SARDAR PATEL UNIVERSITY

Rules and Regulations for

Post graduate Diploma in Dialysis Technology
(PG-DIDT)

(w.e.f. JUNE-2011)

R. DIDT. 1: Eligibility for the admission:

a) A Candidate for admission to the Post graduate Diploma in Dialysis Technology (PG-DIDT) must have passed the B Sc. Degree examination of the Sardar Patel University with Medical Technology (any speciality) / Microbiology / Bio Chemistry / Zoology / Botany / Chemistry / BioTechnology / Environment Science / Genetics / Bioinformatics as principal subject or B. Sc. (Home Science) (Vocational) or B. Sc (Industrial Microbiology) (Vocational) or B.Sc. (Nursing) / Bachelor of Physiotherapy (BPT) / Bachelor of Homeopathic Medicine and Surgery (BHMS) / Bachelor of Ayurvedic Medicine and Surgery (BAMS) examination of Sardar Patel University or an equivalent examination from any other recognized university.

b) A candidate who has passed an equivalent examining body and is seeking admission to the Institute recognised by this University shall not be admitted without producing on eligibility certificate from the Sardar Patel University

R. DIDT. 2: Duration of the course:
The course of study for the Post graduate Diploma in Dialysis Technology (PG-DIDT) shall be a full time course and its duration shall be of one academic year.

R. DIDT. 3: Medium of instruction:
The medium of instruction and examination shall be in English.

R. DIDT. 4: Criteria for eligibility to appear in University examination
To become eligible to appear in the final examination conducted by Sardar Patel University -

a) a candidate has to keep two terms at the Institute recognised for teaching the course of studies in Post graduate Diploma in Dialysis Technology by the university.

b) a candidate has to keep the minimum attendance of 75% in Theory and Practicals separately.

c) a candidate has to obtain at least 30% marks in aggregate of all the papers/practical in the internal tests conducted by the Institute.
R. DIDT.5: The subjects for Post graduate Diploma in Dialysis Technology (PG-DIDT) and their total teaching hours during the course shall be as under:

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Subject</th>
<th>Course Code</th>
<th>Total Teaching hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Anatomy and Physiology</td>
<td>PG-DIDT-101</td>
<td>90</td>
</tr>
<tr>
<td>2</td>
<td>Biochemistry and Pathology</td>
<td>PG-DIDT-102</td>
<td>90</td>
</tr>
<tr>
<td>3</td>
<td>Dialysis Technology I</td>
<td>PG-DIDT-103</td>
<td>90</td>
</tr>
<tr>
<td>4</td>
<td>Dialysis Technology II</td>
<td>PG-DIDT-104</td>
<td>90</td>
</tr>
<tr>
<td>5</td>
<td>Practicals and Oral (P)</td>
<td>PG-DIDT-105</td>
<td>90</td>
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<tr>
<td></td>
<td>Total Teaching hours-Theory &amp; Practicals</td>
<td></td>
<td>450</td>
</tr>
<tr>
<td></td>
<td>Clinical/Laboratory Posting</td>
<td></td>
<td>540</td>
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<tr>
<td></td>
<td><strong>Total Teaching hours</strong></td>
<td></td>
<td><strong>990</strong></td>
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</tbody>
</table>
R. DIDT. 6: Subjects-wise credits and Scheme of examination shall be as follows:

**PG-DIDT**  
Subject-wise credits, Examination System and Marks distribution:  
Theory and Practical

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Subject</th>
<th>Credit</th>
<th>Duration of Examination (hours)</th>
<th>Distribution of marks</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>PG-DIDT-101</td>
<td>Anatomy and Physiology</td>
<td>3</td>
<td>3 hours</td>
<td>80 20</td>
<td>100</td>
</tr>
<tr>
<td>PG-DIDT-102</td>
<td>Biochemistry and Pathology</td>
<td>3</td>
<td>3 hours</td>
<td>80 20</td>
<td>100</td>
</tr>
<tr>
<td>PG-DIDT-103</td>
<td>Dialysis Technology I</td>
<td>3</td>
<td>3 hours</td>
<td>80 20</td>
<td>100</td>
</tr>
<tr>
<td>PG-DIDT-104</td>
<td>Dialysis Technology II</td>
<td>3</td>
<td>3 hours</td>
<td>80 20</td>
<td>100</td>
</tr>
<tr>
<td>PG-DIDT-105 (P)</td>
<td>Practicals and Oral</td>
<td>3</td>
<td>1 day</td>
<td>160 40</td>
<td>200</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>600</strong></td>
</tr>
</tbody>
</table>
R. DIDT. 7: Eligible candidate desirous for appearing in the University examination of any/all theory papers must forward his/her application in the prescribed form from the respective college to the University on or before the date prescribed for the purpose under the relevant ordinance.

