	Spiral II
PROGRAM	MBBS
COURSE TITLE	URINARY II
ACADEMIC YEAR	4th year, 2023
INTRODUCTION	The students of 4 <sup>th</sup> year MBBS are already familiar with basic knowledge of urinary system which they studied in year 2 of MBBS. While Urinary System 1 focused on the normal structure and functions, this module revolves around pathophysiology, pharmacology and clinical correlation of urinary system. The information obtained here will help the students in the final year during their Medicine and Surgery rotations.
RATIONALE	Diseases related to Urinary System are highly prevalent in our community and constitute a significant burden on our health care system. This module will provide the learners, the necessary knowledge and skills to be better able to understand the relevant management processes in the final year.
TARGET STUDENTS	4 <sup>th</sup> year MBBS 2023
DURATION	4 weeks
MODULE OUTCOMES	The students will be able to justify management plans of diseases related to urinary system on the basis of their basic knowledge and clinical skills.
DEPARTMENTS	Community Medicine, Medicine, Pathology, Pediatrics, Pharmacology, Surgery
OBJECTIVES	By the end of the module, students will be able to:
LECTURES	1. <u>Renal diseases and prevention</u>
<u>COMMUNITY</u> <u>MEDICINE</u>	<ul> <li>Describe common renal diseases</li> <li>Discuss epidemiology of Renal diseases</li> <li>Identify environmental risk factors of renal diseases</li> <li>Explain preventive measures of renal diseases</li> </ul>
MEDICINE	1. Acute kidney injury
	2. Chronic kidney disease
	3. Nephrotic syndrome
	4. Nephritic syndrome
	5. Urinary tract infections
	6. Renal tubular acidosis

	7. Introduction to dialysis & renal transplant
	8. Polycystic kidneys
	<ul> <li>Describe etiology, pathophysiology, risk factors and clinical features of above-mentioned list of conditions</li> <li>Discuss the differential diagnosis related to the above conditions.</li> <li>Discuss related radiological and laboratory investigations (U/S abdomen, x-ray/ CT/ MRI, Urine Routine Examination (RE), and UCE</li> <li>Explain the management and complications of the listed renal diseases</li> </ul>
PATHOLOGY	1. Cysts: Congenital and acquired cystic conditions of kidney
	<ul> <li>Classify cystic diseases of the kidneys</li> <li>Discuss genetics, pathogenesis, morphology and clinical features of autosomal dominant, autosomal recessive polycystic kidney disease.</li> <li>Discuss cystic diseases of renal medulla and acquired (Dialysis associated) cystic disease</li> </ul>
	2. Obstructive Uropathy 1: Urinary out flow Obstruction (Urolithiasis, Hydronephrosis)
	<ul> <li>Discuss the causes, pathogenesis, morphology and clinical features of Hydronephrosis</li> <li>Explain the types, pathogenesis and clinical presentation of renal stones</li> <li>Explain the major causes of Ureteral obstruction</li> </ul>
	3. Obstructive Uropathy 2: Urinary out flow Obstruction (Prostate)
	<ul> <li>Discuss acute and chronic Prostatitis.</li> <li>Explain the etiology, pathogenesis, morphological and clinical features of Benign Prostatic Hyperplasia</li> </ul>
	4. Obstructive Uropathy 3: Carcinoma of Prostate
	<ul> <li>Discuss the etiology, genetic alterations, pathogenesis, morphology and clinical features of Prostatic Adenocarcinoma</li> <li>Explain the grading, staging and laboratory diagnostics of carcinoma of Prostate</li> </ul>
	5. Urinary Tract Infections (Microbiology)
	• Describe the etiologies and pathophysiology of upper and lower urinary infections
	6. Pathogenesis of glomerular disorders
	<ul><li>Classify Glomerular Diseases</li><li>Name the Glomerular syndromes</li></ul>

- Explain various pathological responses to glomerular injury
- Discuss pathogenesis of glomerular injury and mediators of glomerular injury
- Explain the underlying immune mechanism in development of various glomerular diseases

### 7. Nephritic syndrome

- Define nephritic syndrome
- Summarize major primary Glomerulonephritides
- Discuss the etiology, pathogenesis and clinical features of Acute proliferative, Glomerulonephritis, & Rapidly Progressive Glomerulonephritis.

# 8. Nephrotic syndrome

- Define nephrotic syndrome
- List the common causes of Nephrotic syndrome
- Discuss etiology, pathogenesis, microscopic morphology of Membranous Nephropathy, Minimal-Change Disease, Focal Segmental Glomerulosclerosis (FSGS), HIV-Associated Nephropathy, Membrano-proliferative Glomerulonephritis (MPGN)]

### 9. Acute tub<mark>ular necrosis</mark>

- Define tubulointerstitial diseases
- Classify tubulointerstitial diseases
- Discuss etiology, pathogenesis, morphology and clinical features of Acute Tubular Injury/Necrosis & Tubulointerstitial Nephritis

# 10. Glomerular conditions associated with systemic disorders & Isolated Glomerular Abnormalities

- Discuss the pathophysiology, morphology and clinical features of glomerular conditions associated with systemic diseases
- Explain isolated glomerular abnormalities including IgA Nephropathy (Berger's Disease), Hereditary Nephritis and Alport Syndrome

