonary manifestations of collagen vascular disorders
- . OthersDepositional & infiltrative disorders
- . Pulmonary histiocytosis X
- . Pulmonary lymphangiomyomatosis and tuberous sclerosis
- . In born errors of metabolism and lungs

Alveolar disorders

- . Alveolar haemorrhage syndrome
- . Pulmonary alveolar proteinosis

Disorders of pulmonary circulation

- . Pulmonary hypertension
- . Cor-pulmonale
- . Pulmonary thromboembolism
- . Pulmonary oedema/ ARDS
- . Pulmonary vasculitis
- . Pulmonary AV malformations

Disorders of pleural space

- . Pleural effusions
- . Pneumothorax
- . Pleural tumors

Tuberculosis (TB) and Opportunistic diseases

- . Causes of TB and other opportunistic mycobacterial diseases
- . Multi-drug resistant TB

- . Investigation including imaging and use of various pleural biopsy techniques, skin tests and gamma interferon tests
- . Differential diagnosis of TB and opportunistic mycobacterial diseases
- . Treatment and management of patients with
- . Infection control
- . Tuberculin skin testing
- . Role of appropriate tests in diagnosis
- . Pulmonary disease in the immuno-compromised host
- . HIV/AIDS
- . Transplant patients
- . Patients on immunosuppressive drugs
- . Immunodeficiency patients.
- . Causes of immuno-compromise in patients.
 - Causes of lung disease in immuno-compromised patients
- . Investigation of lung disease in immuno-compromised patients
- . Differential diagnosis of lung disease in immuno-compromised patients

- . Other lung tumors
- . Extra-pulmonary manifestations of lung tumors

Acute respiratory failure

- . Lung failure
- . Systemic inflammatory response and multiple organ dysfunction syndrome
- . Acute respiratory failure in surgical patient
- . Respiratory distress syndrome in newborn
- . Nutrition in respiratory failure
- . Oxygen therapy & oxygen utility
- . Upper airways management (intubation)
- . Mechanical ventilation

Respiratory manifestations of extra-pulmonary disorders

- . Cardiac diseases
- . Renal diseases

- . Abdominal diseases
- . Hematologic diseases. Endocrine diseases
- . Obstetric & gynecologic diseases
- . Transplant & immunodeficiency disorders (HIV)
- . Paediatric aspects of pulmonology

Haemodynamics & respiratory monitoring

Critical care situation

- . Sedation & analgesia in ICU
- . Infectious diseases of lungs (pulmonary TB, pneumonia, viral & fungal infection etc)
- . Ethics in critical care situation
- . Prevention, palliation & pulmonary rehabilitation
- . Intensive care medicine
- . Advanced airway & ventilator management

- . Care of the patient on ventilator
- . Cardiovascular problems in ICU
- . Renal, fluid & electrolyte problems & acid base balance in ICU
- . Infectious disease problems in ICU

Procedures in critical care medicine

- . Airway management & intubation
- . Central venous catheter
- . Arterial line placement & care
- . Tracheostomy
- . Cardiopulmonary resuscitation

Section D:

PROGRAMME FORMAT

A summary of 5 years MD Pulmonology programme is as under:

During first 2 years of MD Pulmonology:

Principles of internal medicine, Relevant basic sciences (physiology, pathology, pharmacology)

During 2- 5 years of training:

Clinical component: Training in Pulmonology with compulsory rotations

Research component: Research work, thesis must be completed and submitted at least 6 months prior to the end of training.

Rotations:

Clinical rotation name	Duration	Placement during the training
Cardiology	1 month	After 2 years and before the end of

Oncology/ Radiotherapy	1 month	training
ICU	2 months	
Thoracic Radiology	1 month	
Thoracic Surgery	1 month	

Section E:

Assessment Plan:

Program duration	Course contents	Assessment method
At the end of 2 nd year of program	<ol style="list-style-type: none">1. Revision of core MBBS component including basic and clinical components.2. Basic knowledge and Acquiring skill related to the specialty according to the objectives made.1. First 2 mandatory Workshops as described in course outline.3. Submission of synopsis	<p>Intermediate Examination: to be taken by university. It will include:</p> <ol style="list-style-type: none">a) Written=300b) TOACS/ OSCE /LONG CASE/ SHORT CASE=300 <p>Total Marks =600</p>
At the end of	<ol style="list-style-type: none">1. Training to act as an individual while managing patient or	<p>Final Examination to be</p>

4 th /5 year	<p>performing any task as defined by the objectives.</p> <ol style="list-style-type: none"> 2. Training to act as a teacher, researcher, leader and a player in a team. 3. Overall development of a health care professional with all the set competencies of the Program. 4. All the mandatory and specialty oriented workshops to be completed as mentioned in the curriculum 5. Rotations as described in the curriculum completed 6. Thesis completion and submission 	<p>conducted by university.</p> <p>It will include:</p> <ol style="list-style-type: none"> a) Written=300 b) TOACS/OSCE/LONG CASE/SHORT CASE=300 c)Continuous internal assessment=100 <p>Thesis evaluation =300</p> <p style="text-align: center;">Total marks=600+100+300= 1000</p>
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Components of Mid-term Examination

- Written: Total Marks =300
- Clinical, TOACS/OSCE = 300
- **Total = 600**

Components of Final Examination:

- Written: 300 Marks
- Clinical, TOACS/OSCE = 300 Marks
- Continuous internal assessment =100
- Thesis Evaluation = 300 Marks

Total = 1000 Marks

Intermediate Examinations:

Intermediate examination would be conducted for the candidate getting training, at the end of 2nd calendar year of the program.

