



# LEARNING OBJECTIVES UROGENITAL MODULE

2<sup>nd</sup> Professional MBBS (Session 2018-19)



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### **MODULE PLANNING COMMITTEE**

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|--------------------|---|
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### LIST OF ABBREVIATIONS

|                 |   |                |  |
|-----------------|---|----------------|--|
| <b>Anat-L</b>   | Anatomy Lecture   | <b>MCQs</b>    | Multiple Choice Questions                    |
| <b>Anat-SGD</b> | Small Group Discussion in Anatomy   | <b>Neph-L</b>  | Nephrology lecture                           |
|                 |   | <b>OSPE</b>    | Objectively Structured Practical Examination |
| <b>Bio-L</b>    | Biochemistry Lecture  | <b>Path-L</b>  | Pathology Lecture                            |
| <b>Bio-P</b>    | Biochemistry Practical  | <b>Phar-L</b>  | Pharmacology Lecture                         |
| <b>Bio-SGD</b>  | Small Group Discussion in Biochemistry  | <b>Phy-L</b>   | Physiology Lecture                           |
| <b>C. Med</b>   | Community Medicine  | <b>Phy-P</b>   | Physiology Practical                         |
| <b>DSL</b>      | Directed Self Learning  | <b>Phy-SGD</b> | Small Group Discussion in Physiology         |
| <b>FDT</b>      | Film/Demonstration/Tutorial   | <b>SDL</b>     | Self-Directed learning                       |
| <b>F. Med</b>   | Forensic Medicine   | <b>SAQs</b>    | Short Essay Questions                        |
| <b>Histo-P</b>  | Histology Practical   | <b>SGD</b>     | Small Group Discussion                       |
| <b>IPS</b>      | Islamiyat/Pak Studies   | <b>Surg-L</b>  | General surgery lecture                      |
| <b>PRIME</b>    | Professionalism and communication skills, Research, Identity formation, Management and leadership, Ethics |                |  |

**DISTRIBUTION & DURATION OF TEACHING ACTIVITIES**  
**AMONG DIFFERENT DISCIPLINES**

| <b>S No</b> | <b>Basic and Clinical Sciences</b> | <b>Lectures/DSLs (LGF)</b> | <b>Practicals/SDLs SGF</b> | <b>SGD/Dissection/FDT SGF</b> |
|-------------|------------------------------------|----------------------------|----------------------------|-------------------------------|
| 1           | General Anatomy                    | 11                         | ---                        | 10×2=20                       |
| 2           | Histology                          | 7                          | 7×2=14                     | ---                           |
| 3           | Embryology                         | 11                         | ---                        | ---                           |
| 4           | Physiology                         | 25                         | 1×2=2                      | 3×2=6                         |
| 5           | Biochemistry                       | 4                          | 5×2=10                     | 2×2=4                         |
| 6           | Pathology                          | 1                          | ---                        | ---                           |
| 7           | General Surgery                    | 1                          | ---                        | ---                           |
| 8           | Forensic Medicine                  | 1                          | ---                        | ---                           |
| 9           | Com. Medicine                      | 1                          | ---                        | ---                           |
| 10          | DSL                                | 6                          | ---                        | ---                           |
| 11          | IPS                                | 5                          | ---                        | ---                           |
| 12          | PRIME                              | 5                          | ---                        | ---                           |
| 13          | SDL                                | ---                        | 16×2=32                    | ---                           |
| 14          | FDT                                | ---                        | 3×2=6                      | ---                           |
| 15          | Dissection                         | ---                        | ---                        | 4×2=8                         |
|             | <b>Sub Totals</b>                  | <b>78</b>                  | <b>64</b>                  | <b>38</b>                     |
|             | <b>Grand Total</b>                 | <b>180</b>                 |                            |                               |

Please Note:

1. Large Group Format (LGF) has 125 students which includes Lecture and DSL.
2. Small Group Format (SGF) has 62 or 63 students which include Practical, SGD and SDL.
3. Duration of each Lecture is one hour.
4. Duration of each Practical, DSL or SGD is one and half hour.

## OBJECTIVES/OVERVIEW/FINAL COMPETENCIES

In Urogenital module the students will study the anatomy, physiology and biochemistry of the urinary (renal) and reproductive (genital) systems, with some of their related abnormalities. This is the final module of 2<sup>nd</sup> year of MBBS

By the end of the Foundation module the student shall be able to:

- 1) Describe the anatomy of structures in posterior abdominal wall in relation to kidneys and ureter
- 2) Describe the development, structure, and relations blood supply and venous drainage of kidneys
- 3) Describe the structure, functions and regulations of nephrons and tubules
- 4) Describe the mechanism of formation and constituents of urine
- 5) Describe the acid base balance and its regulation by the kidneys and lungs
- 6) Describe the development, structure, functions and relations of ureters, bladder and urethra
- 7) Describe the development, structure and functions of bony pelvis, uterus, ovaries and perineum
- 8) Describe the development, structure and functions of mammary glands
- 9) Explain the contents and mechanism of formation of milk
- 10) Describe the development, structure and functions of male genital organs

- 11) Explain the synthesis, mechanism of action, physiological effects and regulation of sex hormones in males and females and hormones released from placenta
- 12) Describe the physiology of gestation and parturition
- 13) Describe basic statistical tests and their significance
- 14) Describe the concept of empathy as part of professionalism
- 15) Explain the steps of research evaluation, its validity and reliability

The duration of Module will be 8 weeks in first year MBBS and will be followed by a block assessment of both Gastrointestinal and Urogenital modules at the end of this module.