R. DIDT.8: Standard of passing:
The standard of passing the Post graduate Diploma in Dialysis Technology degree examination will be as under:
(a) To pass the PG-DIDT examination, a candidate must obtain at least 45% marks (aggregate of external and internal) in each subject and in practical separately.
(b) Award of class will be as per the other degree examinations of faculty of Medicine, Sardar Patel University.

R. DIDT. 9: The Post graduate Diploma in Dialysis Technology shall not be conferred upon a candidate unless he/she has passed in all the subjects of the theory examination and the practical in accordance with the provisions of relevant regulations.
PAPER I:

ANATOMY AND PHYSIOLOGY

COURSE CODE: PGDIDT: 101

ANATOMY

1. Urinary System:
   - Introduction to Urinary System
   - Kidney
     - Location
     - Size and shape
     - External structure
     - Hilum of the kidney
     - Internal Structure
     - Organs associated with kidney
     - Coverings of the kidney
     - Blood supply
     - Nerve supply
   - Nephron
     - Introduction
     - Size and shape
     - Structure
     - Types
     - Collecting duct
   - Ureter
     - Location
     - Size and shape
     - Structure
     - Blood supply
     - Nerve supply
   - Urinary Bladder
     - Location
     - Size and shape
     - Three layers of bladder wall
     - Structures
     - Relations of urinary bladder
     - Blood flow
Nerve supply

2. Arteries and Veins of the Limbs and the Neck
   Radial Artery and Vein
   Brachial Artery and Vein
   Cephalic Vein
   Basillic Vein
   Ulnar Artery and Vein
   Femoral Artery and Vein
   Great Saphenous Vein
   Intra Jugular Vein
   Subclavian Vein

3. Peritoneum
   Peritoneal Membrane
   Perital peritoneum
   Visceral peritoneum
   Folds of peritoneum
   Peritoneal cavity
   Arterial supply
   Venous drainage

   Pores
   Large pores
   Small pores
   Ultra pores

PHYSIOLOGY

1. Functions of Kidney
   Role in Homeostasis
   Excretion of waste products
   Maintenance of water balance
   Maintenance of electrolyte balance
   Maintenance of acid base balance
   Hemopoietic Functions
   Endocrine Functions
   Blood Pressure Regulation
   Regulation of Blood Calcium level

2. Micturation
   Process of filling
   Sphincters
   Micturition
   Micturition reflux
1. Proteins, Minerals, Vitamins
Proteins:
   Plasma proteins
   Albumin
   Globulin
   Immunoglobulins
   Fibrinogen
   Amino acids
   Functions of proteins
   Protein requirements
   Causes of protein deficiency

   Complications of protein deficiency
   Dietary sources of protein

Vitamins
   Water soluble and Fat soluble
   Recommended dietary allowances
   Deficiency diseases
   Upper intake level
   Overdose disease
   Dietary sources

Minerals (Dietary resource, requirement, uses and sources)
   Introduction
   Sodium
   Potassium
   Calcium
   Iron
   Magnesium
   Phosphate
   Iodine
   Copper
   Cobalt
   Chloride
   Fluoride

2. Nucleoproteins
   Hemoglobin
3. Nutrition
   RDA for healthy individuals and for dialysis patients
   RDA for health individuals
   RDA for Hemodialysis patients
   RDA for Peritoneal dialysis patients

PATHOLOGY

1. Acute Renal Failure
   Definition
   Causes
   Prerenal
   Renal
   Post renal
   Pathophysiology
   Prevention
   Risk factors
   Treatment
   Signs and symptoms

2. Chronic Renal failure
   Definition
   Causes
   Pathophysiology
   Prevention
   Treatment and Management

3. Urinary tract infection
   Causes
   Prevention
   Treatment

4. Diabetes
   Types
   Treatment
   Complications

5. Hypertension
   Types
   Treatment
   Complications
1. Types of Hemodialysis
   Conventional Hemodialysis
   Daily Hemodialysis
   Nocturnal Hemodialysis

2. Principles of Hemodialysis
   Ultrafiltration
   Diffusion
   Osmosis
   Convection

3. Dialyser Membranes
   High Flux and Low Flux
   Membranes and their biocompatibility

4. Reprocessing of Dialysers
   Rinse
   Clean
   Test
   Disinfect

5. Chemicals used in dialysis unit
   Chemicals used for Reprocessing
   Formalin
   Sodium Hypochloride
   Hydrogen Peroxide
   IV Fluids
   Normal Saline
   Half Normal Saline and Deci Normal Saline
   Dextrose
   Hemodialysis Concentrates
   Acid Concentrate (Part A)
   Bicarb Concentrate (Part B)
   Acetate Concentrate
   Machine Disinfectants
   Puristerile
   Citrosterile
   Others
   Sterillium
   Betadine

6. CRRT (Continuous Renal Replacement Therapy) and special blood based therapies
   CVVHD
CVVHF
CVVHDF
SCUF
IUF
SLED

7. Water Treatment
   Steps in Water Treatment
   Hemodialysis Water Quality
   AAMI Standards

8. Vascular Access
   Temporary access
   Permanent access

9. Monitoring and Assessment of Hemodialysis
   Pre, Post & Intra Dialytic patient assessment
   Hemodialysis Machine monitoring

