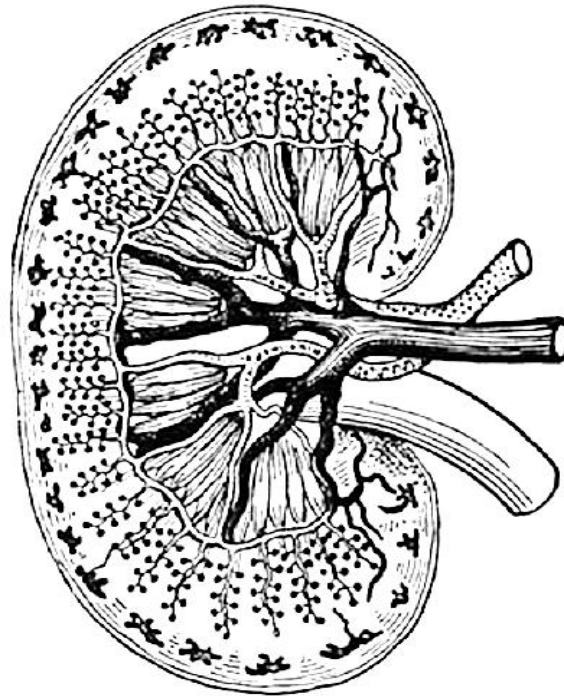
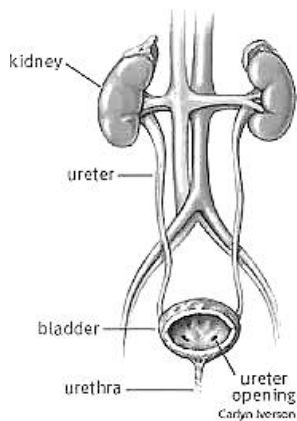


**REN-0318**  
**Class 5<sup>th</sup> Year**

## **Study Guide**

# **THE RENAL MODULE**

**Class 2017 : Spiral 03: Module 18**



**AZAD JAMMU KASHMIR MEDICAL COLLEGE**

**MUZAFFARABAD, AZAD JAMMU KASHMIR**

# Contents

1.....	1
MODULE TEAM .....	- 3 -
2.....	2
RATIONALE .....	- 3 -
3.....	3
MODULE OUTCOMES.....	- 3 -
4.....	4
ORGANIZATION OF MODULE .....	- 3 -
5.....	5
CONTENT DELIVERY .....	- 3 -
5.1.  LARGE GROUP INTERACTIVE SESSION (LGIS).....	- 3 -
5.2.  VIDEOS .....	- 3 -
5.3.  HANDS ON ACTIVITIES/PRACTICAL .....	- 3 -
5.4.  OPDs/Wards/Emergency Rooms/operation Theatre.....	- 4 -
5.5.  DIRECTED SELF LEARNING (DSL).....	- 4 -
6.....	6
ASSESSMENT .....	- 4 -
7.....	7
TABLE OF SPECIFICATIONS (TOS).....	- 4 -
8.....	8
THEMES & CORE CONTENTS .....	- 4 -
8.1.  Renal Pain & Ureteric Colic (10 %).....	- 4 -
8.2.  Puffiness & Edema (20 %).....	- 4 -
8.3.  Oliguria & Chronic Kidney Disease (CKD)/Chronic Renal failure (CRF) (20%) .....	- 5 -
8.4.  Burning (scalding) Urination & Urinary Tract Infections (UTI) (15%) .....	- 5 -
8.5.  Defective Urinary Tract (10%) .....	- 5 -
8.6.  Urinary Trauma, Tubes & Stomas (10%).....	- 6 -
8.7.  Acute Renal Injury (Acute Renal Failure) & Acute Tubular Necrosis (ATN) (10%).....	- 6 -
8.8.  Involvement of Kidney in systemic diseases. (5%).....	- 6 -
9.....	9
ENTRUSTABLE PROFESSIONAL ACTIVITIES (EPA) .....	- 6 -
10.....	9
1.Levels of EPA .....	- 6 -
11.....	9
2.STAR: Statement Award of Responsibility.....	- 7 -
12.....	1
0.CLINICAL SCENARIO & CRITICAL QUESTIONS.....	- 7 -
10.1.  Case 02: Renal Pain.....	- 7 -
10.2.  Case 02: Puffy. ....	- 7 -
10.3.  Case 03: Renal failure .....	- 8 -
13.....	1
1.LIST OF PBLs .....	- 8 -
11.1.  PBL 01: Puffiness & Edema .....	- 8 -
11.2.  PBL 02: Renal Pain & Ureteric Colic .....	- 8 -
11.3.  PBL 03: Renal Failure .....	- 9 -
11.4.  PBL 04: Bladder Outlet Obstruction (BOO) & Hematuria/Dysuria .....	- 9 -
14.....	1
2.LEARNING RESOURCES.....	Error! Bookmark not defined.
12.1.  TIME TABLE .....	Error! Bookmark not defined.
15.....	1
3.REFERENCE BOOKS .....	- 12 -
16.....	1
4.ONLINE RESOURCES.....	- 12 -
17.....	F
or Inquiries & Trouble Shooting.....	Error! Bookmark not defined.