## **TEACHING STRATEGIES**

### **Teaching strategies to be used to develop knowledge:**

- Lectures (Large Group Format)
- Audiovisual Aids
- Practical sessions
- Directed Self Learning (DSL)
- Self-directed learning (SDL)
- Small Group Discussions (SGD)
- Multidisciplinary Lectures (Vertical Integration)

### **Methods of assessment of knowledge acquired:**

1. End Of Module Assessment (MCQs, SEQs/SAQs)

### **Teaching strategies to be used to develop skills:**

- Practice on virtual models
- Laboratory sessions
- Lab Skills
- Hospital Visits

### **Methods of assessment of student's psychomotor skills:**

Evaluation of the activities in laboratories, homework assigned and  
Practical examination (OSPE)

## **ATTITUDE AND BEHAVIOUR**

**By the end of Foundation Module the student shall gain the ability and carry responsibility to:**

1. Demonstrate ability to give and receive feedback, respect for self and peers.
2. Demonstrate empathy and care to patients.
3. Develop respect for the individuality and values of others - (including having respect for oneself) patients, colleagues and other health professionals
4. Organize & distribute tasks
5. Exchange opinion & knowledge
6. Develop communication skills and etiquette with sense of responsibility.
7. To equip themselves for teamwork
8. Regularly attend the classes

**Teaching strategies to be used to develop attitude and behavior:**

1. SGDs
2. DSLs
3. SDLs
4. Assignment formation through team work

**Methods of assessment of students' interpersonal skills and capacity to carry responsibility:**

1. Class attendance should be recorded
2. Score for performance during SGD session using a designed Proforma.

## INSTRUCTIONAL METHODS

Principles and concepts covered in the Foundation Module will be studied by:

- **Lectures** will be given for the purpose of conveying deeper understanding of the general concepts and principles underlying normal and abnormal structure and function during the module.
- **Practical sessions** will be timetabled to enforce theoretical aspects of the subject but will be used for demonstrating skills/procedures and the use of electronic material will be encouraged.
- **Directed Self Learning**
- **Self-Directed Learning** sessions will promote self-learning and thus, time will be available for further study by the students using all available learning resources including electronic learning materials.
- **Small Group Discussion** will engage the students in small groups of about 35 students. The small group sessions on special topics will be organized for the purposes of enriching the students' general knowledge and overall understanding. It allows students to apply newly acquired knowledge and it is suitable for higher order cognitive objectives which will help in
  - Complementing knowledge in lectures
  - Expanding on the concepts considered in lectures
  - Encouraging student reflection
  - Developing students' communication skills
  - Encouraging active life-long learning

**INTENDED LEARNING OUTCOMES AND  
WEEKLY ACTIVITIES OF DIFFERENT DEPARTMENTS**

**WEEK 1**  
**THEME 1: LOIN PAIN**

**Department of Anatomy**

| <b>Activity Code</b> | <b>Topics</b>                              | <b>Learning Outcomes</b>  |
|----------------------|--|---|
| Anat-L1              | Posterior abdominal wall<br>1              | Describe the general features of lumbar vertebrae   |
|                      |  | Describe the special features of lumbar vertebrae   |
| Anat-L2              | Posterior abdominal wall<br>2              | Enlist the muscles of posterior abdominal wall.<br>Describe their origin, insertion, nerve supply and actions   |
|                      |  | Explain the course and relations of Abdominal Aorta   |
|                      |  | Enumerate and elaborate the paired branches of abdominal aorta  |
|                      |  | Discuss the formation of inferior vena cava   |
|                      |  | Illustrate the branches and distribution of lumbosacral plexus  |
| Embryology           | Development of kidney and excretory system | Enlist the stages of development of kidneys and excretory system  |
| Histo-P1             | Kidney                                     |   |
| FDT-1                | Posterior Abdominal Wall                   | Enumerate muscles of posterior abdominal wall.<br>Describe their origin, insertion, nerve supply and actions of muscles.<br>Describe the abdominal aorta.<br>Describe the contents of male pelvis<br>Describe the contents of female pelvis |
| Anat-SGD1            | Lumbar Vertebrae                           |   |
| Anat-DISSECTION-     | Dissection of Muscles of                   |   |

|   |                          |  |
|---|--------------------------|--|
| 1 | Posterior Abdominal Wall |  |
|---|--------------------------|--|

### Department of Physiology

| Activity Code | Topics   | Learning Outcomes  |
|---------------|--|--|
| Phy-L1        | Physiological Anatomy of the kidneys and Overview of its Functions | State major functions of the kidneys.  |
|               |  | Define the gross structures and their interrelationships: renal pelvis, calyces, renal pyramids, renal medulla (inner and outer zones), renal cortex, papilla.                                     |
|               |  | Define the components of the nephron and their interrelationships: renal corpuscle, glomerulus, nephron, and collecting-duct system.   |
|               |  | Draw the relationship between glomerulus, Bowman's capsule, and the proximal tubule.   |
|               |  | Describe the 3 layers separating the lumen of the glomerular capillaries and Bowman's space; defines podocytes, foot processes, and slit diaphragms.   |
|               |  | Define glomerular mesangial cells and states their functions and location within the glomerulus.   |
|               |  | List the individual tubular segments in order; state the segments that comprise the proximal tubule, Henle's loop, and the collecting-duct system; defines principal cells and intercalated cells. |
|               |  | List in order the vessels through which blood flows from the renal artery to the renal vein; contrasts the blood supply to the cortex and the medulla; defines vasa recta and vascular bundles.    |
|               |  | Describe, in general terms, the differences among superficial cortical, midcortical, and   |

