Total Credits: 22

Semester 3RD		**Contact Hours**			**Max Marks**		**Total Marks**	**Credits**
Subject Code	**Subject Name**	**L**	**T**	**P**	**Int.**	**Ext**		
BDLTS1-301	Introduction To Dialysis	4	0	0	40	60	100	4
BDLTS1-302	Fundamentals of Dialysis	3	0	0	40	60	100	3
BDLTS1-303	Pharmacology in Dialysis	2	0	0	40	60	100	2
BDLTS1-304	Community Orientation & Clinical Visit (Including related practical to the parent course)	0	0	8	60	40	100	4
BDLTS1-305	Introduction To Dialysis Practical	0	0	2	60	40	100	1
BDLTS1-306	Fundamentals of Dialysis Practical	0	0	4	60	40	100	2
BDLTS1-307	Medical Bioethics & IPR	3	0	0	60	40	100	3
BDLTS1-308	Organizational Behavior	3	0	0	60	40	100	3
Total		**-**	**-**	**-**	**420**	**380**	**800**	**22**

Total Credit: 25

Semester 4TH		**Contact Hours**			**Max Marks**		**Total Marks**	**Credits**
Subject Code	**Subject Name**	**L**	**T**	**P**	**Int.**	**Ext**		
BDLTS1-401	Concept of Renal Disease & Disorders	3	1	0	40	60	100	4
BDLTS1-402	Nutrition in Dialysis	3	0	0	40	60	100	3
BDLTS1-403	MDT Directed Clinical Education-II (One month in vacation)	0	0	0	50	0	50	8
BDLTS1-404	Concept of Renal Disease & Disorders - Practical	0	0	2	60	40	100	1
BDLTS1-405	Seminar	0	0	6	50	0	50	3
BDLTS1-406	Human Rights & Professional Values/ Pursuit of Inner Self Excellence (POIS)	3	0	0	40	60	100	3
BDLTS1-407	Biostatistics and Research Methodology	3	0	0	40	60	100	3
Total		**-**	**-**	**-**	**320**	**280**	**600**	**25**

Total Credits: 22

Semester 5TH		Contact Hours			Max Marks		Total Marks	Credits
Subject Code	**Subject Name**	**L**	**T**	**P**	**Int.**	**Ext**		
BDLTS1-501	Applied Dialysis Technology– I	4	0	0	40	60	100	4
BDLTS1-502	Advance Dialysis Technology– I	4	0	0	40	60	100	4
BDLTS1-503	Community Orientation & Clinical Visit (Including related practical's to the parent course)	0	0	8	60	40	100	4
BDLTS1-504	Applied Dialysis Technology:– I Practical	0	0	4	60	40	100	2
BDLTS1-505	Advance Dialysis Technology– 1 Practical	0	0	4	60	40	100	2
BDLTS1-506	Basics of Clinical Skills Learning	3	0	0	40	60	100	3
BDLTS1-507	Hospital Operation Management	3	0	0	40	60	100	3
Total		**-**	**-**	**-**	**340**	**360**	**700**	**22**

Total Credits: 20

Semester 6TH		Contact Hours			Max Marks		Total Marks	Credits
Subject Code	**Subject Name**	**L**	**T**	**P**	**Int.**	**Ext**		
BDLTS1-601	Applied Dialysis Technology II	4	0	0	40	60	100	4
BDLTS1-602	Advance Dialysis Technology II	4	0	0	40	60	100	4
BDLTS1-603	MDT Directed Clinical Education-IV (240 hr)	0	0	0	50	0	50	8
BDLTS1-604	Applied Dialysis Technology II Practical	0	0	4	60	40	100	2
BDLTS1-605	Advance Dialysis Technology II Practical	0	0	4	60	40	100	2
Total		**-**	**-**	**-**	**250**	**200**	**450**	**20**

Semester 7th		Contact Hours			Max Marks		Total Marks	Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.		
BDLTS1-701	Project	0	0	30	0	500	**500**	**15**
Total							**500**	**15**

The candidates will be supervised by the concern faculty & and the project report will be submitted following competitions. The Viva-Voce examination shall be conducted by external expert.