## 1. MODULE TEAM

<b>1</b>	<b>Dr. Mohsin Shakil</b>	<b>Planner</b>
<b>2</b>	<b>Dr. Khalid Awan</b>	<b>Co-ordinator</b>
<b>3</b>	<b>Dr. Sarmad Latif</b>	<b>Member</b>
<b>4</b>	<b>Dr. Nosheena</b>	<b>Member</b>
<b>5</b>	<b>Dr. Zakir Naqvi</b>	<b>Member</b>

## 2. RATIONALE

The Renal System is concerned with the maintenance of homeostasis through formation and excretion of urine by kidneys and carried to the exterior through tubular passages and reservoir. Willful, timed voiding is made thus possible, giving a sense of hygiene and social dignity.

This module, 3<sup>rd</sup> of the series is built upon the cognition, skill and behavior achieved during earlier Renal Modules.

## 3. MODULE OUTCOMES

On Completion of this Module, the students should have learned the necessary knowledge to correlate the relevant signs & symptoms for diagnosis of the diseases of renal system. They should be able to advise and interpret the specific laboratory and radiological investigations to evaluate the disease process and make appropriate decisions about management. They should also suggest the follow up measures to avoid recurrences. They learners should also have the skills of relevant documentation and simple urological procedures.

At the end of the module, student should have the knowledge of urinary system to appropriately use newly learnt skills to help Nephro-Urological patients.

## 4. ORGANIZATION OF MODULE

The Renal Module is consisting of themes, each based on real life situation. The module will apply different modes of instruction, major emphasis will be on discussion, analysis and deduction; all by the learners who will be facilitated and guided and supervised by the faculty.

## 5. CONTENT DELIVERY

Entire Curriculum will be delivered by the clinical case scenarios, each related to a theme. Read the cases and learning objectives of the theme which you are supposed to encounter next day. Understand and explain the cases to yourself and read the relevant information.

Following learning/teaching strategies will be employed to discuss the cases.

### 5.1. LARGE GROUP INTERACTIVE SESSION (LGIS)

Large group instruction will be employed at time. Attend large group session to resolve queries, conceptual learning and to standardize learning of all groups. Read the cases and learning objectives of the theme which you are supposed to encounter next day. Understand and explain the cases to yourself and read the relevant information

### 5.2. VIDEOS

Video Demonstration of nephro-urological Procedures

### 5.3. HANDS ON ACTIVITIES/PRACTICAL

Practical activities, linked with case, will take place.