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|        |   | juxtamedullary nephrons.   |
|        |   | Define juxtaglomerular apparatus and describes its 3 cell types; states the function of the granular cells.  |
|        |   | Define the basic renal processes: glomerular filtration, tubular reabsorption, and tubular secretion   |
| Phy-L2 | Glomerular Filtration: Determinants and Equation  | Describe how molecular size and electrical charge determine filterability of plasma solutes; states how protein binding of a low-molecular-weight substance influences its filterability.                                  |
|        |   | State the formula for the determinants of glomerular filtration rate, and states, in qualitative terms why the net filtration pressure is positive.  |
|        |   | Define filtration coefficient and states how mesangial cells might alter the filtration coefficient; states the reason glomerular filtration rate is so large relative to filtration across other capillaries in the body. |
|        | Describe how arterial pressure, afferent arteriolar resistance, and efferent arteriolar resistance influence glomerular capillary pressure. |  |
|        | Describe how changes in renal plasma flow influence average glomerular capillary oncotic pressure.  | Define renal blood flow, renal plasma flow, glomerular filtration rate, and filtration fraction, and gives normal values.  |
|        | State the Starling forces involved in capillary filtration.   | State the formula relating flow, pressure, and resistance in an organ.   |
|        | State how changes in  | Describe the relative resistances of the   |

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|        | each Starling force affect glomerular filtration rate                       | afferent arterioles and efferent arterioles.   |
|        |   | Describe the effects of changes in afferent and efferent arteriolar resistances on renal blood flow  |
| Phy-L4 | Autoregulation of GFR and renal blood flow                                  | Define autoregulation of renal blood flow and glomerular filtration rate   |
|        |   | Describe the myogenic and tubuloglomerular feedback mechanisms of autoregulation.  |
| Phy-L5 | Review of Transport Mechanisms across the Cell Membrane (Transport Maximum) | Define and state the major characteristics of diffusion, facilitated diffusion, primary active transport, secondary active transport (including symport and antiport) and endocytosis. |
|        |   | Describe the major morphological components of an epithelial tissue, including lumen, serosa, interstitium, apical and basolateral membranes, tight junctions, and lateral spaces.     |
|        |   | State how the mechanisms listed in Objective 1 can be combined to achieve active transcellular reabsorption in epithelial tissues.   |
|        |   | Define paracellular transport and differentiates between transcellular and paracellular transport.   |
|        |   | Define osmolality and osmolarity, and states why osmolarity is commonly used to approximate osmolality.  |
|        |   | Describe what is meant by the expression "water follows the osmoles."  |
|        |   | Describe qualitatively the forces that determine movement of reabsorbed fluid from the interstitium into peritubular capillaries.  |
|        |   | Compare the Starling forces governing glomerular filtration with those governing   |

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|        |  | peritubular capillary absorption.   |
|        |  | Compare and contrasts the concepts of $T_m$ and gradient-limited transport.   |
|        |  | Describe 3 processes that can produce bidirectional transport of a substance in a single tubular segment; states the consequences of pump-leak systems.                             |
|        |  | Contrast "tight" and "leaky" epithelia.   |
| Phy-L6 | Reabsorption /Secretion along Different Parts of the Nephron | List approximate percentages of sodium reabsorbed in major tubular segments.  |
|        |  | List approximate percentages of water reabsorbed in major tubular segments.   |
|        |  | Define the term <i>iso-osmotic volume</i> reabsorption.   |
|        |  | Describe proximal tubule sodium reabsorption, including the functions of the apical membrane sodium entry mechanisms and the basolateral sodium-potassium-adenosine triphosphatase. |
|        |  | Explain why chloride reabsorption is coupled with sodium reabsorption, and lists the major pathways of proximal tubule chloride reabsorption.                                       |
|        |  | State the maximum and minimum values of urine osmolality.   |
|        |  | Define osmotic diuresis and water diuresis.   |
|        |  | Explain why there is an obligatory water loss.  |
|        |  | Describe the handling of sodium by the descending and ascending limbs, distal tubule, and collecting-duct system.   |
|        |  | Describe the role of sodium-potassium-2 chloride symporters in the thick ascending limb.  |
|        |  | Describe the handling of water by descending and ascending limbs, distal tubule, and collecting-duct system   |

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| Phy-L7   | Regulation of Tubular Reabsorption | Discuss the regulation of tubular reabsorption along the different parts of nephron |
| Phy-SGD1 | Multi System Role of Kidneys       |   |

### Department of Biochemistry

| Activity Code    | Topics   | Learning Outcomes  |
|------------------|--|--|
| Bio-L1           | Buffers in regulation of pH                        | Describe Buffer Systems operating in the Body  |
| Bio L2           | Mechanisms for pH Regulation                       | Describe Respiratory Regulation of Acid Base Balance   |
|                  |  | Describe Renal Regulation of Acid Base Balance   |
| Bio-L3<br>Bio-L4 | Acid-Base Imbalance: Acidosis and Alkalosis I & II | Describe Disorders of Acid Base balance: their causes, mechanisms and compensations of Respiratory Acidosis & Alkalosis and Metabolic Acidosis & Alkalosis |
| Bio-P1           | Determination of Titrable Acidity of Given Urine   | Determine the titrable acidity of the given sample of urine<br>Explain the conditions in which the titrable acidity of urine increases or decreases        |
| Bio-SGD1         | Role of Potassium ions in acidosis and alkalosis   | Describe the Role of Potassium ions in acidosis and alkalosis  |

### PRIME

| Activity Code | Topics | Learning Outcomes |
|---------------|--------|-------------------|
|---------------|--------|-------------------|

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|----------------|---|--|
| <b>PRIME-1</b> | <b>Behavioral Sciences<br/>Gender and sexuality</b> |  |
|----------------|---|--|

### Islamiyat and Pakistan Studies

| <b>Activity Code</b> | <b>Topics</b>                 | <b>Learning Outcomes</b> |
|----------------------|-------------------------------|--------------------------|
| Islamiyat            | Spiritual diseases of doctors |                          |
| Pak Studies          | Pak and global challenges     |                          |