Eligibility Criteria:

1. Candidate remained on institution roll during the period approved for appearing in examination.
2. Certificate of completion of mandatory workshops.
3. Completion of Log book signed by supervisor/concerned Head of Department.
4. Certificate of submission of Ethical Review Committee approved synopsis to the university if required as per rules of synopsis submission.
5. Evidence of payment of examination fee as prescribed by the University from time to time.
6. Certificates submitted through Principal/Dean/Head of academic institution shall be accepted as valid towards the candidature of an applicant.
7. submission of application for the examination and the conduct of examination.

Intermediate Examination Schedule and Fee:

- a) Intermediate Examination at completion of two years training, will be held twice a year.
- b) There will be a minimum period of 30 days between submission of application for the examination and the conduction of examination.
- c) Examination fee will be determined periodically by the University.
- d) The examination fee once deposited cannot be refunded / carried over to the next examination under any circumstances.
- e) The Controller of Examinations will issue Roll Number Slips on receipt of prescribed application form, documents satisfying eligibility criteria and evidence of payment of examination fee.

Written Examination:

The written examination will consist of 100 single best answer type Multiple Choice Questions. Each correct answer in the multiple-choice question paper will carry 02 marks. The short essay question will be clinical scenario or practice based, and each question will carry 10 marks.

The marks of written exam will be divided as follows:

- MCQs (single best type) = 200 Marks, 2 marks each. No negative marking
- SEQ (10 marks) =100

Declaration of Results

The candidates scoring 60% marks in the written examination will be considered pass and will then be eligible to appear in the clinical and oral examination.

Clinical, TOACS/OSCE:

The clinical and TOAC/OSCE & Oral examination will evaluate patient care competencies in detail,

The examination will be of 300 total marks consisting of the following components

Clinical, TOACS/OSCE = Total Marks 300

a) 2 short Cases = 100 marks

b) 1 Long Case = 100 marks

c) TOACS/OSCE & ORAL =100 marks (10 stations with 10 marks each)

- Each short case will be of 10 minutes duration, 05 minutes will be for examining the patient and 05 minutes for discussion.
- The long case and oral examination will each be of 30 minutes duration.

Declaration of Results

- A student scoring 60% in long case, 60% in short cases and 60% in TOACS/OSCE will be considered pass in the examination. 60 percent in written (combined MCQs and SEQs) will be declared successful.
- A maximum total of four attempts (availed or unavailed) will be allowed in the Intermediate Examination during which the candidate will be allowed to continue his training program. If the candidate fails to pass his Intermediate Examination within the above-mentioned limit of four attempts, the candidate shall have to take the entire Intermediate examination including written examination again.

Final Examination

(at the end of 5th Calendar year of the programme)

Eligibility Criteria:

To appear in the Final Examination the candidate shall be required:

1. Result card showing that the candidate has passed the Intermediate Examination.
2. Certificate of completion of 5 Years training duly signed by Supervisor, Head of parent Department and that of the Head of Department where rotations were done.
3. Evidence of thesis submission to Department of Examination of the University.
4. Evidence of payment of examination fee as prescribed by the university from time to time.
5. The examination fee once deposited cannot be refunded / carried over to the next examination under any circumstances.

6. Candidate remained on institution roll during the period required for appearing in examination.
7. Only those certificates, submitted through Principal/Dean/Head of academic institution shall be accepted.

Final Examination Schedule and Fee:

- a) Final examination will be held twice a year i.e. at least six months apart.
- b) Examination fee will be determined and varied at periodic intervals by the University.
- c) The examination fee once deposited cannot be refunded / carried over to the next examination under any circumstances.
- d) The Controller of Examinations will issue an Admittance Card with a photograph of the candidate on receipt of prescribed application form, documents satisfying eligibility criteria and evidence of payment of examination fee. This card will also show the Roll Number, date / time and venue of examination.