#### 5.4. OPDs/Wards/Emergency Rooms/Operation Theatres

Attend your schedule clinical rotations & evening visits of the hospitals; Take advantage of these opportunities to master the assigned “Entrustable Professional Activities” (EPA) and use open time for revisiting the suggested subjects already covered in previous renal modules.

#### 5.5. DIRECTED SELF LEARNING (DSL)

Few DSL sessions have been added in between to create an environment for you to search literature as well as to deduce and synthesize information from different sources to meet the learning objectives.

### 6. ASSESSMENT

In this module, you will self-assess yourself frequently and will have formative assessments. An Assessment will also hold at completion of the module: Knowledge, Skills and attitude assessment by ‘Objective Structured Clinical Examination’ will be held at the end of the block. The marks obtained will contribute 30% towards the end of year professional examination/summative assessment.

### 7. TABLE OF SPECIFICATIONS (TOS)

1	Renal Pain & Ureteric Colic	10%
2	Puffiness & Edema	20%
3	Oliguria & Chronic Kidney Disease (Chronic Renal Failure)	20%
4	Burning (Scalding) Micturition & Urinary Tract Infection (UTI)	15%
5	Defective Urinary Tract	10%
6	Urinary Trauma, Tubes & Stomas	10%
7	Acute Renal Injury (Acute Renal Failure) & Acute Tubular Necrosis (ATN)	10%
8	Involvement of Kidney in systemic diseases	05%

### 8. THEMES & CORE CONTENTS

#### 8.1. Renal Pain & Ureteric Colic (10 %)

At the end of the theme learners will be able to discuss Urinary Calculi Disease,

- 1- Enumerate the symptoms and identify the signs of renal pain and ureteric colic.
- 2- Form the provisional diagnosis and provide initial treatment.
- 3- Enlist and explain the appropriate investigations
- 4- Describe plan and execute the management of the disease
- 5- Describe the plan for the prevention of recurrences and management of associated metabolic disorder.

#### 8.2. Puffiness & Edema (20 %)

At the end of this theme learner should to be able to assessment of kidney disease and function:

- 1- List essential test for evaluation of kidney diseases
- 2- Describe procedure for collection of mid-stream urine & explain importance and use of urine analysis
- 3- Define proteinuria & describe different types of proteinuria
- 4- Define hematuria & explain significance of confirmation of hematuria by microscopic examination.
- 5- Define Glomerular Filtration Rate (GFR) & explain formula for estimation of GFR.

- 6- Classify Glomerular diseases
- 7- Enumerate the symptoms and identify the signs of nephritic syndrome
- 8- Enlist the laboratory findings in nephritic syndrome.
- 9- Describe treatment of nephritic syndrome.
- 10- Describe symptoms and signs of nephrotic syndrome
- 11- Describe the laboratory findings in nephrotic syndrome.
- 12- Describe the treatment of nephrotic syndrome.
- 13- Enlist the significance, indications and contraindications of renal biopsy & describe pre and post renal biopsy precautions and care.

### **8.3. Oliguria & Chronic Kidney Disease (CKD)/Chronic Renal failure (CRF) (20%)**

At the end of this theme, learner should to be able to:

- 1- List causes of CKD
- 2- Enlist symptoms and identify the signs of CKD
- 3- List the reversible causes of CKD
- 4- Describe the laboratory findings in CKD.
- 5- Enumerate the cardiovascular complications of CKD.
- 6- Describe the disorders of mineral metabolism in CKD.
- 7- Enlist the hematological complications of CKD.
- 8- Enlist the neurological complications of CKD.
- 9- Describe Hyperkalaemia and its management in CKD.
- 10- Describe acid base disorders in CKD.
- 11- Describe endocrine disorders in CKD.
- 12- Describe the management and prognosis of patient with CKD.
- 13- Describe different types of dialysis in management of CKD.