## WEEK 2 THEME 2: EDEMA

### Department of Anatomy

| <b>Activity Code</b> | <b>Topics</b>                    | <b>Learning Outcomes</b>   |
|----------------------|----------------------------------|--|
| Anat-L3              | Kidney                           | Enumerate the various coverings of the kidney  |
|                      |                                  | Explain the formation and clinical significance of coverings of the kidneys          |
|                      |                                  | Describe the gross structure of kidneys  |
|                      |                                  | Describe the structures entering and leaving the hilum of kidney and their relations |
|                      |                                  | Discuss the blood supply of kidney   |
|                      |                                  | Describe the relations of right and left kidney                                      |
| Emb-L2               | Development of collecting system | Describe the formation of pronephric, mesonephric and metanephric kidneys            |
|                      |                                  | Enumerate the derivatives of metanephric blastema and describe their development     |
|                      |                                  | Enumerate the derivatives of metanephric diverticulum/ureteric bud                   |
|                      |                                  | Describe the changes in position and blood supply of kidneys during development      |

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| Emb-L3           | Development and positional anomalies of kidney and ureter | Enlist the various types of developmental anomalies of kidneys along with their embryological causes                            |
|                  |   | Enlist the various types of developmental anomalies of ureters along with their embryological causes                            |
| Histo-L1         | Kidneys   | Describe the parenchyma of kidney   |
|                  |   | Enlist different components of uriniferous tubules  |
|                  |   | describe different components of nephron  |
|                  |   | Describe the histological features of renal corpuscle   |
| Histo-L2         |   | Describe glomerulus and glomerular basement membrane  |
|                  |   | Describe filtration barrier   |
|                  |   | Enlist the parts of collecting tubules  |
|                  |   | Discuss the histological differences between proximal and distal tubules  |
|                  |   | Describe the microscopic anatomy of collecting duct   |
|                  |   | Enlist the components of juxtaglomerular apparatus  |
|                  |   | Describe the blood supply of the kidneys  |
| Histo-P2         | Ureter and urinary bladder                                | Identify the slide of ureter and urinary bladder under the microscope   |
| Anat-FDT-2       | Kidneys   | Describe the gross structure of kidneys<br>Discuss the blood supply of kidney<br>Discuss the relations of right and left kidney |
| Anat-SGD2        | Studying Kidney Models                                    | Describe the anatomy and relations of the kidney  |
| Ana-DISSECTION-2 | Dissection of Kidneys                                     | Dissect the kidney and see its relation with other retroperitoneal structures and viscera                                       |
|                  |   |   |

### Department of Physiology

| Activity Code | Topics  | Learning Outcomes   |
|---------------|---|---|
| Phy-L7        | Regulation of Tubular Reabsorption                | Discuss the regulation of tubular reabsorption along the different parts of nephron |
| Phy-L8        | Body Fluid compartments (List; Values; Methods of | Describe the balance of input and output of fluid/water in body                     |

|         |                                    |   |
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|         | measurement)                       |   |
|         |                                    | Discuss the distribution of total body water into various body fluid compartments and their value   |
|         |                                    | Describe how to measure various body fluid compartments   |
| Phy-L9  | Concept of Fluid Shift             | Describe the concept of fluid shift between various body fluid compartments   |
|         |                                    | Discuss the changes in volume and osmolarity when various types of fluids are added to extracellular fluid compartment  |
|         |                                    | Explain how body equilibrates osmolarity when various types of fluids are added from outside.   |
| Phy-L10 | Edema: Excess Fluid in the Tissues | Define and classify edema   |
|         |                                    | Describe various factors responsible for development of edema   |
|         |                                    | Explain the pathophysiology of edema  |
|         |                                    | Describe the safety factors that prevent edema  |
| Phy-L11 | Concept Of Renal Clearance         | Define the terms clearance and metabolic clearance rate, and differentiates between general clearance and renal clearance.  |
|         |                                    | List the information required for clearance calculation   |
|         |                                    | State the criteria that must be met for a substance so that its clearance can be used as a measure of glomerular filtration rate; states which substances are used to measure glomerular filtration rate and effective renal plasma flow. |
|         |                                    | Calculate $C_{In}$ , $C_{PAH}$ , $C_{urea}$ , $C_{glucose}$ , $C_{Na}$ .  |
|         |                                    | Predict whether a substance undergoes net reabsorption or net secretion by comparing its clearance with that of inulin or by comparing its rate of filtration with its rate of excretion.   |
|         |                                    | Calculate net rate of reabsorption or secretion for any substance.  |
|         |                                    | Calculate fractional excretion of any substance.  |
|         |                                    | Describe how to estimate glomerular filtration rate from $C_{Cr}$ and describes the limitations.  |
|         |                                    | Describe how to use plasma concentrations of urea and creatinine as indicators of changes in glomerular filtration rate.  |

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| Phy-L12<br>Phy-L13 | Mechanism of diluted & concentrated urine formation         | Describe the process of "separating salt from water" and how this permits excretion of either concentrated or dilute urine.   |
|                    |   | Describe how antidiuretic hormone affects water reabsorption.   |
|                    |   | Describe the characteristics of the medullary osmotic gradient.   |
|                    |   | Explain the role of the thick ascending limb, urea recycling, and medullary blood flow in generating the medullary osmotic gradient.  |
|                    |   | State why the medullary osmotic gradient is partially "washed out" during a water diuresis  |
|                    |   | Describe the origin of antidiuretic hormone and the 2 major reflex controls of its secretion; define diabetes insipidus; state the effect of antidiuretic hormone on arterioles.                                    |
|                    |   | Distinguish between the reflex changes that occur when an individual has suffered iso-osmotic fluid loss because of diarrhea as opposed to a pure water loss (ie, solute-water loss as opposed to pure-water loss). |
|                    |   | Describe the control of thirst.   |
|                    |   | Describe the pathways by which sodium and water excretion is altered in response to sweating, diarrhea, hemorrhage, high-salt diet, and low-salt diet.  |
| Phy-L14            | Osmoreceptors:<br>ADH Feedback System &<br>Thirst mechanism | Explain Osmoreceptor-ADH Feedback System  |
|                    |   | Describe formation and Regulation of ADH Secretion  |
|                    |   | Explain role of ADH for regulating plasma osmolarity and sodium concentration   |
|                    |   | Explain relation of ADH secretion to decreased arterial pressure and decreased blood volume.  |
|                    |   | Explain thirst mechanism including Centers and Stimuli of thirst  |
| Phy-SGD2           | Hypernatremia and Hyponatremia                              | Describe the causes, symptoms and signs and treatment of Hypernatremia and Hyponatremia   |

