DIPLOMA IN DIALYSIS TECHNOLOGY

SCHEME OF EXAMINATION

Subject code	Title of the Course	Hours	Passing Minimum
Semester I			
Subject 1	Anatomy & Physiology	3	40/100
Subject 2	Nutrition and Dietics	3	40/100
Subject 3	Immunohaematology	3	40/100
Subject 4	Communicative English	3	40/100
Subject 5	Practical I	3	40/100
Semester II			
Subject 1	Microbiology	3	40/100
Subject 2	Biochemistry	3	40/100
Subject 3	Life Skill	3	40/100
Subject 4	Internship	3	40/100
Subject 5	Practical II	3	40/100
Semester III			
Subject 1	Applied Pathology	3	40/100
Subject 2	Concept of Renal Disease, Dialysis and Nutrition	3	40/100
Subject 3	Fundamentals of Health	3	40/100
Subject 4	Practical III	3	40/100
Subject 5	Applied Pharmacology	3	40/100
Semester IV			
Subject 1	Applied Dialysis Technology –I	3	40/100
Subject 2	Applied Dialysis II	3	40/100
Subject 3	Continuous Dialysis	3	40/100
Subject 4	Practical IV	3	40/100
Subject 5	Project Work	3	40/100

Eligibility for admission: Pass in 12 th std examination conducted by the Govt. of Tamil Nadu Board of Secondary Education, Government of Tamil Nadu or any other equivalent examination.

Examination: Passing Minimum for each Course is 40%. Classification will be done on the basis of percentage marks of the total marks obtained in all the Courses and as given below:

- 40 % but less than 50 % - Third class
- 50 % but less than 60 % - Second class
- 60 % and above - First class

Theory Paper

Internal Marks-25

External Marks-75

SYLLABUS

Semester I

Subject I	:	Anatomy & Physiology
Subject II	:	Nutrition and Dietics
Subject III	:	Immunohaematology
Subject IV	:	Communicative English
Subject V	:	Practical I

Semester II

Subject VI	:	Microbiology
Subject VII	:	Biochemistry
Subject VIII	:	Life Skill
Subject IX	:	Internship
Subject X	:	Practical II

Semester III

Subject XI	:	Applied Pathology
Subject XII	:	Concept of Renal Disease, Dialysis and Nutrition
Subject XIII	:	Fundamentals of Health
Subject XIV	:	Practical III
Subject XV	:	Applied Pharmacology

Semester IV

Subject XVI	:	Applied Dialysis Technology –I
Subject XVII	:	Applied Dialysis II
Subject XVIII	:	Continuous Dialysis
Subject XIX	:	Practical IV
Subject XX	:	Project Work

Semester I
Subject I
Anatomy and Physiology

Unit I Introduction to Anatomical Terms **18 Hrs**

Organization of body -cells, tissues, organs, systems, membranes and glands-

Anatomical positions, cell divisions and organelles.

Unit II Skeletal and Muscular System **18 Hrs**

Bones-types, structure functions, axial skeleton, appendicular skeleton, joints-classification, structure and functions- Types, structure, functions of muscles, position and action of chief muscles of the body - Joints and types, functions.

Unit III Cardio-Vascular System **18 Hrs**

Blood –composition, clotting and group- Heart: position, structure, condition system; functions and cardiac cycle-Blood vessels, structural difference and positions of chief vessels- Circulation of blood-systemic, pulmonary, and portal- blood pressure and pulse.

Unit IV Respiratory System **18 Hrs**

Structure and function of organs of digestion and accessory organs- Process of digestion and absorption-Metabolism-the meaning- Metabolism of food constituents.

Unit V Excretory System **18 Hrs**

Structure and function of organs of urinary system- Structure and function of skin-Regulation of body temperature-Fluid and electrolyte balance.

Reproductive System

Female reproductive system- Structure and functions of reproductive and accessory organs- Menstrual cycle, menopause and process of reproduction-Male reproductive system- Structure and functions.