### **8.4. Burning (scalding) Urination & Urinary Tract Infections (UTI) (15%)**

At the end of the module learners will be able to discuss “Urinary Tract Infections (UTI)” & “Bladder Outlet Obstruction (BOO)”:

- 1- Enlist common urinary tract Pathogens and factors predisposing to infections.
- 2- Define Urethritis, Prostatitis, Vesiculitis, Epididymitis, Orchitis, Cystitis and Pyelonephritis.
- 3- Describe Lower Urinary Tract Symptoms (LUTS) & other features of UTIs.
- 4- Advise rational investigations for identifying the cause of the UTI and explain the laboratory findings.
- 5- Prescribe appropriate medicines to relieve symptoms and cure the UTI.

### **8.5. Defective Urinary Tract (10%)**

At the end of the theme, learner will be able to discuss the congenital anomalies of urogenital tract;

- 1- Enlist the congenital anomalies of the Kidney, pelvis, pelvi ureteric junction, uretero vesical junction, bladder, urethra and testes.
- 2- Define Pelvi Ureteric Junction (PUJ) obstruction; enlist its types and management.
- 3- Identify clinical features of Vesico Ureteral Reflux (VUR) and UTI in children and manage it.
- 4- Enumerate various causes of Bladder out let obstruction/Urinary retention in children and discuss their management.
- 5- Describe the types, clinical features and management of Hypospadias.
- 6- Revisiting ambiguous genitalia and cryptorchidism.

### **8.6. Urinary Trauma, Tubes & Stomas (10%)**

At the end of the theme learner will be able to discuss Urinary Trauma, urinary diversions, stomas and relevant tubes.

- 1- Describe the mechanism of urinary tract trauma involving kidney, ureter, bladder and urethra.
- 2- Provide basic trauma support, take history, perform clinical examination, Advise relevant investigations, plan and execute the subsequent management.
- 3- Describe Urinary Tract Trauma, important measure to avoid such trauma, measures to identify and manage iatrogenic trauma.
- 4- Describe the use of gut in urological surgery
- 5- Define ureterostomies, ileal conduit, stoma, augmentation cystoplasty.
- 6- Practice care of urinary catheter, suprapubic catheter and nephrostomy tubes.

### **8.7. Acute Renal Injury (Acute Renal Failure) & Acute Tubular Necrosis (ATN) (10%)**

At the end of the theme learner will be able to discuss Acute Renal Injury & Acute Tubular Necrosis.

- 1- Define acute renal injury. Describe symptoms, signs & explain laboratory findings in acute renal injury.
- 2- Describe the pre-Renal & post-Renal causes of acute renal injury.
- 3- Describe the intrinsic causes of acute renal injury.
- 4- Define acute tubular necrosis & describe endogenous & exogenous nephrotoxins causing acute tubular necrosis.
- 5- Describe symptoms, signs & explain laboratory findings in acute tubular necrosis.
- 6- Describe management of acute tubular necrosis & describe its course and prognosis.

### **8.8. Involvement of Kidney in systemic diseases. (5%)**

At the end of the theme learner will be able to discuss involvement of kidney in systemic disorders

- 1- Describe diabetic nephropathy
- 2- Describe HIV associated nephropathy
- 3- Describe renal amyloidosis

## **9. ENTRUSTABLE PROFESSIONAL ACTIVITIES (EPA)**

Achievement of necessary skills for performing different clinical activities is suggested for competency based outcome of renal module & hence named "Professional Activities".

- 1- Digital Rectal Examination (DRE)**
- 2- Urethral Catheterization.**
- 3- Suprapubic Puncture.**
- 4- Lower Urinary Tract Symptoms (LUTS) & international prostate symptoms Score.**
- 5- Venous Access and care of vascular access line.**
- 6- Interpretation of ABG.**

Trustable level of competencies is required from student before exit exam duly entered in logbook and endorsed by supervisor. Different levels of EPA are required for different level of competencies starting from level 1 to level 5 as follow

### **9.1. Levels of EPA**

**At Level 1:** The learner has insufficient knowledge and skills to perform the task.

**At Level 2:** The learner may perform the activity under full proactive supervision, the supervisor deciding the level of supervision.