Written Part of Final Examination

a) The written examination will consist of 100 single best answer type Multiple Choice Questions (MCQs) and 10 Short Essay Questions (SEQs). Each correct answer in the Multiple-Choice Question paper will carry 02 marks. Each Short Essay Question will carry 10 marks. b) The Total Marks of the Written Examination will be 300 and to be divided as follows:

- Multiple Choice Question paper Total Marks = 200
- Short Essay Question paper Total Marks = 100

- **Total=300**

Paper 1

- MCQs 100 (2marks each)

Paper 2

- SEQs 10 (10 marks each)
 - a. Paper 1 shall comprise of hundred (100) "single best answer" type Multiple Choice Questions. Each Question shall carry 02 marks.
 - b. Paper 2 shall comprise of ten (10) Short Essay Questions, each carrying 10 marks.

Declaration of Results

- c. The candidates scoring 60% marks in aggregate of Paper 1 and Paper 2 of the written examination will be declared pass and will become eligible to appear in the Clinical Examination.

Clinical, TOACS/OSCE:

- a) The Clinical Examination will consist of 04 short cases, 01 long case and TOACs/OSCE with 01 station for a pair of Internal and External Examiner. Each short case will be of 10 minutes duration, 05 minutes will be for examining the patient and 05 minutes for discussion.

b) The Total Marks of Clinical and TOACs/OSCE & Oral will be 300 and to be divided as follows:

- 4 Short Cases (25 each) Total Marks = 100
- 1 Long Case Total Marks = 100
- TOACS/OSCE & ORAL Total Marks = 100

Total= 300

Declaration of Results

- A student scoring 60% in long case, 60% in short cases and 60% in TOACS/OSCE will be considered pass in the examination.
- Candidate, who passes written examination, shall be allowed a maximum of Three available attempts within two years to pass Clinical/Oral examination. However, in case of failure to pass Clinical examination within stipulated attempts the credit of passing the written examination shall stand withdrawn and candidate shall have to take entire examination including written examination, afresh.
- The candidate who has completed his/her training with all requirements mentioned in curriculum shall appear in final exam within 8 years at least once (from the time of induction). Failure to comply with this, the matter will be referred to the competent authority through proper channel for final decision

Synopsis and Thesis Writing:

Thesis writing must be completed and thesis be submitted at least 6 months before the end of final year of the program.

Thesis evaluation & defense will be carried out at the end of 5th calendar year of MD Pulmonology

Submission / Evaluation of Synopsis

- a) The candidates shall prepare their synopsis as per guidelines provided by the Advanced Studies & Research Board, available on the university website.

- b) 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.

- c) Synopsis of research project shall be got approved by the end of the 2nd year of MS/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.

Submission and evaluation of Thesis Evaluation (300 Marks)

1. The Thesis shall be submitted to the Controller of Examination through Head of Institute, duly signed by the Supervisor, Co-Supervisor(s) and Head of the Department.
2. Submission of Thesis is a prerequisite for taking Final Theory Examination.

3. Examiners shall be appointed by the Vice chancellor on recommendation of Controller of Examination from a panel approved by Advance Studies & Research Board for evaluation of thesis.
4. All MD thesis shall be evaluated by two examiners, one internal and one external (The supervisor must not be the evaluator)
5. Thesis defense shall be held after approval of evaluation reports by Advanced Studies & Research Board.
6. Thesis defense shall be conducted by the examiners who evaluated Thesis of the candidate.
7. The candidate scoring 60% marks in Thesis defense examination will be declared as pass in the examination.

Continuous Internal assessment

It will consist of professional growth oriented student-centered integrated assessment with an additional component of formative assessment and measurement-based summative assessment

Attendance

- Students joining postgraduate training program shall work as full-time residents during the duration of training and maximum 2 leaves are allowed in one month, and should take full responsibility and participation in all facets of the educational process. The period of training for obtaining degrees shall be four completed years.

Presentations

- In addition to the conventional teaching methodologies interactive strategies will also be introduced to improve both clinical and

communication skills in the upcoming consultants. Presentations must be conducted regularly as scheduled and attended by all available faculty and residents. As a policy, active participation of the postgraduate resident will be encouraged. Proper written feedback will be given for these presentations and that will be a part of Resident's Portfolio as well. Reflection of the events to be written by the residents as well and must be included in their portfolios.

Task evaluation

- This competency will be learned from journal clubs, review of literature, policies and guidelines, audit projects, medical error investigations, root cause analysis and awareness of healthcare facilities. Active participation and ability to fulfill given tasks will be encouraged. Written feedback must be given and documented to be included in portfolio

Continuous Internal Assessment format (100 Marks)

1. The award of continuous internal assessment shall be submitted confidentially in a sealed envelope.
2. The supervisor shall submit cumulative score of internal assessment of all training years to be added together to provide a final cumulative score of Continuous Internal Assessments of all the trainees to the Head of the Department/ Dean of Post Graduate studies.
3. The Head of Department/ Dean shall submit the continuous internal assessment score through the Principal/ Registrar office to the Examination Department of the University. Score of continuous internal assessment once submitted shall be final and cannot be changed subsequently under any circumstances.
4. The weightage of internal assessment in the final examination will be 10%.

Section K

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