NEPHROLOGY

Residency Training Program
Leading to the degree of

MD NEPHROLOGY

SHAHEED ZULFIQAR ALI BHUTTO MEDICAL UNIVERSITY
ISLAMABAD

CURRICULUM

MD NEPHROLOGY

CURRICULUM DEVELOPMENT COMMITTEE

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Note: This is an evolving document and new changes will be done as per requirements/ needs of the newly developed MD Nephrology program to make it at par with HEC/ international requirements

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ROAD MAP OF MD Nephrology
(A Brief Summary)

University offers a 06 year MD program in the field of Nephrology. This program intends to attract candidates that have an interest in Nephrological diseases, pathologies and related research methodologies. The curriculum focuses on formal teaching & training as well as practical fieldwork.

This MD Nephrology program aims to train and equip the post-graduate students with all the necessary knowledge & skills, at par with international standards, required to be a leader in the field of Nephrologysurgery. The candidates, upon graduation, will be expected to demonstrate a high level of expertise in the field of Nephrology.

COURSE DESCRIPTION:

A total of one hundred and twenty eight (146) credit hours of instruction and supervised activities are distributed over six years academic period. This comprises approximately 1834 contact hours of instruction including formal didactic, clinical, research and laboratory experience.

MD Nephrology program will comprise of 6 years.
Induction into program will be done as per University regulations after passing he university MD Part 1 (Medicine and Allied) and interview.

- 2 years in Internal medicine
- Mid Term Assessment (MTA) Examination
- 4 years in structured training in Nephrology including rotations
    - 4 Years in Nephrology
    - 1 Year Mandatory Rotations
        - General Medicine……..6 months
        - Urology & transplantation ……3 months
        - Radiology…..3 months
    - Optional Rotations
        - MICU…..2months
        - Cardiology….1 month
        - Neurology……1 month
        - Gastroenterology….1 month
        - Pulmonology…….1 month
- Synopsis ……. First 6 months into nephrology training Before IMM
- Research…… 6 months
- Thesis submission

- Defense of Thesis
- Final Examination
    - Written Examination
    - Long and Short Cases
    - OSCE
    - Award of MD Nephrology Degree

Requirements of MD Nephrology Degree

- Fulfillment of University requirements for postgraduate study.
- Six (6) years of consecutive full time advanced study and clinical training.
- Complete and approved master's thesis based on original research during the course of study in an area related to specialty, suitable for publication in a reputable dental journal.
- Must complete all didactic & clinical work in the required curriculum and satisfactorily pass all the University examinations.
- A minimum of 60% must be earned in all work/examinations attempted in the master's program. A grade below this will require re-examination.

A complete road map for postgraduate MS/MD/MDS can be seen on University website at http://www.szabmu.edu.pk/content/downloads/road-map-for-postgraduate-residents.pdf

INTRODUCTION

INTRODUCTION

The residency program in Nephrology is a six-year course covering all aspects of Nephrological diseases and leading to the degree of MD Nephrology.

This curriculum has been developed on the basis of SPICES model which is indicative of the competencies required at the varying levels of training within the specialty together with the knowledge, skills and attitudes achieved by the trainee in acquiring those competencies. The training has been based on the current thinking and the requirements for

- Greater protection of the public interest by providing clear information as to the level of training achieved.
- Improved access to specialty training than general practitioners.
- Greater flexibility of training through the availability of multiple instructors.
- Producing a competent workforce with the appropriate skills and knowledge necessary to meet the varying levels of treatment complexity, as well as considering the relative need and demand of potential patients.
- Acquire the experience to carry out research projects, critically evaluate scientific publications and communicate clinical and research papers in journals and conferences.

RATIONALE

RATIONALE:

Need of program

This training program is structured keeping in view the need of the society. Following needs are identified through formal and informal discussion with the stakeholders.

- Deficiency of the quality health care providers to public especially in remote areas in the field of Nephrology.
- Dearth deficiency of competent faculty in the field.
- Deficiency of state of the art Nephrology unit.

Purpose of training

The purpose of this curriculum is to guide the training of an individual to the core level of competence required for specialist and consultant. This training will produce consultant who are specialists in their field.

Context of Training

To provide an organized educational program with guidance and supervision, a structured training program will be followed so that each trainee is exposed to different aspects of the subject and acquires special knowledge and skill as expected in this program. The training will provide a basis for the candidate to develop into a lifelong learner who is capable of self-reflection and self-directed learning. It will provide a basis for further ongoing development in the field.

Duration of training

The program leading to MD Nephrology will be of 06 years full time.

AIMS & OBJECTIVES

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Aims of Training

The aim of six years MD program in Nephrology is to train residents to acquire the competency of a specialist in the field of Nephrology so that they can become good teachers, researchers and clinicians in their specialty having requisite knowledge, attitude and skills after completion of their training.