**At level 3:** The learner can be trusted to know when to ask for help (reactive supervision).

**At Level 4:** The learner may perform an activity with back stage, mainly formal supervision.

**At Level 5:** The learner has learnt enough skills, knowledge and appropriate attitude that they would be suitable to supervise others.

### **9.2.STAR: Statement Award of Responsibility**

To be awarded an EPA, the trainee needs to reach **Level 4** competence. He calls the recorded achievement a '**STAR**' (Statements of Awarded Responsibility).

## **10.CLINICAL SCENARIO & CRITICAL QUESTIONS**

### **10.1. Case 02: Renal Pain**

A 45-year-old man Khani Zaman was referred to Urology OPD of AIMS hospital complaining of severe colicky pain in right lumbar area, radiating to lower abdomen and into the genital area. He also had chills, fever and nausea. He also noticed increased frequency of urination and blood in urine.

USG and X-ray findings indicated a 10 mm stones in the renal pelvis. Stone was removed by lithotripsy and on chemical examination, it was found to be a Calcium Oxalate stone. 24-hour urine analysis for Calcium was 300 mg/day. This Khani Zaman was encouraged to increase his water intake and slightly decrease his dietary calcium.

1. Khani Zaman is a calcium stone former and may have the hereditary condition known as idiopathic hypercalciuria.
2. How do stones, or calculi, form?
3. Are calculi formed from minerals or compounds other than calcium? If so, give examples.
4. List some ways renal calculi are removed.

### **10.2. Case 02: Puffy.**

A 23-year-old man Raja Rahmat felt puffy, weak, and tired for several months. He suddenly noticed his urine had a red to brown discoloration and the volume was minimal. He went to the Nephrology OPD of AIMS hospital and the following data was obtained upon examination and investigations:

#### **Hematology:**

Serum sodium	125 mEq/L
Serum potassium	6 mEq/L
Serum Creatinine	2.6 mg/dL
BUN	24.0 mg/dL
pH (arterial)	7.32
Hematocrit	25%

#### **Urinalysis:**

Appearance	Red to brown
Specific Gravity	1.025
Blood	Positive
Glucose	Negative
Protein	+

#### **Renal Function Tests:**

GFR	40 mL/min
Renal Blood Flow (RBF)	280 mL/min

- 1-
  - a. What is the disorder of this individual?
  - b. What situation(s) predispose an individual to this disorder?
2. Define hyponatremia and hyperkalemia.
3. What is the cause of the hyponatremia and hyperkalemia?
4. Why is there blood in the urine?
5. How do the renal function tests for this individual compare to normal?
6. What caused the puffy feeling?
7. What type of treatment does this person need?
8. Is this person a candidate for kidney dialysis? Explain your answer.

### 10.3. Case 03: Renal failure

A 35 year old Asif Habib, who is a known diabetic on irregular treatment for 13 years, has developed Renal Failure. While waiting for a kidney transplant, he is on maintenance hemodialysis; five to eight hours, three times in each week. He is on a diet restricted in sodium (500 mg/day), potassium (2.6 g/day) and protein as well as his usual diabetic diet. He has a shunt (arterio-venous fistula) in his left wrist to allow for easy hookup to the dialysis machine.

Prior to hemodialysis, his representative blood values are the following:

<b>Serum sodium</b>	<b>120 mEq/L</b>
<b>Serum potassium</b>	<b>6.4 mEq/L</b>
<b>Serum chloride</b>	<b>102 mEq/L</b>
<b>Serum Creatinine</b>	<b>16 mg/dl</b>
<b>Hematocrit</b>	<b>24%</b>

The dialysis fluid in the kidney dialysis machine contains the following:

<b>Sodium</b>	<b>134 mEq/L</b>
<b>Potassium</b>	<b>2.6 mEq/L</b>
<b>Calcium</b>	<b>2.5 mEq/L</b>
<b>Magnesium</b>	<b>1.5 mEq/L</b>
<b>Chloride</b>	<b>104 mEq/L</b>
<b>Sodium Acetate</b>	<b>36.6 mEq/L</b>
<b>Anhydrous dextrose</b>	<b>2 g/L</b>

1. What is Hemodialysis?
2. Following eight to ten hours of hemodialysis, do you think the following blood values would be increased, decreased, or remain the same?
  - Serum sodium
  - Serum potassium
  - Serum chloride:
  - Serum creatinine
3. Why does anemia usually develop with maintenance dialysis?
4. Why is hemodialysis required every two to three days for eight to ten hours/day for individuals with complete renal failure? (Flow rate of blood through the dialyzer is 150-300 mL/min.)
5. Differentiate between hemodialysis and peritoneal dialysis

## 11. LIST OF PBLs

### 11.1. PBL 01: Puffiness & Edema

04 years old was brought in Pediatric Nephrology OPD with puffiness of face, swelling of eye lids and feet for seven days. On examination, she had swelling around eyes and both feet. On pressing the swelling over feet with thumb produce a dimple. Her "Urine Routine Examination" (URE) showed 3+ protein in specimen.

### 11.2. PBL 02: Renal Pain & Ureteric Colic

20 years old presented in Accident and Emergency (A&E) department of SKBZ Hospital complaining of severe left lumbar pain radiating to left lower abdomen. On physical examination, there was tenderness in left lumbar region. Left renal punch was also positive. Urine Routine Examination (URE) showed many Red Blood Cells (RBCs) and Calcium Oxalate crystals, Ultrasonography Scan (USG) revealed mild hydronephrosis of left kidney and 8mm calculus 4 centimeter distal to the left Pelvi Ureteric Junction (PUJ). X-Ray showed a radio opaque shadow in line of the left ureter.




### **11.3. PBL 03: Renal Failure**

A 40 yrs old woman came to AIMS hospital complaining of insomnia, anorexia, shortness of breath and swelling of both feet. She was a known hypertensive on irregular treatment for last ten years. On physical examination, he was having pallor, pitting ankle edema and bilateral crepitation in lower lungs field. Her Blood Urea and Creatinine were markedly raised.

### **11.4. PBL 04: Bladder Outlet Obstruction (BOO) & Hematuria/Dysuria .**

A 65 years old man reported in Urology OPD of the AIMS Hospital complaining of poor stream, frequency, Urgency, Nocturia and Hematuria. His physical examination revealed visible and palpable Urinary bladder even after voiding, rectal examination showed moderately enlarged prostate. URE showed numerous Puss cells and RBCs. USG showed moderately enlarged prostate, mild Hydronephrosis Hydroureter (bilateral) and 180 milliliters of post void residual urine volume.

**AJK Medical College, Muzaffarabad (AJK)**  
**Renal Module (5<sup>th</sup> Year)**

Week 01							
	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	
0800 - 8:40 AM	<b>Introduction to Module &amp; Entrustable Professional Activities (EPA)</b> Dr. Mohsin Shakil	<b>LGIS</b> <b>Urinary Tract Infections &amp; LUTS</b> Dr. Mohsin Shakil	<b>LGIS</b> <b>Urological Diversions &amp; Care of Stomas</b> Dr. Mohammad Ijaz	<b>یوم پاکستان</b>  <b>23 مارچ</b> <small>روزِ دہلی پاکستان</small>	<b>LGIS</b> <b>Urinary Tract Trauma</b>  Dr. Sarmad Latif	<b>Clinical Rotation</b>	
8:45 AM to 9:25 PM	<b>LGIS</b> <b>Painful Urinary Calculi</b>  Dr. Mohsin Shaki	<b>Skill Lab</b> <b>Urethral catheterization &amp; Suprapubic puncture</b> Dr. Mohsin Shakil	<b>LGIS</b> <b>Hypospadias &amp; Ambiguous Genitalia</b>  Dr. Zakir Naqvi	<b>Holiday</b>			
9:30 AM - 10:00 AM	<b>Clinical Rotation</b>	<b>Clinical Rotation</b>	<b>Clinical Rotation</b>	<b>Celebrations</b> Full Joint Inter-Services military parade, conferring of national decorations	<b>Clinical Rotation</b>		
<b>Break (2:00 to 3:00 PM)</b>							
3:00-4:00PM	<b>Clinical Rotation</b>	<b>Clinical Rotation</b>	<b>Clinical Rotation</b>	<b>Significance</b> Commemoration of Pakistan Resolution and Constitution	<b>Clinical Rotation</b>		