Subject II

Nutrition and Dietics

Unit I **18 Hrs**

Classification and functions of food nutrients- carbohydrates- protein- fat- vitamins- minerals- water and cellulose- good nutrients- mal nutrition

Unit II **18 Hrs**

Nutritive value of foodstuffs- the balanced diet- food groups for the family- cultural factors- food fads and habits- calorie intake for the venerable groups- sample balanced diet- special diet for the patients.

Unit III **18 Hrs**

Protein energy malnutrition- vitamins deficiencies- mineral deficiencies- anemia in women- Health worker role in prevention of deficiencies and malnutrition

Unit IV **18 Hrs**

Food adulteration- selection – storage – preparation of foods – methods of cooking – preservation of foods

Unit V **18 Hrs**

Nutrition education – principles of nutrition education – methods and media used for nutrition education – types of diets – diets in special condition – preparation of special diets

Subject III

Immunohaematology

Unit I **18 Hrs**

Basic principles of immuno hematology, Application of Blood groups; Population Genetics, Forensic medicine, Transfusion medicine.

Unit II **18 Hrs**

ABO Blood of Group system; History, Genetics, ABH Antigens, Biochemical Synthesis of blood groups antigens, Antigenic sites, weaker variants, Bombay Phenotype, ABO antibodies.

Unit III **18 Hrs**

RH Blood Group System; History, Genetics, Molecular Genetics, Nature of RH Antigens, Partial D, other variants of RH, RH Null, RH antibodies, factors influencing RH immunization, Functional role of RH antigens.

Unit IV **18 Hrs**

Other Blood group system: Lewis, P, Ii, MNSs, Kell, Duffy, Celano, In, Private antigens, Public antigens

Unit V **18 Hrs**

Principles of Direct and indirect antiglobulin test, enzyme technique, albumins technique, Detection of blood groups antibodies, identification of their specificity, clinical significance of antibody detection, differentiation between auto and allo-antibodies.

Subject IV

Communicative English

1. **Basic Grammar**:
   a. Review of grammar
   b. Remedial study of grammar
   c. Simple sentence
   d. Word passive voice etc.
2. **Bubbling Vocabulary**:
   a. Synonyms
   b. Antonyms
   c. One – work Institution
3. **Reading and Understanding English**
   a. Comprehension passage
   b. Précis – writing
   c. Developing a story from hints.
4. **Writing English**
   a. Writing Business letters.
   b. Paragraph writing
   c. Essay writing
   d. Dialogue writing
5. **Speaking English**
   a. Expressions used under different circumstances
   b. Phonetics

Subject V

Practical I

1. Blood circulation
2. Blood grouping- RH blood group system
3. Hb estimation – Sahli's method
4. Estimation of blood sugar, blood urea and electrolytes.
5. Demonstration of strips, demonstration of glucometer.
6. Health Education
7. Care of sick patients.
8. Eliminational Needs
9. RBC count, WBC count, Platelet count
10. ESR
11. Urine- physical examination, chemical examination
12. Sputum analysis

Semester II
Subject VI
Microbiology

Unit I **18 Hrs**

Morphology

Classification of microorganisms- size, shape and structure of bacteria, Use of microscope in the study of bacteria.

Unit II **18 Hrs**

Growth and Nutrition

Nutrition, growth and multiplications of bacteria, use of culture media in diagnostic bacteriology.

Unit III **18 Hrs**

Sterilization and Disinfection

Principles and use of equipments of sterilization namely hot air oven, autoclave and serum inspissator, pasteurization, antiseptic and disinfectants.

Unit IV **18 Hrs**

Immunology

Immunity, vaccines, types of vaccine and immunization schedule, Pirnciples and interpretation of common serological tests namely Widal, VDRL,ASLO,CRP,RF and ELIZA-Rapid tests for HIV and HBs Ag [excluding technical details].

Unit V **18 Hrs**

Systematic Bacteriology

Morphology, `Cultivation, Disease caused, Laboratory Diagnosis including specimen collection of the following bacteria [excluding classification, antigen structure and pathogenicity], staphylococci, Pnemonococcai, Gonococci, Meningococcoi, C.

Subject VII
Biochemistry

Unit I **18 Hrs**

Specimen Collection

Pre-analytica variables, Collection of blood, Collection of CSF other fluids, Urine collection, Use of preservatives, Anticoagulants.