GENERAL OBJECTIVES

MD Nephrology 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 Nephrological 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 nervous 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 patients

- Recognize the value of knowledge and research and its application to clinical practice:
    - Assume responsibility for self-directed learning
    - Critically appraise new trends in Nephrology
    - Facilitate the learning of others
- Appreciate ethical issues associated with Nephrology:
    - 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 Nephrology
    - 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

Health advocacy:

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

Learning Objectives

On completion of training, the trainee will be able to achieve following aptitudes.

Knowledge

- Demonstrate knowledge of clinical aspects of basic sciences as applied to Nephrology.
- Demonstrate knowledge of the etiology, pathology and clinical presentations of Nephrological diseases.
- Demonstrate knowledge of the impact of systemic diseases on nervous system.

Attitude

- Demonstrate a professional and ethical approach to patient care.
- Demonstrate a professional attitude to all the members of the team.
- Demonstrate full and clear understanding of equality and diversity legislation as it applies to the workplace and to professional practice.

Skill

- Take history and conduct clinical examination and investigations that allow collection of information needed to evaluate the patients with Nephrological diseases.
- Determine the differential, provisional and definitive diagnosis by interpreting and correlating findings from the history, clinical &

radiographic examination together with other diagnostic tests.

- Devise treatment plans specific to the needs and expectations of individual patients.
- Demonstrate competency in teaching methods, use of information technology, appraisal and assessment techniques and development of appropriate learning methods for lifelong learning.
- Show evidence of ability to undertake research.

ENTRY CRITERIA

ENTRY CRITERIA:

Eligibility to apply for MD Nephrology

- Candidate must possess MBBS or equivalent degree and one year house job from PMDC recognized Institutions.
- Permanent valid registration with PM&DC.
- Declared successful in MD Part-I for University programs.
- In case of foreign candidate, valid registration with Medical Council of their country of origin must be produced.

Required Documents

Attested photo copies of the following documents must be attached with application form:

- Computerized National Identity Card (CNIC)
- Domicile certificate
- Matric/O Level, FSc/A Level, Certificates or equivalent
- MBBS degree with detail marks certificates of all professional
- MBBS Attempts certificates of all professional
- NEB pass certificate (for foreign graduates)
- House Job certificates
- PMDC valid permanent registration certificate
- MD Part-I passing certificate
- Experience Certificates (if any)
- Migration Certificate (To be produced at the time of admission)

Admission Procedure

- Details of admission procedure is available on university website at http://www.szabmu.edu.pk/admission/postgraduate-admission

CONTENT OF LEARNING:

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The program outline addresses both the knowledge needed in Nephrology and allied medical specialties in its scope. A minimum of six years of formal training through a graded system of education as specified will equip the trainee with knowledge, skill and attitude at its completion to be able to practice basic medicine and Nephrology competently.

The topics are considered as under:-

Basic Sciences:
Student is expected to acquire comprehensive knowledge of Physiology, Pathology, Pharmacology relevant to the clinical practice appropriate for Nephrology

1. Physiology

- Functional anatomy of kidney, nephron-structure, parts, function, types.
- Juxtaglomerular apparatus: autoregulation, peculiarities, measurements.
- Renal circulation: Auto regulation, peculiarities, and measurement
- Glomerular filtration: filtration barrier, forces governing filtration, measurement.
- Tubular functions: re-absorption, secretion, Tm values
- Regulation of ECF-volume, osmolality and electrolytes
- Micturition
- Renal function tests, renal clearance, abnormal constituents of urine
- Excretory functions of skin
- Control of water balance & fluid compartments
- Acid base balance
- Oedema & lymphatic function in renal disease
- Calcium metabolism
- Testicular function Spermatogenesis & Endocrine
- Renal & Suprarenal Endocrines
- Physiology of Bladder-innervation
- Clinical and applied physiology

- 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 extraceliular compartment fluids.
- Water and sodium balance. Role of kidney in its maintenance.
- Renal mechanism for pH regulation.

2. **Pharmacology**

- The evolution of medical drugs
- British pharmacopeia
- Introduction to pharmacology
- Receptors
- Mechanisms of drug action
- Pharmacokinetics
- Pharmacokinetic process
- Absorption
- Distribution

- Metabolism
- Desired plasma concentration
    - ■ Volume of distribution
    - ■ Elimination
- Elimination rate constant and half life
- Creatinine clearance
- Drug effect
- Beneficial responses
- Harmful responses
- Allergic responses
- Drug dependence, addiction, abuse and tolerance
- Applied aspects related to pharmacokinetics
- Drug therapies of renal failure (including drug interactions)
    - Commonly used drugs (anti-hypertensive, anti-diabetic drugs, diuretics
      etc.)
    - Principals and use of anti microbial therapy
    - Antiseptics
    - Drug interactions
    - Dialysis
    - Drug use in pregnancy and in children
    - Renal toxicity and medication