**AJK Medical College, Muzaffarabad (AJK)**  
**Renal Module (5<sup>th</sup> Year)**

<b>Week 02</b>						
	<b>Monday</b>	<b>Tuesday</b>	<b>Wednesday</b>	<b>Thursday</b>	<b>Friday</b>	<b>Saturday</b>
<b>0800 - 8:40 AM</b>	<b><u>LGIS</u> Nephrotic Syndrome Dr. Mateen</b>	<b><u>LGIS</u> Chronic Kidney Disease (CKD) Dr. Ali Arshed</b>	<b><u>LGIS</u> Kidney in Systemic Diseases By Dr. Khalid Awan</b>	<b><u>Skill Lab</u> Renal Biopsy Dr. Khalid Awan</b>	<b><u>LGIS</u> Congenital Anomalies of Urogenital Tract By Dr. Zakir Naqi</b>	<b>Clinical Rotation</b>
<b>8:45 AM to 9:25 PM</b>	<b><u>LGIS</u> Nephritic Syndrome By Dr. Khawaja Imtiaz Ahmed</b>	<b><u>Skill Lab</u> Interpretation of ABG Dr. Ali Arshed &amp; Team</b>	<b><u>LGIS</u> Acute Renal Injury Dr. Robina</b>	<b><u>Skill Lab</u> Counselling of patients in end stage renal disease By Dr. Hamed rashid</b>	<b><u>DSL</u> Acute Scrotum</b>	
<b>9:30AM-</b>	<b>Clinical Rotation</b>	<b>Annual Sports Week 2017 28<sup>th</sup> – 31<sup>st</sup> March 2017</b>				
<b>3:00-4:00PM</b>	<b>Clinical Rotation</b>					

## REFERENCE BOOKS

- 1- Walsh Campbell Urology, 10<sup>th</sup> edition.
- 2- Smith & Tanagho'General Urology, 18<sup>th</sup> edition.

## 12.ONLINE RESOURCES

- 3- **American Urological Association (AUA) Guidelines**  
<http://www.auanet.org/education/aua-guidelines.cfm>  
*(AUA Android Application for download at Google play) for installation at you mobile phone device.*  
[https://play.google.com/store/apps/details?id=org.auanet.Guidelines&feature=search\\_result#?t=W251bGwsMSwyLDEsIm9yZy5hdWFuZXQuR3VpZGVsaW5lcjJd](https://play.google.com/store/apps/details?id=org.auanet.Guidelines&feature=search_result#?t=W251bGwsMSwyLDEsIm9yZy5hdWFuZXQuR3VpZGVsaW5lcjJd)
- 4- **European Association of Urology (EAU) Pocket Guidelines.**  
<http://uroweb.org/guidelines>  
*(Android Application for download at Google play) for installation at you mobile phone device.*  
<https://play.google.com/store/apps/details?id=nl.code.eaupocketguidelines.app>



Inquires & trouble shooting

Department of Medical Education,  
AJK Medical College, Muzaffarabad, AJK, Pakistan

Email: [ayub@ajkmc.edu.pk](mailto:ayub@ajkmc.edu.pk), [DME@ajkmc.edu.pk](mailto:DME@ajkmc.edu.pk)

Tel: +92-5822-920527-8/808, 816