## Department of Biochemistry

| Activity Code | Topics   | Learning Outcomes  |
|---------------|--|--|
| Bio-L4        | Acid-Base Imbalance:<br>Acidosis and Alkalosis I & II            | Describe Disorders of Acid Base balance: their causes, mechanisms and compensations of Respiratory Acidosis & Alkalosis and Metabolic Acidosis & Alkalosis |
| Bio-P2        | Estimation of the concentration of creatinine in the given urine | Determine the concentration of creatinine in the given sample of urine<br>Name the conditions in which creatinine in urine will increase or decrease       |
| Bio-SGD2      | Metabolic alkalosis  | Discuss the causes, diagnosis and treatment of metabolic alkalosis   |

### PRIME

| Activity Code | Topics                                       | Learning Outcomes |
|---------------|--|-------------------|
| PRIME-2       | Community medicine<br>Statistics in research |                   |

### Islamiyat and Pakistan Studies

| Activity Code | Topics                      | Learning Outcomes |
|---------------|-----------------------------|-------------------|
| Islamiyat     | Doctor patient relationship |                   |
| Pak Studies   | Pak-Afghan relation         |                   |

### Department of Pathology

| Activity Code | Topics                                    | Learning Outcomes  |
|---------------|---|--|
| Path-L1       | Glomerulonephritis and Nephrotic Syndrome | Describe the etiology and pathogenesis of glomerulonephritis<br>Describe nephrotic syndrome and its etiology |

**WEEK 3**  
**THEME 3: URINARY RETENTION**

**Department of Anatomy**

| <b>Activity Code</b> | <b>Topics</b>               | <b>Learning Outcomes</b>   |
|----------------------|-----------------------------|--|
| Anat-L4              | Ureters and urinary bladder | Describe the gross anatomy of ureters  |
|                      |                             | Describe the relations of right ureter in males and females                              |
|                      |                             | Describe the relations of left ureter in males and females                               |
|                      |                             | Highlight the clinical significance of relations of right and left ureters in both sexes |
|                      |                             | Describe the gross structure of urinary bladder  |
|                      |                             | Discuss the blood supply and nerve supply of urinary bladder                             |
|                      |                             | Discuss the relations of urinary bladder in males  |

|                   |   |  |
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|                   |   | Discuss the relations of urinary bladder in females                                |
| Anat-L5           | Prostate & Urethra                                    | Describe the structure of prostate gland   |
|                   |   | define Benign prostatic hyperplasia and its clinical significance                  |
|                   |   | Describe the gross anatomy of urethra  |
|                   |   | Enlist the differences between male and female urethra                             |
| Emb-L4            | Development of bladder and urethra in male and female | Describe the development of bladder  |
|                   |   | Discuss the developmental anomalies of bladder                                     |
|                   |   | Describe the development of male urethra   |
|                   |   | Describe the development of prostate and bulbourethral glands                      |
|                   |   | Describe the development of female urethra   |
| Emb-L5            | Developmental defects of bladder                      | Discuss the developmental anomalies of urinary bladder and male and female urethra |
| Histo-L3          | Prostate, Ureter, urinary bladder and urethra         | Describe the microscopic structure of prostate                                     |
|                   |   | Describe the microscopic structure of ureter                                       |
|                   |   | Describe the microscopic structure of urinary bladder                              |
| Histo-P3          | Prostate & Ovary                                      | Identify the slide of prostate under the microscope                                |
| Ana-SGD3          | Studying relations of ureters and bladder             | Discuss the relations of left and right ureters and bladder                        |
| Ana-SGD-4         | Studying male pelvis model                            | Describe the bones, soft tissues and contents of male pelvis                       |
| Ana-Dissection -3 | Dissection of ureters and urinary bladder             | To study the pelvic viscera insitu.<br>To dissect the ureters and urinary bladder  |

**Department of Phisiology**

| Activity Code | Topics   | Learning Outcomes  |
|---------------|--|--|
| Phy-L15       | Renal regulation of Potassium                  | State the normal balance and distribution of potassium within different body compartments, including cells and extracellular fluid.  |
|               |  | Describe how potassium moves between cells and the extracellular fluid, and how, on a short-term basis, the movement protects the extracellular fluid from large changes in potassium concentration. |
|               |  | Describe how plasma levels of potassium do not always reflect the status of total-body potassium.  |
|               |  | State generalizations about renal potassium handling for persons on high- or low-potassium diets.  |
|               |  | State the relative amounts of potassium reabsorbed by the proximal tubule and thick ascending limb of Henle's loop regardless of the state of potassium intake.                                      |
|               |  | Describe how the cortical collecting duct can manifest net secretion or reabsorption; describes the role of principal cells and intercalated cells in these processes.                               |
|               |  | List the 3 inputs that control the rate of potassium secretion by the cortical collecting duct.  |
|               |  | Describe the mechanism by which changes in potassium balance influence aldosterone secretion.  |
|               |  | State the effects of most diuretic drugs and osmotic diuretics on potassium excretion.   |
|               |  | Describe the association between perturbations in acid-base status and the plasma potassium level  |
| Phy-L16       | Long term control of Blood pressure by Kidneys | Describe the 3 temporal domains of blood pressure control and the major mechanisms associated with them.   |
|               |  | Describe the relationship between renin and angiotensin II.  |
|               |  | Describe the 3 detectors that can alter renin secretion.   |
|               |  | Define pressure natriuresis and diuresis.  |