3. **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
- Reversible and Irreversible Injury
- Fatty change, Pathologic calcification
- Necrosis and Gangrene
- Cellular adaptation
- Atrophy, Hypertrophy,
- Hyperplasia, Metaplasia, Aplasia
- 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, Haemorrhage, Thrombosis, Embolism, Infarction & Hyperaemia
- 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
- Tumour immunology

- Immunological tolerance, autoimmunity and autoimmune diseases.
- Transplantation immunology
- Hypersensitivity
- Immunodeficiency disorders
- Immunoprophylaxis & Immunotherapy

Related Microbiology

- Role of microbes in various urological 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

Special Pathology

- Discuss the pathogenesis, clinical course, and outcome of post - streptococcal and crescentic glomerulonephritis.
- Discuss three causes of the nephrotic syndrome.
- Recognize the gross and most important microscopic characteristics of various types of acute glomerulonephritis.
- Compare the pathology and clinical symptoms of acute and chronic pyelonephritis.
- Compare glomerulonephritis and pyelonephritis.

- Describe the pathology and clinical features of renal cell carcinoma, Wilms' tumor, and transitional cell carcinoma of the renal pelvis and bladder.
- Glomerulonephritis, pyelonephtitis, renal cell carcinoma, bladder transitional cell carcinoma.

Basic Principles of Internal Medicine

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 Nephrological labs
- Approach to the patient
- History taking
- General physical examination
- Systemic examination
- Routine investigations

Course Contents:

1. 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
- Dyslipidaemia
- *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, erthryoderma, 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: topical steroids, immunosuppressants

3. 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
    - Dyslipidaemia
    - Endocrine emergencies: myxoedemic 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. Haematology

Common and / or Important Problems:

- Bone marrow failure: causes and complications
- Bleeding disorders: DIC, haemophilia
- Thrombocytopaenia
- 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

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, 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

9. Medicine in the Elderly

Common or Important Problems:

- Deterioration in mobility.
- Acute confusion

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- Stroke and transient ischaemic attack
- Falls
- Age related pharmacology
- Hypothermia

Continence 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

10. 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, vasculitides

Clinical Science:

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

11. 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-Barre, myasthenia gravis, spinal cord lesion
• Multiple sclerosis
• Motor neuron disease

Clinical Science:

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

12. Psychiatry

Common and /or Important Problems:

■ Suicide and parasuicide
• Acute psychosis
• Substance dependence
• Depression

• 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, disulpharam, acamprosate, methadone)

13. Cancer and Palliative Care

Common or Important Nephrology Problems:

• Hypercalcaemia
• 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

fit

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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, opioicls,

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

■ Arterial Blood Gas analysis

■ Cortisol and short Synacthen test

HbA1C

■ Lipid profile

- Amylase
- Full blood count

■ Coagulation studies

■ Haemolysis studies

- ❑ dimer

■ Blood film report

- Blood / Stool / urine culture
- Fluid analysis: peritoneal, ascitic
- Abdominal and pelvic radiograph

More Advanced Competencies;

■ Viral hepatitis serology

- HIV testing
- Ultrasound

■ Detailed imaging: Barium studies, CT, CT Gastroenterological angiography,

high resolution CT, MRI

Ambulatory blood pressure monitoring

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 anaesthetics and minimization of patient discomfort.

- Venepuncture
- Cannula insertion, including large bore
- Ascitic tap and aspiration
- Abdominal paracentesis
- Central venous cannulation
- Basic and, subsequently, advanced cardiorespiratory resuscitation
- Urethral catheterization

Specialty training in Nephrology

Specific Program Content

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

Specialized training in Nephrology can be divided into the following:

A. General Nephrology
B. Dialysis and Extracorporeal Therapy
C. Renal Transplantation
D. Ambulatory Services [Out-Patient Clinic]
E: Electives
F . Technical and Other Skills
G. Research opportunities

General Nephrology

1. Disorders of mineral metabolism, including nephrolithiasis, osteoporosis and renal osteodystrophy
2. Disorders of fluid, electrolyte, and acid-base balance
3. Acute renal failure

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4.Chronic Kidney Disease and its management by conservative and nutrition methods
5. End-stage renal disease
6. Hypertensive disorders
7. Renal disorders of pregnancy
8. Urinary tract infections
9. Tubulointerstitial renal diseases, including inherited diseases of transport, cystic diseases, and other congenital disorders
10. Glomerular and vascular diseases, including the glomerulonephritides, diabetic nephropathy, renovascular disease and microvascular syndromes
11. Malignancy related to the Kidneys
12. Disorders of drug metabolism, adjustment of medications according to the GFR and renal drug toxicity.