Semester 8th		Contact Hours			Max Marks		Total Marks	Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.		
BDLTS1-801	Internship	0	0	30	0	500	**500**	15
Total							**500**	15

The candidate shall undergo internship of Six months in Medical Dialysis department. The internship report shall be submitted to the principal & Viva-Voce examination shall be conducted by external expert.

Semester	Credit
1st	25
2nd	26
3rd	22
4th	25
5th	22
6th	20
7th	15
8th	15
Total	170

INTRODUCTION TO DIALYSIS

Course Code: BDLTS1-301 **L T P C** **Duration - 60 hrs**
4 0 0 4

Course Objective:

- To enable students, understand the fundamental of dialysis
- To teach students about maintenance of the Dialysis machine, tubing's.

Course Outcomes

- Practice personal safety & standard precautions.
- Handling complications during dialysis procedures.
- Understand Infectious diseases, mode of transmission, prevention & care of the patient in a Dialysis Unit.

Unit:1 (20 Hrs)

- **Anatomy & Physiology** (normal kidney structure and functions), Derangement of kidney functions (aetiology, clinical manifestation, diagnosis of acute and chronic renal failure)

Unit:2 (15 Hrs)

- **Dialysis** – the concept (Brief history, definition, mechanism) Components of Dialysis Access, blood flow, anticoagulant, dialysate)

Unit:3 (15 Hrs)

- **Hemodialysis** – Basics (Blood circuit: tubing, pump, dialyzer, flow rate, dialysate circuit, concentrates, delivery systems, flow rate)

Unit:4 (10 Hrs)

- **Anticoagulation** (Heparin, alternatives to Heparin, regional no anticoagulation), Vascular access (Temporary, Permanent).
- **Dialysis water and water treatment:** Dialysis and Dialyzer (including reuse)

Reference books

● Tripathi K.D. (2008) Essentials of Pharmacology 6th Ed, Jaypee Brothers medical publishers: New Delhi 2. Rang H.P., (1995) Pharmacology 3rd Ed, and Churchill Livingstone: Michigan
● Himmelfarb, J., Savegh, M. H.,(2010) Chronic Kidney disease, Dialysis, transplantation: Companion to Brenner & Rector's Kidney 3rd Ed,Elesvier: St Louis
● Tripathi, K.D.,(2010). Pharmacological Classification of drugs, doses and Preparations 4th Ed, Jaypee Brothers medical publishers: New Delhi

- Dialysis Technology – A Manual for Dialysis Technicians by Jim Curtis, Philip Varughese

INTRODUCTION TO DIALYSIS PRACTICAL

Course Code: BDLTS1-305 **L T P C** **Duration - 30 hrs**
0 0 2 1

Course Objective:

- To enable students, understand the fundamental of dialysis
- To teach students about maintenance of the Dialysis machine, tubing's.

Course Outcomes

- Practice personal safety & standard precautions.
- Handling complications during dialysis procedures.
- Understand Infectious diseases, mode of transmission, prevention & care of the patient in a Dialysis Unit.

Experiment:

- A Hemodialysis unit
- Demineralization plant
- Machine
- Initiation of Dialysis
- Conduction of Dialysis
- Dialysis – closure
- Washing, cleaning, reuse
- Maintenance of hygiene in Dialysis unit
- Access – core
- Anticoagulation

Reference books

- Tripathi K.D. (2008) Essentials of Pharmacology 6th Ed, Jaypee Brothers medical publishers: New Delhi 2. Rang H.P., (1995) Pharmacology 3rd Ed, and Churchill Livingstone: Michigan
- Himmelfarb, J., Savegh, M. H.,(2010) Chronic Kidney disease, Dialysis, transplantation: Companion to Brenner & Rector's Kidney 3rd Ed,Elesvier: St Louis
- Tripathi, K.D.,(2010). Pharmacological Classification of drugs, doses and Preparations 4th Ed, Jaypee Brothers medical publishers: New Delhi
- Dialysis Technology – A Manual for Dialysis Technicians by Jim Curtis, Philip Varughese

FUNDAMENTAL OF DIALYSIS

Course Code- BDLTS1-302 **L T P C** **Duration: 45 Hrs**
3 0 0 3

Course Objective

- To enable students, understand the correct cannulation techniques.
- To demonstrate patient positioning and preparation
- To teach students about maintenance of the Dialysis machine, tubing's.