Unit II **18 Hrs**

Introduction to Laboratory Apparatus

Pipettes; different types [graduated, volumetric, Pasteur, automatic etc]- Calibration of glass pipettes-burettes, beakers, etri dishes, depression plates. Flasks; different type [volumetric, round bottomed, Erle Meyer conical etc]- Funnels; different types [conical Buchner etc] - Bottles; reagent bottles- graduated and common, wash bottles-different types specimen bottles.

Unit III **18 Hrs**

Instruments [Theory and Demonstration] Diagrams To Be Drawn

Use, care and maintenance of; water bath, oven and incubators, water distillation plant, water De-ionizers, refrigerators, cold box, deep freezers, reflux condenser, centrifuge, balances, colorimeter, spectrophotometer, Ph meter and electrodes.

Unit IV **18 Hrs**

Acid-Base Indicators [Theory And Practical's]

Definition, concepts, mechanism of dissociation of an indicator, color change of an indicator in acidic and basic conditions, use of standard buffer solution and indicators of pH determinations, preparation and its application, list of commonly used indicators and their pH range, suitable pH indicators used in different titrations, universal indicators.

Unit V **18 Hrs**

Special Investigations

Metabolic alkalosis, respiratory acidosis, respiratory alkalosis, basic principles and estimation of blood gases and Ph, basic principles.

Subject VIII

Life Skill

I Life Coping or adjustment

(a) External and internal influence in one's life
(b) Process of coping or adjustment
(c) Coping with physical change and sexuality
(d) Coping with stress, shyness, fear, anger far live and criticism.

II Attitude

(a) Attitude
(b) Self acceptance, self – esteem and self actualization
(c) Positive thinking

III Problem Solving

(a) Goal Setting
(b) Decision Making
(c) Time Management and stress Management.

IV Computers

(a) Introduction to Computers
(b) M.S.Office
(c) Power Point

V Internet

(a) Introduction to internet
(b) E – mail
(c) Browsing

Subject IX

Internship

Subject X

Practical II

List of Exercises

1. Vital signs.
2. Sphygmomanometer.
3. Composition of Urine
4. Maintaining of haemodialysis apparatus.
5. Urine examination for detection of abnormal constituents.
6. Estimation of blood sugar, blood urea and electrolytes.
7. Demonstration of strips, demonstration of glucometer.
8. Liver function test
9. Lipid Profile
10. Renal Function Test
11. Estimation of blood sugar, blood urea and electrolytes
12. Various urine analysis
13. Microscopes
14. Sterilization
15. WIDAL
16. Eliza

Semester III

Subject XI

Applied Pathology

Unit I **18 Hrs**

Congenital abnormalities of urinary system- Classification of renal diseases- Glomerular diseases: causes, types & pathology

Unit II **18 Hrs**

Tubulo-interstitial diseases-Renal vascular disorders- End stage renal diseases: causes & pathology

Unit III **18 Hrs**

Pathology of kidney in hypertension, diabetes mellitus, pregnancy.

Unit IV **18 Hrs**

Pathology of peritoneum, peritonitis, bacterial, tubular & sclerosing peritonitis, dialysis induced changes

Unit V **18 Hrs**

Pathology of Urinary Tract Infections- Pyelonephritis & tuberculous pyelonephritis

Subject XII

Concept of Renal Disease, Dialysis and Nutrition

Unit I **18 Hrs**

Basic concepts of Renal diseases: 1) Actual renal failure 2) Nephrotic syndrome- primary & secondary 3) Nephritic syndrome 4) UTI (Urinary Tract Infection) 5) Asymptomatric urinary abnormalities

Unit II **18 Hrs**

Classification of renal diseases: Define renal disorders, introduction to the classification of the various types of renal disorder – Glomerular diseases-causes, types & pathology definition, etiology, types of pathophysiology, medical and surgical management. Tubulointzerstitial diseases & Renal vascular disorders definition, etiology, types of pathophysiology, medical surgical management.