Dialysis and Extracorporeal Therapy

Each trainee will be exposed to dialysis and extracorporeal therapies. During this rotation, the trainee evaluates all initial consults when hemodialysis is considered even if it is not imminent, supervised by the dialysis consultant of the month. The clinical experience includes:

1. Evaluation and selection of patients for acute hemodialysis or continuous renal replacement therapies.

2. Evaluation of end-stage renal disease patients for various forms of therapy and their instruction regarding treatment options. The plan for access placement and evaluation.
3. Drug dosage modification during dialysis and other extracorporeal therapies.
4. Evaluation and management of medical complications in patients during and between dialysis and other extracorporeal therapies, including dialysis access and an understanding of their pathogenesis and prevention.
5. Long-term follow-up of patients undergoing chronic dialysis, including their dialysis prescription and modification and assessment of adequacy of dialysis. 6. An understanding of the principles and practice of peritoneal dialysis, including the establishment of peritoneal access, the principles of dialysis catheters and how to choose appropriate catheters.
7. An understanding of the technology of peritoneal dialysis, including the use of cyclers.

8. Assessment of peritoneal dialysis efficiency, using peritoneal equilibration testing and the indications and interpretation of peritoneal biopsy.
9. An understanding of how to write a peritoneal dialysis prescription and how to assess peritoneal dialysis adequacy.
10. The pharmacology of commonly used medications and their kinetic and dosage alteration with peritoneal dialysis.
11. An understanding of the complications of peritoneal dialysis, including peritonitis and its treatment, exit site and tunnel infections and their management, hernias, pleural effusions, and other less common complications and their management.
12. An understanding of the special nutritional requirements of the hemodialysis and peritoneal dialysis patient.

Renal Transplantation:

The trainee will be part of the Transplantation service to include transplant

- donor and recipient evaluation, hospital admission of patients receiving

transplants or those with transplants who are suffering from acute or chronic complications, as well as the outpatient management of patients post -transplant. Each trainee will have two rotations 6 months and three months respectively. The trainee is trained in the pre and post transplant management and follow up of patients. During the rotation, the trainee attends out -patient transplant clinics weekly and participates in management decisions. This transplant experience includes the following:

1. Evaluation and selection of transplant candidates.
2. Preoperative evaluation and preparation of transplant recipients.
3. Observation of at least 3 renal transplant surgeries. Immediate postoperative management of transplant recipients including administration of immunosuppressive drugs.
4. Clinical diagnosis and management of all forms of acute and chronic rejection including laboratory, histopathologic and imaging techniques.
5. Recognition and medical management of the surgical and non surgical complications of transplantation.

6. Long-term follow-up of transplant donors and recipients in the out patient clinic.

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Ambulatory Renal Service:

The trainee will spend one-half day each week in the ambulatory practice setting, seeing the entire spectrum of out-patient nephrology. The trainee will evaluate the patients and formulate plans and will discuss the case with the consultant physician. The trainee is responsible for communicating with referral physicians and for longitudinal follow-up of these patients when appropriate. This rotation will expose trainee to:

1. Evaluation and management of patients with hematuria and proteinuria
2. Evaluation and management of the complicated hypertensive patients
3. Management of patients with chronic renal failure
4. Evaluation and management of patients with nephrolithiasis
5. Evaluation of patients for transplantation
6. Transplant donor evaluations
7. Management of patients following renal transplantation

CI)

Electives

2 Electives of 2 weeks each will be provided to the trainee during the General Nephrology Rotation in the second and the 4th Years of training, to spend in:

1. Pediatrics : If specialty clinic for pediatrics is available in the pediatrics department.

2, Radiology: This elective should be structured with the Department of Radiology. During this elective, the trainee will attend the various renal - focused procedures and the interpretation sessions.

3. Pathology: This rotation involves supervised training in the preparation and processing of renal tissues, and in the interpretation of the material by light or electron microscopy. During the elective, the trainee presents the pathology findings during the weekly pathology conference.

Technical and Other Skills trainee will be provided hands on training, including the indications, contraindications, complications, and interpretation of results of the following procedures:

1. Urinalysis: Perform a dipstick urinalysis and prepare urine sediment for microscopy
2. Percutaneous biopsy of native and transplanted kidneys
3. Peritoneal dialysis

4. Placement of temporary vascular access (subclavian, femoral or internal jugular) for hemodialysis and related procedures.
5. Acute and chronic hemodialysis
6. Placement of peritoneal catheters acute and chronic
7. Renal ultrasound (use and interpretation)
8. Continuous hemofiltration, arteriovenous and/or venovenous
9. Placement of temporary peritoneal catheters
10. Perform bladder catheterization

Certain Procedures if not available or performed will be still discussed and opportunities sought to expose the trainee to such procedures.

1. Radiology of vascular access
2. Balloon angioplasty of vascular access
3. Therapeutic plasmapheresis
4. Hemoperfusion
5. Electron microscopy and Immunoflourescence.

PRACTICAL PROCEDURES

Technical Skills

It is essential that every trainee becomes competent in the techniques of:

a) Biopsy of both native and transplanted kidneys.
b) Temporary vascular access.