Course Outcome

- Practice personal safety & standard precautions.
- Handling complications during dialysis procedures.

- Understand Infectious diseases, mode of transmission, prevention & care of the patient in a Dialysis Unit.

Unit:1 (10 Hrs)

- **Medical Abbreviations Patient pedigree:** Common medical abbreviations, Patient encounter, History taking of patient: - Present, Past, Family History.
- **Physical Examination:** Inspection of whole body of the patient e.g. Chest, abdomen, pedal edema & Facial edema. Significance of edema as per the dialysis patient concern. Palpation – Method for palpation, Percussion - Resonance, hyper-resonance and dullness, Heart sounds & murmurs & any other abnormal body sound.

Unit:2 (15 Hrs)

- **Vital signs:** Assessing Pulse - Radial, Brachial, Apical & Femoral, Assessing Respiration - Normal rhythm and rate, Common disorders, Assessing Blood Pressure - Normal values, Hyper and hypotension, Assessing Temperature - Methods, Common abnormalities.
- **Essential Care:** Blood leaks, clotting, acute bleeding, hypotension, hypertension, fever, nausea, pyrogenic vomiting, headache, cardiac arrhythmias, chest pain, reactions muscle cramps, restlessness pruritus, convulsion, hemolysis.
- **Total patient care:** Nutritional consideration in CKD and dialysis patient, Diet, hygiene, fluid, rehabilitation. Recording and reporting.

Unit:3 (5 Hrs)

- **Safety Practices:** Identify specific risks associated with any work activities undertaken as a renal dialysis technician, The principles and practice of health and safety at work. Safe lifting and handling techniques when moving equipment and/or supplies. Correct handling procedures for chemicals and toxic agents. Health and Safety regulations and guidance, the consequences of current flow within the body& control measures to be taken to manage risks, clinical risks posed by the application of technologies to treat

Unit:4 (15Hrs)

- **Aseptic Technique:** Hand Washing: Medical & surgical Management, use of appropriate personal protective equipment for all personnel involved in the renal area, type and range of personal protective equipment and the reasons for their use. Procedures for infection control within the renal environment. Methods to control spread of infection by hospital personnel.
- **Patient Management:** Cannulating, Line cannula termination. Positioning during the procedure of dialysis.

Reference books

- Water quality in hemodialysis by E. Bonnie - Schorn, A, Grassmann, I. Uhlenbusch-Korwer, C.Weber, J.Vienken
- Orientation to National Kidney Foundation Hemodialysis Program – Training Manual by Gay Martin.
- Dialysis Technology – A Manual for Dialysis Technicians by Jim Curtis, Philip Varughese

FUNDAMENTALS OF DIALYSIS PRACTICAL

Course Code- BDLTS1-306 **L T P C** **Duration:60 Hrs**
0 0 4 2

Course Objective

- To enable students, understand the correct cannulation techniques.
- To demonstrate patient positioning and preparation
- To teach students about maintenance of the Dialysis machine, tubing's.

Course Outcome

- Practice personal safety & standard precautions.
- Handling complications during dialysis procedures.

Understand Infectious diseases, mode of transmission, prevention & care of the patient in a Dialysis Unit

Experiment:

- Checking Vitals
- Physical Examination
- Patient and Technologist safety practices
- Aseptic Techniques
- Medication techniques (Demo): Oral, IM, IS, IV & cathedral
- Diet Plan & Intake and output plan

Reference books

- Water quality in hemodialysis by E. Bonnie - Schorn, A, Grassmann, I. Uhlenbusch-Korwer, C.Weber, J.Vienken
- Orientation to National Kidney Foundation Hemodialysis Program – Training Manual by Gay Martin.
- Dialysis Technology – A Manual for Dialysis Technicians by Jim Curtis, Philip Varughese.

PHARMACOLOGY IN DIALYSIS

Course Code- BDLTS1-303 **L T P C** **Duration: 30 Hrs**
2 0 0 2

Course Objective

- This course is designed to enable students to acquire understanding of Pharmacodynamics
- Pharmacokinetics and principles of therapeutics and Dialysis implications.