Unit III **18 Hrs**

Pathology of kidney in hypertension, diabetes mellitus, pregnancy definition, etiology, types pathophysiology, medical and surgical management, pathology of peritoneum- peritonitis- bacterial, tubercular & sclerosing peritonitis definition, etiology, types pathophysiology, medical and surgical management

Unit IV **18 Hrs**

Pahtology of Urinary Tract Infection definitions of UTI's, common organism involved, etiology, pathophysiology of UTI, medical and surgical management – Pyelonephritis & tuberculous pyelonephritis defition, etiology, types pathohysiology, medical and surgical management

Unit V **18 Hrs**

Dialysis in the intensive care setting emergency care & intensive care of a dialysis patient, Principles of Extracorporeal short wave Lithotripsy, Plasmapheresis, CRRT & SLED, common Urosurgical procedures & instruments and their maintenance, Preparation of dialysis patients for various surgical procedure and post operative dialysis support, Basic and advanced cardiac life support.

Subject XIII

Fundamental of Health

Unit I **18 Hrs**

Introduction to Nursing

Hospital-Its set up and functions and the health team-Patient-As an individual the reaction of the patient and his family to illness- Nursing-Basic nursing principles, Concepts of nursing- Nursing-as a community service- Nursing and scope of nursing- History and development of nursing in ancient times, early Christian era, Middle Ages and modern nursing- Nurse-Qualities-Professional and ethical behavior expected-Role and responsibilities of a nurse in the health team- Health agencies-Hospital and community-Holistic approach to nursing.

Unit II **18 Hrs**

The Patient and His Illness

Admission of a patient-Admission procedure and reception of patient-Care of patients belongings-Maintaining therapeutic environment-Temperature-Discharging a patient-Preparation of the patient-physically and mentally-Discharge procedure-Hospital policies.

Unit III **18 Hrs**

Basic Nursing Care Needs of the Patient

Hygienic needs-Importance of maintaining good personal hygiene in health and disease-Nurses role in maintaining good personal hygiene- Physical comforts-Meaning and its importance in health and disease-Factors promoting and inhibiting physical comforts-Comfort devices and their uses-Position for comfort and positioning-Beds and bed making-Factors to be considered in selecting and making bed –different types of beds and their uses-Principles of lifting and moving patients in bed.

Unit IV **18 Hrs**

Observation and Assessment of Patient

Principles, process and importance of observation and developing skill in observation- Observation of physical and physiological state, height, weight, posture, speech and level of consciousness, observation of common signs and symptoms-Psychological observation-Mood, intelligence and emotion-Characteristics of normal behavior and deviation- Physical examination and nurse's role-Body discharges-Urine and stool-Normal and abnormal characteristics-Sputum and vomit-Collection of specimens-routine and culture examination-Vital signs-Temperature, pulse, respiration-Blood pressure-Characteristics of normal and abnormal and factors influencing the variation-Recording and Reporting-Types and important record and reports and nurse role.

Unit V **18 Hrs**

First Aid and Emergency Nursing

Introduction-Importance of first aid and rules of first aid-Concepts of emergency-First Aid in emergencies -Fire, burns, fractures, accidents, poisoning, drowning, haemorrages, insect bites, foreign bodies-Transportation of the injured-Bandaging and splinting-Community emergencies and resources-Community emergencies-Fire explosions, floods, earthquakes, famine-Immediate and later role of nurse-Need for rehabilitation-Community resources-Police assistance-Voluntary agencies, local, national and international agencies-Ambulance service-their function in relation to emergencies.

Subject XIV

Practical III

List of Exercises

1. Dialyzer reuse
2. Maintaining of hemodialysis apparatus
3. Water treatment system
4. Types of stain and action
5. Laboratory instruments: Principles and working of centrifuge, incubator and calorimeter
6. Hypertension
7. Diabetes mellitus

Subject XV

Applied Pharmacology

Unit I **18 Hrs**

IV Fluid therapy with special emphasis in renal diseases- Neuretics: classification, actions, dosage, side effects & contradictions- Anti hypertensive: classification, actions, dosage, side effects & contraindications, special reference during dialysis, vasopressors, drugs used in hypotension,

Unit II **18 Hrs**

Drugs & dialysis: dose & duration of administration of drugs- Dialyzable drugs: Phenobarbitone, lithium, methanol etc.