Diagnostic Techniques

Trainees should understand the indications for and interpretations of the results from the following procedures:

a) Urinalysis
b) Serum biochemistry
c) Percutaneous biopsy of native and transplanted kidneys
d) Ultrasound of the urinary tract
e) Intravenous urography
f) Renal angiography
g) Radionuclide imaging and measurement of renal function
h) CT and MRI scanning

Additional training and experience will be required for trainees wishing to obtain a license from the Administration of Radioactive Substances Advisory Committee (ARSAC) to allow them to personally perform investigations using radioactive substances.

Therapeutic Procedures

Trainees should be aware of the indications for and the contraindications and complications of the following techniques:

a) Peritoneal dialysis, acute and chronic
b) Haemodialysis, acute and chronic
c) Continuous hemofiltration and allied techniques
d) Plasmapheresis
e) Angioplasty
f) Percutaneous nephrostomy

Medical Knowledge

Theoretical knowledge to be acquired during the training period includes:

a) Renal anatomy, physiology and pathology including examination of renal biopsies by light and electron microscopy and immunofluorescent or immunoperoxidase techniques.

b) Disorders of fluids and electrolytes and acid-base balance.

c) Normal mineral metabolism and its alteration in renal disease, metabolic bone disease and nephrolithiasis.

d) Pathogenesis, natural history and management of hereditary, congenital and acquired diseases of the kidney and urinary tract and renal diseases associated with pregnancy and systemic disorders such as diabetes and vasculitides.

e) The pathogenesis and management of urinary tract infections.

f) The pathogenesis and management of acute renal failure.

g) Clinical pharmacology, including drug metabolism and pharmacokinetics and the effects of drugs on renal structure and function.

h) Nutritional aspects of renal disorders.

i) Immunology, including:

1. Basic principles
2. Immunological mechanisms of renal disease
3. Immunological tests relevant to renal disease

j) Normal and deranged blood pressure regulation.

k) Transplantation including:

(113,

1. Biology of transplant rejection.
2. Indications for and contraindications to renal transplantation.
3. Principles of transplant recipient evaluation and selection.
4, Principles of evaluation of transplant donors, both live and cadaveric, including histocompatibility testing.
5. Principles of organ harvesting, preservation and storage.

6. Short and long-term complications of transplantation.
7. Mechanisms of action and usage of immunosuppressive drugs.
8. Histopathology of transplant rejection.
9. Psycho-social aspects of organ donation and transplantation.

I) Dialysis and Extra-Corporeal Therapy including:

1. The kinetic principles of both haemodialysis and peritoneal dialysis.
2. The short-term and long-term complications of each mode of dialysis and their management.
3. An understanding of the principles of dialysis access, including indications, techniques and complications. This includes both acute and chronic vascular access and peritoneal access.
4. Prescription of and assessment of adequacy of dialysis, including an understanding of the use and limitations of urea kinetics and protein catabolic rate
5. The influence of the various dialysis modes on drug metabolism.
6. The nutritional management of haemo and peritoneal dialysis patients.
7. An understanding of the artificial membranes used in haemodialysis and the issue of biocompatibility.
8. The psycho-social and ethical issues of dialysis.

Clinical Rotations

General Nephrology

The trainee will be assigned to the nephrology ward taking care of the nephrology inpatients only. The trainee will also be responsible for the procedures performed, relating to nephrology, in these patients.

Hemodialysis and Peritoneal Dialysis:

The trainee will be assigned to the Dialysis unit taking care of the chronic Hemodialysis and any acute or chronic Peritoneal Dialysis patients.

Transplant service:

The trainee will be assigned to the Renal Transplant Unit taking care of the Renal transplant patients, [pre transplant evaluation, Attend at least 3-5 transplant surgeries, post transplant care, follow up of stable renal transplant patients and managing acute and chronic complications in a renal transplant patient].

Consultation and Ambulatory Clinics [Nephrology and Transplant Services].

Topic assignment and submission for research: 6 months

The trainee will be responsible for evaluating and making initial decisions for all nephrology consultations form the different units of the hospital. The trainee will also be responsible for the procedures performed, relating to nephrology, in these patients.

- [The Fellow will see all requests for consultation called in to the Renal Consultation service. After seeing the patient, the fellow discusses the problem with the visit for the Renal Consult service, writes an initial note after communication with the attending nephrologist, and follow-up notes as considered appropriate. Medical Residents rotating on the Renal Service may also take this role, and students are also involved in working up and following these patients. A fixed time is designated each day for the fellow (+/-student and resident) to meet with the attending nephrologist to discuss progress and plans. The fellow sees all the Nephrology Division patients admitted to the hospital, whatever the reason for admission is. If patients are admitted to the Renal Visit on the private medical service, the fellow and the visit will act as the primary caretakers (in concert with the medical house staff) during hospitalization. When patients are admitted to the medical ward service or other non -medical services, the fellow acts as a consultant giving input as needed and appropriate. The fellow also manages any problems with peritoneal dialysis patients.

The trainee will be assigned to the nephrology and Transplant out patient clinics i.e. 2 half day clinics / week.