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|          |                                      | Define tubuloglomerular feedback and describe the mechanism for tubuloglomerular feedback and autoregulation of glomerular filtration rate |
| Phy-L17  | Micturition reflex                   | Explain the mechanism of micturition   |
|          |                                      | Explain basal cystometrogram   |
|          |                                      | Describe the nervous control of bladder functions  |
| Phy-SGD3 | Renal control of Calcium & Phosphate | State the normal total plasma calcium concentration and the fraction that is free.   |
|          |                                      | Describe the distribution of calcium between bone and extracellular fluid and the role of bone in regulating extracellular calcium.        |
|          |                                      | Describe and compare the roles of the gastrointestinal tract and kidneys in calcium balance.   |
|          |                                      | Describe and compare osteocytic osteolysis and bone remodeling.  |
|          |                                      | Describe the role of vitamin D in calcium balance.   |
|          |                                      | Describe the synthesis of the active form of vitamin D (calcitriol) and how it is regulated.   |
|          |                                      | Describe the regulation of parathyroid hormone secretion and state the major actions of parathyroid hormone.                               |
|          |                                      | Describe renal handling of phosphate.  |
|          |                                      | Describe how parathyroid hormone changes renal phosphate excretion.  |

### Department of Biochemistry

| Activity Code | Topics   | Learning Outcomes |
|---------------|--|-------------------|
| Bio-P3        | Estimation of the concentration of urea in the blood |                   |

### PRIME

| Activity Code | Topics                       | Learning Outcomes |
|---------------|------------------------------|-------------------|
| PRIME-3       | Medical Education<br>Empathy |                   |

### Islamiyat and Pakistan Studies

| Activity Code | Topics                      | Learning Outcomes |
|---------------|-----------------------------|-------------------|
| Islamiyat     | Doctor patient relationship |                   |
| Pak Studies   | Pak-Afghan relation         |                   |

### Department of Surgery

| Activity Code | Topics                                     | Learning Outcomes |
|---------------|--|-------------------|
| Surg-L1       | Urinary Retention:<br>Causes and Treatment |                   |

### WEEK 4

### THEME 4: OBSTRUCTED LABOUR

### Department of Anatomy

| Activity Code | Topics | Learning Outcomes   |
|---------------|--------|---|
| Anat-L6       | Uterus | Describe the gross structure, location and relations of uterus                                |
|               |        | Describe the blood supply of uterus   |
|               |        | describe the boundaries of pouch of douglas/recto-uterine pouch and its clinical significance |
|               |        | Describe the gross structure, location and relations of fallopian tubes                       |
|               |        | Describe the blood supply of fallopian tubes  |
|               |        | Enlist various support mechanisms of uterus   |

|          |                                       |  |
|----------|---------------------------------------|--|
|          |                                       | Describe the formation and components of broad ligament                                  |
|          |                                       | Discuss the clinical correlates of uterus and fallopian tubes                            |
|          | Ovary                                 | Describe the gross structure, location and relations of ovaries.                         |
|          |                                       | Describe the blood supply of ovaries   |
|          |                                       | Name ligaments supporting the ovaries  |
| Anat-L7  | Pelvic Floor                          | Describe the general features of sacrum  |
|          |                                       | Describe the special features of sacrum  |
|          |                                       | Name the muscles making the pelvic floor   |
|          |                                       | Describe their origin, insertion, nerve supply and actions of muscles of pelvic floor    |
|          |                                       | Describe the boundaries and contents of superficial perineal pouch                       |
|          |                                       | Describe deep perineal pouch   |
|          |                                       | List the boundaries and contents of ischio rectal (anal) fossa                           |
|          |                                       | Give the clinical significance of ischio rectal fossa                                    |
| Emb-L6   | Development of genital system         | Discuss the development of genital system (the indifferent gonad)                        |
| Emb-L7   | Development of ovaries/ mammary gland | Describe the development of ovaries  |
|          |                                       | Describe the development of mammary gland  |
|          |                                       | Enlist various developmental anomalies of mammary gland along with embryological reasons |
| Emb-L8   | Development of uterus                 | Describe the development of uterus   |
|          |                                       | Enlist the various developmental Anomalies of uterus                                     |
|          |                                       | describe the remnants of mesonephric and paramesonephric ducts in females                |
| Histo-L4 | Ovary                                 | Describe the microscopic structure of ovary  |
|          |                                       | Elaborate the different stages of ovarian follicle                                       |
| Histo-L5 | Uterus                                | Describe the microscopic structure of uterus   |

|           |                                      |  |
|-----------|--------------------------------------|--|
|           |                                      | Discuss the microscopic features of endometrium in different phases of menstrual cycle   |
| Histo-L6  | Mammary gland                        | Describe the microscopic features of inactive mammary gland  |
| Anat-SGD5 | Osteology of sacrum                  | Discuss the anatomy of the sacrum  |
| Anat-SGD6 | Osteology of pelvic inlet and outlet | Describe the boundaries of the pelvic inlet and outlet<br>Describe the structures passing through the pelvic inlet and outlet. |
| Anat-SGD7 | Study of female pelvic model         | Describe the anatomy, boundaries and contents of the female pelvis.<br>Describe the differences between male and female pelvis |
| Anat-SGD8 | Studying pelvic floor muscles        | Describe the origin, insertion, nerve and blood supply of pelvic floor muscles   |
| Histo- P4 | Uterus (proliferative and secretory) | Identify the slide of proliferative and secretory phases of uterus under the microscope  |
| Histo- P5 | Mammary gland (active and inactive)  | Identify the slide of active and inactive states of mammary gland under the microscope   |
| FDT-3     | Male and female Pelvis               | To discuss different features of male and female pelvis.<br>To describe the differences between male and female pelvis.        |