10. Lab data assessment
    Normal Lab values
    Lab values in renal failure

**PAPER IV:**

**DIALYSIS TECHNOLOGY - II**

**COURSE CODE: PGDIDT: 104**

1. Nutrition management in dialysis patients
   Malnutrition
   Recommended daily allowance of nutrients for dialysis patients
   Total parenteral Nutrition
   Intradialytic parenteral nutrition

2. Anticoagulation in dialysis
   Types of anticoagulation
   Heparin in Detail

3. Infection control and universal precautions
   Safety precautions
   Infection control
   Needle stick injury
   Air borne diseases
   Chemical exposure

4. Complications of Hemodialysis
   Acute
   Hypotension
Muscle cramps  
Nausea and vomiting  
Head ache  
Chest pain  
Back pain  
Fever and chills  
Itching  

Chronic  
Mineral bone disease  
Sleep disorders  
Left ventricular hypertrophy  
Infections  
Others

5. Indications and contraindications of dialysis therapy  
6. Psychosocial aspects in dialysis, patient education  
7. Body composition monitoring  
   Indications  
   Contraindications  
   Advantages  
   Procedure  
   Care of the machines  
8. Drugs and dialysis  
   Erythropoietin  
   Vitamin Supplements  
   Vancomycin and other antibiotics  
   Dextrose Solution  
   Iron Sucrose  
   Colloids  
   Antihypertensive drugs  
   Emergency drugs  
   Nitroglycerides  
   Dopamine & Dobutamine  
   Epinephrine & Nor epinephrine  
   Others  
9. Principles of Peritoneal dialysis  
   Osmosis  
   Diffusion  
10. Types and complications of peritoneal dialysis  
    Selection of modality  
    Types of Peritoneal dialysis  
    Complication of PD  
    Non Infection complications  
    Infectious Complications
PRACTICALS

COURSE CODE: PGIDT: 105 (P)

(A) Anatomy

1. Identification of different parts of the urinary system, kidney, nephrons, veins and arteries, Peritoneum
2. Urinary system
   - Kidneys
   - Ureter
   - Urinary bladder
   - Urethra
   - Renal Artery
   - Renal vein
   - Renal pelvis
3. Kidneys
   - Surface, Borders, Poles, Coverings and Hilum of the kidney
   - Cortex
   - Medulla
   - Renal pyramids
   - Major calyx
   - Minor calyx
   - Renal pelvis
   - Renal artery and vein
   - Capsule
   - Renal facia
   - Renal fat
   - Ureter

(B) Dialysis technology

1. Patient assessment (Pre, Intra and post dialysis)
   a. Weight
   b. Edema
   c. Vitals
      - Blood pressure
      - Pulse
      - Temperature
      - Respiration
   d. Vascular access
      - Bruit and Thrill, Aneurysm, Pseudoaneurysm
2. Cannulation site selection and preparation
3. Cannulation of fistula
4. Predialysis patient and machine preparation
5. Dialyser reprocessing
6. Post dialysis machine preparation
7. Intra dialytic complication management
8. Medication administration
9. Heparin dosage selection
10. Machine trouble shooting

Suggested Reference Books:

Anatomy:       Gray’s Anatomy
Physiology:    Text book of Physiology by Sembulingam
Biochemistry:  Textbook of Biochemistry by Sathyanaraya
Pathology:     Textbook of Pathology by Harsh Mohan
Dialysis:      Handbook of Dialysis by Daugirdas,
                Textbook of Dialysis therapy by Allen Nissensson
Examination Structure

- The external examination of four theory papers and one practical will be held at the end of the academic year.
- Candidates will be examined in four theory papers and two practical to make the total of 550 marks at the end of the year.
- This will include 400 marks of theory examination, 150 marks of practical.
- The ratio between internal and external assessment will be 20:80 respectively.
- For the purpose of internal assessment the Institute will conduct at least one test in the year.
- The distribution of marks will be as under (internal assessment)
  - Each internal theory exam will be of 100 marks
  - Each internal practical exam will be of 50 marks
  - That is $100 + 50 = 150$ marks in total.
- From these 100 and 50 marks 20% will be added in external theory and practical assessment respectively.
- Passing standard: 45%
- Award of rankings: According to university

<table>
<thead>
<tr>
<th></th>
<th>Theory Marks</th>
<th>Prac Marks</th>
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<tbody>
<tr>
<td>Anatomy and Physiology</td>
<td>Paper I</td>
<td>100</td>
</tr>
<tr>
<td>Biochemistry and Pathology</td>
<td>Paper II</td>
<td>100</td>
</tr>
<tr>
<td>Dialysis Technology I</td>
<td>Paper III</td>
<td>100</td>
</tr>
<tr>
<td>Dialysis Technology II</td>
<td>Paper IV</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>400</strong></td>
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