### 11. Pyelonephritis

- Define Pyelonephritis
- List the causes and organisms of urinary tract infections
- Discuss the mechanism of ascending infection involving upper urinary tract and kidneys
- Discuss pathogenesis, morphological & clinical features of Acute & Chronic Pyelonephritis and Reflux Nephropathy
- Describe morphological features and complications of pyelonephritis

	<ol> <li>Tumors of renal system I</li> <li>Classify renal neoplasms</li> <li>Discuss benign neoplasms of the kidney</li> <li>Explain the risk factors, pathogenesis, molecular alterations, morphology &amp; clinical features of malignant renal neoplasms</li> <li>Tumors of renal system II</li> </ol>
	<ul> <li>Classify Urothelial tumors</li> <li>Discuss the etiology, pathogenesis, morphology, clinical features and diagnosis of urothelial tumors &amp; non-neoplastic lesions of urinary bladder</li> </ul>
	14. Renal Vascular Diseases
	<ul> <li>Classify renal vascular diseases</li> <li>Discuss the etiology, pathogenesis, morphology and clinical features of Nephrosclerosis, Malignant Nephrosclerosis, Renal Artery stenosis, Thrombotic Microangiopathies and other vascular disorders</li> </ul>
PEDIATRICS	1. Nephrotic syndrome
	2. AGN nephritis
	3. Acute renal failure
	4. Urinary tract infections
	<ul> <li>For the topics listed above:</li> <li>Define the conditions</li> <li>Describe their etiology, risk factors, sign and symptoms, investigations, management and complications</li> <li>Interpret investigations related to these conditions</li> <li>Interpret results of a urinalysis</li> </ul>
PHARMACOLOGY	1. Diuretics I & II
	<ul> <li>Classify Diuretics</li> <li>Discuss basic &amp; clinical pharmacology of those classes with their clinical uses, side effects &amp; contraindications</li> </ul>
<u>SURGERY</u>	<ul> <li>1. Urinary Symptoms and Investigations <ul> <li>Discuss the basis for diagnosing hematuria</li> <li>List the pigments that may discolor the urine, mimicking hematuria</li> <li>List the differential diagnosis for hematuria originating in the different anatomical parts of the urinary tract</li> <li>Justify the significance of the information gathered from the palpation of</li> </ul> </li> </ul>

	the prostate rectally
	• List the radiological investigations available for the assessment of the
	urinary tract
	• Describe the management plan for the patient with hematuria
	2. Kidneys and ureters
	• Differentiate between obstruction at different levels of the urinary
	tract based on history, clinical features and diagnostic modalities
	<ul> <li>Discuss the presenting features, signs and symptoms of urological emergencies</li> </ul>
	<ul> <li>Classify the urological emergencies based on etiology (excluding trauma)</li> <li>Justify differential diagnosis based on given data</li> </ul>
	• Discuss the appropriate investigations leading to a definite diagnosis
	• Devise a management plan according to clinical presentation
	• Interpret relevant investigations including kidney, ureter, and
	bladder (KUB) X-ray (KUB), Intravenous pyelogram (IVP)
	and CT Pyelography (calculi only)
	3. Urinary Bladder
	• Describe the etiology, presentation and management of benign and
	malignant conditions of urinary bladder
	• List the treatment options for benign and malignant urinary bladder
	diseases
<b>TUTORIALS</b>	<ul> <li>Discuss the following clinical features related to kidney and urinary system:</li> </ul>
MEDICINE	i. Pain & fever
	ii. Urinary obstructive symptoms (urgency, hesitancy, pain, frequency, altered flow of urine)
	iii. Burning sensation on micturition
	iv. Altered color and appearance of urine
PATHOLOGY	1. Urinary Analysis
	• Interpret urine detailed report
	• Discuss Lab/Dipsticks method of urine analysis
	• Identify proteinuria in a given sample of urine by Lab/Dipsticks method
	2. Urine Culture and Sensitivity (C/S)
	• Discuss the procedure of performing urine C/S
	• Identify the culture media and growth of different organism of UTI on
	culture plates
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	3. Histopathology of Glomerular Diseases
	<ul> <li>Discuss morphology (light microscopic, electron microscopic and</li> </ul>
	immunofluorescent microscopic features) of important diseases related
	to Nephritic and nephrotic syndromes

	<ul> <li>4. Histopathology of kidney, urinary bladder and Prostatic tumors</li> <li>Briefly discuss the morphology of renal, urinary bladder and prostatic tumors</li> </ul>
PHARMACOLOGY	<ul> <li>Role of Diuretics</li> <li>Justify management of clinical conditions with different classes of diuretics along with the pharmacokinetics and dynamics of those classes of drugs</li> </ul>
CLINICAL SKILLS	• Pass a Foley's catheter in male and female mannequins by following the given protocols
SKILLS LAB	• Take history of a urological case from a simulated patient
<u>To be learnt during</u> ward rotations	<ul> <li>Take a comprehensive and detailed history of kidney and urinary tract symptoms in detail</li> <li>Examine the abdominal system correctly</li> <li>Perform relevant examination and interpret the findings</li> <li>Observe Peritoneal and hemodialysis procedures</li> </ul>
INTERNAL ASSESSMENT	Internal assessment will take place as per institutional policy
FINAL EXAMINATION	MCQs and OSCE/OSPE (observed + unobserved)
COURSE EVALUATION	Course evaluation will be obtained through a feedback form which will be posted on the JSMU website