### Department of Physiology

| Activity Code | Topics                             | Learning Outcomes  |
|---------------|------------------------------------|--|
| Phy-L19       | Overview of Reproductive System    | Describe the spermatogenesis   |
|               |                                    | Explain the function of prostate gland.                                      |
|               |                                    | Describe the composition of semen  |
| Phy-L20       | Physiological changes in Pregnancy | Describe the transport of fertilization ovum in the fallopian in the uterus. |
|               |                                    | Explain the effects of HCG in causing persistence in pregnancy               |
|               |                                    | Describe the secretion of estrogen and progesterone by placenta              |
|               |                                    | Describe the secretion of estrogen and progesterone by placenta              |

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|         |                               | Describe the functions of HCS.  |
|         |                               | Describe the maternal changes in pregnancy  |
|         |                               | Describe the changes in maternal circulatory system during pregnancy.             |
|         |                               | Describe the development of breast during pregnancy.                              |
| Phy-L21 | Parturition                   | Explain the process of parturition and involution of the uterus after parturition |
| Phy-L22 | Physiology of lactation       | Explain the functions of prolactin  |
|         |                               | Describe the ejection or "let down" of milk.                                      |
|         |                               | Explain the composition of milk.  |
| Phy-L23 | Fetal and Neonatal Physiology | Describe Growth and Functional Development of the Fetus                           |
|         |                               | Describe Adjustments of the Infant to Extrauterine Life                           |
|         |                               | Discuss Special Functional Problems in the Neonate                                |
|         |                               | Discuss Special Problems of Prematurity   |

### Department of Biochemistry

| Activity Code | Topics   | Learning Outcomes  |
|---------------|--|--|
| Bio-P4        | Estimation of the concentration of Creatinine in the given serum | Estimate the concentration of creatinine in the given serum<br>Name the conditions in which serum creatinine will increase or decrease |

### PRIME

| Activity Code | Topics  | Learning Outcomes |
|---------------|---|-------------------|
| PRIME-4       | Community medicine<br>Evaluating a research article |                   |

## Islamiyat and Pakistan Studies

| <b>Activity Code</b> | <b>Topics</b>                                       | <b>Learning Outcomes</b> |
|----------------------|---|--------------------------|
| Islamiyat            | Doctor as advocate of character building in society |                          |
| Pak Studies          | Pak-Saudi relation                                  |                          |

## WEEK 5

### THEME 5: INFERTILITY

#### Department of Anatomy

| <b>Activity Code</b> | <b>Topics</b>      | <b>Learning Outcomes</b>   |
|----------------------|--------------------|--|
| Anat-L8              | Perineum-1         | Describe the anatomy of perineum   |
|                      |                    | Describe superficial and deep perineal pouches   |
| Anat-L9              | Perineum-2         | Describe the muscles of perineum, their origin, insertion, nerve supply and actions of these muscles |
| Anat-L10             | Scrotum and testes | Describe the anatomy of scrotum  |

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|          |  |   |
|          |  | Discuss the gross anatomy of testes   |
|          |  | Describe the coverings and contents of spermatic cord                                 |
|          |  | Describe epididymis, ductus deferens and seminal vesicles                             |
|          |  | Describe the clinical correlates of male genital system                               |
| Anat-L11 | Female genitalia and vaginal canal                       | Give the gross Anatomy of female external genitalia and vagina                        |
| Emb-L9   | Development of external genitalia in males and females   | Describe the development of external genitalia in males                               |
|          |  | Describe the development of external genitalia in females                             |
|          |  | Discuss the developmental anomalies of male and female genitalia                      |
| Emb-L10  | Development of testis                                    | Describe the development of testis  |
|          |  | Name the factors responsible for descent of testis                                    |
|          |  | Discuss the descent of testis   |
|          |  | Describe the developmental anomalies of testes  |
| Emb-L11  | Development of genital ducts                             | Discuss the development of epididymus, vas deferens and seminal vesical               |
|          |  | Describe the development of vagina  |
|          |  | describe the remnants of mesonephric and paramesonephric ducts in males               |
| Histo-L7 | Testes, Epididymis, ductus deferens and seminal vesicles | Discuss general microscopic structure of testes                                       |
|          |  | Discuss seminiferous tubule.  |
|          |  | Discuss different cells of seminiferous epithelium                                    |
|          |  | Define blood testes barrier   |
|          |  | describe the microscopic structure of epididymis, ductus deferens and seminal vesicle |

|              |                                     |  |
|--------------|-------------------------------------|--|
|              |                                     | Describe the microscopic structure of fallopian tube                                     |
| Anat-SGD9    | Studying superficial perineal pouch | Describe the boundaries, contents and anatomical relations of superficial perineal pouch |
| Anat-SGD10   | Studying deep perineal pouch        | Describe the boundaries, contents and anatomical relations of deep perineal pouch        |
| DISSECTION-4 | Dissection of scrotum and testis    | Dissect the scrotum and testis   |
| Histo-P6     | Testis and epididymis               | Identify the slide of Testes, epididymis.  |
| Histo-P7     | Fallopian tube and ductus deferens  | Identify the slide of Fallopian tube and ductus deferens under the microscope            |