During this time the trainee should plan and submit the research topic for approval. This will help the trainee to initiate research during the end of the 3rd year so that ample time is available for conducting the study and analyzing it in the final year.

PRINCIPLES OF NEPHROLOGY EXAMINATION AND PROCEDURES

Management of adults and children as in-patients, including the medically at-risk patient

Objectives	Learning Outcomes	Teaching & Learning Methods	Assessments
To provide in depth knowledge and skill in: • Ability to explain to a patient the hospital process. • Describe differential diagnosis when appropriate, and treatment options. • Know when to refer to or confer with other specialists. • Ability to undertake therapy in a safe manner. • Ability to recognize and deal with complications that may arise. • Describe the spectrum of general illness behavior and relate this to diseases relevant to Nephrology practice and inpatient	The trainee should be able to: • Take record and interpret an accurate history from patients of any age and communicate effectively. • Know when and where to refer. Seek advice if unsure. Recognize when input from another specialty is required for individual patients. • Work effectively with other health care professionals. • Describe the nature, benefits and risks of planned procedure. • Assess the likelihood of a significant underlying diagnosis and differentiate patients with urgent and non-	• Workplace (clinical) experience • Clinical cases for observational and personal treatment • Attend trainee seminars within department and wards • Attendance at suitable courses • Attendance at suitable combined clinic-pathological meetings • Self-directed & Independent study	• Workplace based assessments (CBD, DOPS, MSF) • Written Examination/ VIVA

management. • Know and interpret the appropriate investigations needed for management of patients with complex medical histories and/or how to obtain relevant advice. • know the process for patient discharge, appropriate prescribing and arrangements for follow-up if required.	urgent care needs. • Respect patient confidentiality. Maintain cultural awareness and identity. Value patient comprehension and views. • Demonstrate willingness and ability to teach students and healthcare colleagues sound history skills where appropriate. • Show respect for others' opinions. Be conscientious and work cooperatively. Respect colleagues, including nonmedical professionals and recognize good advice. • An appreciation of when to discuss patient management with colleagues from other hospital clinical specialties.		
	Learning Outcomes	**Teaching & Learning Methods**	**Assessments**
To provide in depth knowledge and skill in: • Double Lumen Catheterization	The trainee should be able to: • Demonstrate an understanding of various aspects of the procedure	• Workplace (clinical) experience • Clinical cases for observational and	• Workplace based assessments (CBD, DOPS,

• Complications. • Ability to safely perform a central venous catheterization	• Apply knowledge to diagnose & prevent complication • Devise a management plan tailored to patient's needs • Assess the risks involved • use instruments safely and appropriately. • Carry out technique under local anesthesia or sedation. • Carry out steps of procedure	personal treatment • Extra mural training • Attend trainee seminars within department • Attendance at suitable courses • Attendance at suitable meetings • Independent study	Mini-CEX, MSF) • Written Examination/ VIVA • OSCE

	safely and correctly. • Resist pressure from patient or carer to provide inappropriate treatment • Be willing to offer care. Behave appropriately when dealing with a difficult patient.		

Research

The resident would be required to undertake a research project and to present the result for examination in the form of a thesis. They would be encouraged to present and publish the result of the project in refereed journals.

The guideline for synopsis and thesis writing is available on University website at

http://www.szabmu.edu.pk/content/downloads/guidelines-for-synopsis-writing.pdf

http://www.szabmu.edu.pk/content/downloads/guidelines-for-thesis-writing.pdf

ASSESSMENT

ASSESSMENT

Assessment of trainees will cover the cognitive, psychomotor and affective domains. It will take two forms

- Formative Assessment
- Summative Assessment

Formative Assessment

It is the continuous assessment of progress and competence. It will be conducted through workplace based assessment throughout the training. Assessment will be undertaken by a range of assessors and will cover a range of procedures appropriate to the stage of training. Formative assessment will include

- Directly observed practical skills (DOPS)
- Case based discussion (CbD)
- Mini clinical examination exercises (Mini-CEX)
- Multiple source feedback (MSF)

Summative Assessment

Summative assessment will be held twice

- Mid Term Assessment (MTA) Examination (At the end of 2nd year)
- Final/Exit Examination (At the end of Final Year)

The level of performance required for passing the exam will depend on the knowledge and skills necessary for acceptable performance and will not be adjusted to regulate the number or proportion of persons passing the examination. The pass point will be determined by careful analysis and judgment of acceptable performance.

Record of Clinical Cases

The trainees will be required to keep a record of the allocated clinical work in a log book. It will be the responsibility of trainee to keep the log book up to date with the signature of the faculty certifying the work.