Unit III **18 Hrs**

Vitamin D & its analogues, phosphate binders, iron folic acid & other vitamins of therapeutic value

Unit IV **18 Hrs**

Erythropoietin in detail- Heparin including low molecular weight heparin- Protamine sulphate – Formalin, sodium hypochlorite, hydrogen peroxide: role as disinfectants & adverse effects of residual particles applicable to formalin

Unit V **18 Hrs**

Haemo Dialysis concentrates: composition & dilution (acetate & bicarbonates) - peritoneal dialysis fluid in particular hypertonic solution: composition- potassium exchange resins with special emphasis on mode of administration

Semester IV

Subject XVI

Applied Dialysis Technology –I

Unit I **18 Hrs**

Applied Dialysis – History & types of dialysis- Theory of haemodialysis: diffusion, osmosis, ultrafilteration & solvent drag – Haemodialysis apparatus: types of dialyzer & membrane, dialzsate- physiology of peritoneal dialysis.

Unit II **18 Hrs**

Dialysis machines: mechanism of functioning & management: a) Haemodialysis machine. b) Peritonel dialysis machine – biochemical investigations required for renal dialysis-Adequancy of dialysis: a) Haemodialysis b) peritoneal dialysis c) Peritoneal equilibrium test (PET)

Unit III **18 Hrs**

Complication and management of complication during dialysis- assessment of adequacy of dialysis

Unit IV **18 Hrs**

Anti coagulation- Withdrawal of dialysis criteria: a) Acute dialysis b) Chronic dialysis. – Dialyzer reuse- water treatment system

Subject XVII

Applied Dialysis II

Unit I **18 Hrs**

Dialysis in special situations: a) Patients with congestive cardiac failure b) Advanced liver disease c) Patients positive for HIV, HBSAg & HCV d) Failed transplant e) Poisioning cases f) Pregnency

Unit II **18 Hrs**

Dialysis in infants & children- Special dialysis procedures: a) Continuous therapies in haemodialysis. b) Different modalities of peritoneal dialysis. c) Haemodiafilteration. d) Haemoperfusion e) SLED f) MARS

Unit III **18 Hrs**

Plasmapheresis – Special problems in dialysis in patients: a) Psycology & rehabilitation b) Diabetes c) Hypertension d) Infections e) Bone diseases f) Aluminium toxicity – Renal anaemia management : chronic dialysis

Unit IV **18 Hrs**

Vascular access for haemodialysis & associated complications- Peritoneal access devices: types of catheter, insertion techniques & associated complications of dialysis: a) Haemodialysis: acute & long term complications. b) Peritoneal dialysis: mechanical & metabolic complications

Unit V **18 hrs**

Peritonitis & exit site infection- Recent advances in haemodialysis a) Nocturnal dialysis b) Online dialysis c) Daily dialysis- Telemedicine in dialysis practice

Subject XVIII

Continuous Dialysis

Unit I **18 Hrs**

Hemodialysis Apparatus- vascular access for haemodialysis & associated complications

Unit II **18 Hrs**

Complications of dialysis:- Haemodialysis: acute & long term complications

-Peritoneal Dialysis: mechanical & metabolic complications

Unit III **18 Hrs**

Peritonitis & exit site infection.

Unit IV **18 Hrs**

Recent advances in hemodialysis : Nocturnal dialysis-Online dialysis-Daily dialysis

Unit V **18 Hrs**

Telemedicine in dialysis practice- preparing Diet chart for different kidney Diseases.

Subject XIX

Practical IV

List of Exercises

1. Enema
2. Sterilization and disinfection
3. Potassium exchange resins
4. Types of dialysis
5. Biomedical investigation
6. Hemodialysis machine
7. Heamodialysis apparatus
8. Patients positive for HIV Ag & HCV
9. Failed transplant
10. Hemodia filteration
11. Hypertension
12. Complication of dialysis
13. Vascular access
14. Peritoneal dialysis

Subject XX

Project Work