### Department of Physiology

| Activity Code | Topics  | Learning Outcomes  |
|---------------|---|--|
| Phy-L24       | Hormonal cyclical changes of Female reproductive system | Describe the monthly ovarian cycle.  |
|               |   | Describe the effects of gonadotropic hormones on the ovaries.  |
|               |   | Describe the functions of estrogens  |
|               |   | Describe the functions of progesterone   |
|               |   | Explain monthly endometrial cycle.   |
|               |   | Describe the role of hypothalamic and Pituitary ovarian system in controlling the female hormones.           |
|               |   | Define puberty, menarche and menopause.  |
|               |   | Enumerate the changes produced in puberty.   |
| Phy-L25       | Functions of Testosterone                               | Describe the structure, secretion, mechanism of action, physiological actions and regulation of Testosterone |
|               |   | Describe the hormonal changes occurring in puberty in males and females                                      |
|               |   | Relate the functions of testosterone with its secretion and metabolism                                       |
|               |   | Describe the intracellular mechanism of action of testosterone   |
|               |   | Relate the control of secretion of testosterone with its congenital and acquired abnormalities               |
| Phy-P1        | Pregnancy Test  | Perform and interpret the pregnancy test   |

## Department of Biochemistry

| Activity Code    | Topics   | Learning Outcomes  |
|------------------|--|--|
| Bio-L5<br>Bio-L6 | Testosterone,<br>Estrogen & Progesterone                       | Discuss the chemistry of these hormones  |
|                  |  | Describe the synthesis of these hormones   |
|                  |  | Discuss the enzyme deficiencies and their manifestations   |
|                  |  | Describe the diagnostic role of 17-ketosteroids' excretion in urine  |
|                  |  | Describe the mechanism of action of these hormones and their receptors   |
|                  |  | Describe the classical & non classical target organs of these hormones   |
|                  |  | Describe the metabolic functions of these hormones   |
|                  |  | Describe the regulation of these hormones especially by FSH & LH   |
|                  |  | Discuss the manifestations of deficiency and excess of these hormones  |
|                  |  | Discuss the andropause and menopause   |
|                  |  | Discuss the role of LHRH Agonists and antagonists as well as anti-androgens  |
|                  |  | Discuss the role of 5 $\alpha$ -Reductase Inhibitors   |
| Bio-P5           | Estimation of the concentration of chloride in the given serum | Estimate the concentration of Chloride in the given serum<br>Describe the conditions in which serum chloride increases or decreases. |

### PRIME

| Activity Code | Topics                                 | Learning Outcomes |
|---------------|--|-------------------|
| PRIME-5       | Medical education<br>Sexual harassment |                   |

### Islamiyat and Pakistan Studies

| Activity Code | Topics  | Learning Outcomes |
|---------------|---|-------------------|
| Islamiyat     | Doctor as advocate of character building in society |                   |
| Pak Studies   | Pak-Saudi relation                                  |                   |

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### Department of Forensic Medicine

| Activity Code | Topics   | Learning Outcomes                                |
|---------------|--|--|
| FMed-L1       | Abortion                                       | Define abortion                                  |
|               |  | Describe the type of abortion                    |
|               |  | Discuss criminal abortion and its complications  |
|               |  | Explain the findings of abortion in victims      |
|               |  | Describe the indications of therapeutic abortion |
|               | Diagnosis and medicolegal aspects of pregnancy | Describe the steps of diagnosis of pregnancy     |
|               |  | Explain the medicolegal aspects of pregnancy     |

### Department of Community Medicine

| Activity Code | Topics                             | Learning Outcomes  |
|---------------|------------------------------------|--|
| CMed-L1       | Safe motherhood and its components | Describe the steps of antenatal and postnatal care, family planning and emergency obstetric care |
|               | Breast feeding                     | Explain the importance of breast feeding   |
|               | Maternal mortality                 | Describe the causes, impact and prevention of maternal mortality in Pakistan                     |

### LEARNING RESOURCES

#### Textbooks:

1. The Developing Human: Clinically Oriented Embryology, by Dr. Keith L. Moore, T.V.N. Persaud, and Mark G. Torchia, 9th edition ,Elsevier Saunders;2013
2. Clinical Anatomy by Regions. by Richard S. Snell MD.PhD 9th edition ; Lippincott Williams and Wilkins;2012
3. Clinical Neuroanatomy by Richard S. Snell MD.PhD 7th edition ;Lippincott Williams and Wilkins;2004
4. Last's Anatomy, Regional and Applied by Chummy S. Sinnatamby FRCS Twelfth Edition Churchill Livingstone;2011
5. Langman's Medical Embryology, by T.W.Sadler 13th edition;Lippincott Williams and Wilkins;2015

6. Junqueira's Basic Histology, Text and Atlas by Anthony L. Mescher, Ph.D...13th edition...McGraw Hill ;2013
7. Gray's Anatomy, the Anatomical Basis of Clinical Practice, by Susan StandringPhD,DSc 41st edition,Elsevier USA;2014
8. Color Textbook of Histology; 3rd ed.; Gartner LP & Hiatt JL; WB Saunders Company; 2004.
9. Textbook of Medical Physiology; 13th ed.; Guyton AC and Hall JE; Saunders / Elsevier Co.; 2016.
10. Human Physiology from Cell to System; 9th ed.; Lauralee Sherwood; Brooks/Cole Pub. Co.; 2015.
11. Harper's Illustrated Biochemistry; 30th ed.; Robert K Murray; 2015.
12. Textbook Medical Biochemistry, 8th ed.; Chatterjea MN, ShindeRana, JAYPEE, 2013.
13. Robbins Basic Pathology; 9th ed.; Cotran RS, Robbins SL and Kumar V; WB Saunders Company; 2011.
14. Lippincott's Illustrated Review of Pharmacology; 6th ed.; Richard A Harvey & Pamela C Champe; Lippincott's Williams & Wilkins; 2015.
15. ABC of Learning and Teaching in Medicine; Cantillon P, Hutchinson L and Wood D; BMJ Publishing Groups Books; 2003.
16. Davidson's Principles and Practice of Medicine; 22th ed; 2014.
17. Katzung Basic and Clinical Pharmacology; 12th ed.; Katzung B; McGraw Hill Medical Company; 2012.
18. Kumar & Clerk Internal Medicine; 8th ed.; Saunders; 2013.