TABLE OF SPECIFICATION

TABLE OF SPECIFICATION

Table of specification for Mid Term Assessment (MTA) and Final (Exist) Examination is here as under

TOS FOR MID TERM ASSESSMENT (MTA)
MD Nephrology

There will be two one best type multiple choice theory papers

- **Theory Paper 1 (MCQs) – Gen Medicine (see next page)** **100 Marks**
- **Theory Paper 2 (MCQs) – Gen Nephrology** **100 Marks**

TOS FOR MTA THEORY EXAMINATION PAPER 1 (Gen Med)

TOS ID	Title	Knowledge			Skill			Attitude			%	MCQs
		C1	C 2	C 3	P 1	P 2	P 3	A 1	A 2	A3		
MED-1	Basic principles of Medicine			20			30			10	**50**	**50**
MED-2	Gen Medicine			02			06			02	**10**	**10**
MED-3	Cardiology			03			10			02	**15**	**12**
MED-4	Gastroenterology			01			03			01	**5**	**5**
MED-5	Nephrology			01			03			01	**5**	**5**
MED-6	Infectious Diseases			02			02			01	**5**	**8**
MED-7	Pulmonology			01			03			01	**5**	**5**
MED-8	Endocrinology			01			03			01	**5**	**5**
TOTAL											**100**	**100**

Note: The details of these modules titles are given in curriculum of medicine

TOS ID	Title	Knowledge			Skill			Attitude			%	MCQs
		C1	C 2	C 3	P 1	P 2	P 3	A 1	A 2	A3		
NEPH-2	Basic principles of Nephrology			40			30			30	**100**	**100**

TOS for Final/Exit Examination MD

Final Examination (After completion of 6 years)

The student shall submit completion of training certificate, Log Book, mandatory workshop attendance, thesis on research topic approved by supervisor, through the Dean to the Controller of Examination. If the thesis not approved by the supervisor, application for extension may be recommended by supervisor through Registrar to the AS&RB. The final examination of subject, thesis evaluation and viva voce examination will be conducted by board of at least Four (04) examiners. The candidate will be examined in major subject and thesis as under: supervisor will not be paper setter /Examiner of his/her candidate as per PMDC regulation 2001.

Theory Paper			**200 Marks**
Paper I	Speciality Course MCQs	100 Marks	
Paper II	Speciality Course MCQs	100 Marks	
Viva Voce & Practical			**300 Marks**
Practical and OSCE/OSPE			**300 Marks**
a.	Long Case (One)	(100 Marks)	
b.	Short Case (Four)	(100 Marks)	
c.	OSCE	(100 Marks)	
Thesis Defence			**100 Marks**
TOTAL			**600 Marks**

TOS for Theory Paper A & B Final Exit Examination

The composition of the paper is as follows:

Topic	**Number of questions***
Glomerulonephritis, tubulointerstitial nephritis (incl. vasculitis, anti-GBM disease, SLE)	30
Acute kidney injury, acute renal replacement therapy, disorders of fluid, electrolytes and acid base	26
Chronic kidney disease, haematuria, proteinuria	24
Renal bone disease, renal anaemia	12
Cardiovascular disease, hypertension, renovascular disease and diabetes	20
Urological presentations including renal stone disease, urinary tract infection and obstruction	14
Inherited and rarer diseases	14
Peritoneal dialysis	8
Haemodialysis	14
Renal transplantation	14
Other^	24
Total	**200**

The questions in each category are distributed across both papers
*This should be taken as an indication of the likely number of questions – the actual number may vary. **^ 'Other' includes the following topics:**

Therapeutics and safe prescribing
Renal disoders in pregnancy
Infection in the renal patient
Active supportive (non-dialysis) care
Nutrition
Practical procedures
Sexual health
Adult-pediatric interface
End-of-life care

TOS FOR PRACTICAL EXAMINATION

10 OSCE-Stations (100 Marks)

(5 minutes each station)

TOS ID	Title	Stations
Neph-01	ECG	**1**
Neph-02	Histopathology	**1**
Neph-03	Acid-Base disorders	**1**
Neph-04	Nephroradiology	**1**
Neph-05	Dialysis	
Neph-06	Counselling	1
Neph-07	Transplant	1
Neph-08	Gen Nephrology	
Neph-09	AKI	
Neph-10	Miscellaneous	1
Total		**10**

LEARNING RESOURCES

LEARNING RESOURCES

List of Essential Readings

Books:

INTERNAL MEDICINE:

1. Clinical Medicine: Textbook for Medical Students & Doctors. Kumar & Clark (editors). Elsevier Saunders, Edinburgh.
2. Harrison's Principles of Internal Medicine by Eugene Braunwald. McGraw-Hill
3. Davidson's Principles and Practice of Medicine by Nicholas A. Boon. Churchill Livingstone
4. Hutchison's Clinical Methods in Medicine by Michael Swash. A. Saunders Ltd.

NEPHROLOGY:

1. Textbook of Comprehensive clinical Nephrology
2. The Kidney – Brenners and Rectors
3. Oxford Textbook of Clinical Nephrology
4. Primer on Kidney Diseases
5. Schriers Diseases of the Kidney
6. Daugirdas – Handbook of Dialysis
7. Handbook of Kidney Transplantation – Gabriel Danovitch
8. Acid Base - Rose Burton

Journals:

Issues of last two years of the following journals

- American Journal of Kidney Diseases, including core curriculum
- Kidney International
- NDT
- New England journal of Medicine

PROGRAM EVALUATION

PROGRAM EVALUATION

The program director will continue to ensure that the program is fit for purpose in that it provides the trainee with the appropriate knowledge, skills, attitudes and competencies required to meet the requirements of a specialist.

Program evaluation will be carried out after every two years according to the CIPP model of evaluation. Any suggested updates will only be made following appropriate consultation with stakeholders, including trainees and lay members.

Feedback forms are attached as “Annexure A”

Note: This is an evolving document and new changes will be done as per requirements/ needs of the newly developed MD Nephrology program to make it at par with HEC/ international requirements

ANNEXURE A

Supervisor Evaluation Form

Date:_____ Supervisor's Name: _____

Your Name:_____ Signature: _____

Evaluations of supervisors by Trainee's are an important process for providing supervisors with an assessment of the quality of their work. Annual supervisor assessments can be used to compliment a supervisor for doing a good job. Annual assessments can also identify areas for improvement. Evaluations can strengthen communications between supervisors and trainee's.

Trainees have three options for evaluating supervisors:

1) Completing the Evaluation of Supervisor form.
2) Writing a signed memo evaluating the supervisor.
3) Meeting with the supervisor's department head.

Evaluations received by the deadline (January 15) will be incorporated into the annual review of the supervisor. Forms and/or signed memos should be sent to the Human Resources department.

* * *

(E=Excellent, G=Good, S=Satisfactory, N=Needs Work, U=Unsatisfactory, Ø=No Opinion)

Performs Supervisory Functions

Provides on-going positive and negative feedback	**E**	**G**	**S**	**N**	**U**	**Ø**
Makes expectations known	**E**	**G**	**S**	**N**	**U**	**Ø**
Is tactful and considerate	**E**	**G**	**S**	**N**	**U**	**Ø**
Promotes teamwork and good working relationships	**E**	**G**	**S**	**N**	**U**	**Ø**
Recognizes and addresses concerns in a timely manner	**E**	**G**	**S**	**N**	**U**	**Ø**
Delegates authority appropriately	**E**	**G**	**S**	**N**	**U**	**Ø**
Provides training of new employees	**E**	**G**	**S**	**N**	**U**	**Ø**
Provides direction of work	**E**	**G**	**S**	**N**	**U**	**Ø**
Communicates openly and honestly with peers, staff and administration	**E**	**G**	**S**	**N**	**U**	**Ø**

Comments: _____

_____

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_____

Develops Innovative Procedures

Is receptive to new ideas	**E**	**G**	**S**	**N**	**U**	**Ø**
Is receptive to questions	**E**	**G**	**S**	**N**	**U**	**Ø**
Encourages initiative and innovation	**E**	**G**	**S**	**N**	**U**	**Ø**

Comments: _____

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III. Maintain Positive Works Environment

Recognizes contributions	**E**	**G**	**S**	**N**	**U**	**Ø**
Motivates workers	**E**	**G**	**S**	**N**	**U**	**Ø**
Provides relaxed yet efficient work atmosphere	**E**	**G**	**S**	**N**	**U**	**Ø**
Encourages staff development	**E**	**G**	**S**	**N**	**U**	**Ø**

Comments: _____

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Knows the Operations of the Department

Understands employee workload	**E**	**G**	**S**	**N**	**U**	**Ø**
Is alert to potential problems	**E**	**G**	**S**	**N**	**U**	**Ø**
Keeps staff informed about department and university developments	**E**	**G**	**S**	**N**	**U**	**Ø**

Comments: _____

_____

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Work Habits

Acknowledges own limitations and mistakes	**E**	**G**	**S**	**N**	**U**	**Ø**
Maintains a positive work attitude	**E**	**G**	**S**	**N**	**U**	**Ø**
Uses time efficiently and effectively	**E**	**G**	**S**	**N**	**U**	**Ø**
Demonstrates a good work ethic	**E**	**G**	**S**	**N**	**U**	**Ø**

Comments: _____

_____

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_____

Please use the bottom and back of this sheet as space for expanding on any comments above or to make any

additional comments.

Program Evaluation Form

Please use the following scale to indicate your response to the statements below:

SA = strongly agree

A = agree

N = neither agree/disagree

D = disagree

SD = strongly disagree

The information was presented effectively	**SA**	**A**	**N**	**D**	**SD**
The information presented was practical	**SA**	**A**	**N**	**D**	**SD**
The program provided a good working knowledge of the subject matter presented	**SA**	**A**	**N**	**D**	**SD**
The program has allowed me to acquire practical skills and knowledge to manage my business more effectively and efficiently	**SA**	**A**	**N**	**D**	**SD**
The program attended was sufficient for my purpose	**SA**	**A**	**N**	**D**	**SD**