Course Outcomes

At the end of the course the students are able to:

- Understand the basic concepts of pharmacology
- Understand the pharmacology of common chemotherapeutics.
- Understand common antiseptics, disinfectants and insecticides.
- Understand drug acting on various systems of the human body.
- Understand alternative systems of medicines.

Unit:1 (10Hrs)

- **Introduction to Pharmacology:** Definitions, Terminology used, Types: Classification, Pharmacodynamics: Actions, therapeutic, Adverse, toxic effects, Pharmacokinetics: Absorption, distribution, metabolism, interaction, excretion, Review: Routes and principles of administration of drugs, Indian pharmacopoeia: Legal issues, Storage of various drugs, Calculation of drugs dosage, Rational use of drugs, Principles of therapeutics in Kidney Dialysis.
- **Fluid therapy with special emphasis in renal diseases:** Define IV fluids, differentiate the various IV fluids. Use of crystalloids and colloids in renal diseases. Mode of action, contraindication, precautions and side effects of using various IV fluids.

Unit:2 (10 Hrs)

- **Antihypertensive:** Definition, classification, actions, dosage, side effects & contraindications, special reference during dialysis, vasopressors, drugs used in Hypotension.
- **Drugs & dialysis:** Dose & duration of drugs used in dialysis. The administration of drugs and the effect of dialysis on the action of drugs, Dialyzable drugs List of drugs that are dialyzable, action, dosage, side effects and contraindications of phenobarbitone, lithium, methanol etc.

Unit:3 (05 Hrs)

- **Heparin including low molecular weight heparin:** Introduction to heparin and Low molecular weight heparin. Description of Heparin & LMWH, pharmacokinetics, mode of action, indications and use, dosage and route of administration & side effects Protamine sulphate

- **Introduction to protamine**, mode of action, pharmacokinetics, indications,uses, dosage, route of administration, side effects, precautions, contraindications Formalin, sodium hypochlorite, hydrogen peroxide Action, characteristics, the use of the drugs and its role as disinfectants & adverse effects of residual particles applicable too formalin.

Unit:4 (05 Hrs)

- **Hemodialysis:** concentrates Composition & dilution (acetate & bicarbonates). Peritoneal dialysis fluid in particular hypertonic solutions – composition Fluids used in peritoneal dialysis, the composition and strength of concentration. Mode of action, uses, indications and precaution

Potassium exchange resins with special emphasis on mode of administration Introduction to potassium exchange resins, chemical composition. Types, mode of action, indications for use, side effects, precautions and contraindications

Recommended Text Books:

- Satoskar, Bhandarkar, Ainapure: Pharmacology and Pharmacotherapeutics, 18 Edition Popular Prakashan Mumbai.
- M M Das: Pharmacology, Books & Allied (p) Ltd, 4 Edition 2001.
- Rodman & Smith: Clinical pharmacology in nursing, 2 Edition, J B Lippincott company, Philadelphia.
- Tripathi K.D. (2008) Essentials of Pharmacology 6th Ed, Jaypee Brothers medical publishers: New Delhi 2. Rang H.P., (1995) Pharmacology 3rd Ed, and Churchill Livingstone: Michigan
- Himmelfarb, J., Savegh, M. H.,(2010) Chronic Kidney disease, Dialysis, transplantation: Companion to Brenner & Rector's Kidney 3rd Ed, Elesvier: St Louis.
- Tripathi, K.D.,(2010). Pharmacological Classification of drugs, doses and Preparations 4th Ed, Jaypee Brothers medical publishers: New Delhi
- Ajay, P., Medhi - Bikash (2010). Pharmacology, Jaypee Brothers medical publishers: New Delhi

COMMUNITY ORIENTATION & CLINICAL VISIT (INCLUDING RELATED PRACTICAL TO THE PARENT COURSE)

Course Code- BDLTS1-304 **L T P C** **Duration: 360 Hrs**
0 0 8 4

Students will gain additional skills in clinical procedures, interaction with patients and professional personnel. Students will apply knowledge from clinical learning experience under the supervision of a senior technologist Students are tested on intermediate clinical cardiac care skills.

MEDICAL BIOETHICS & IPR

Course Code- BDLTS1-307 **L T P C** **Duration: 45 Hrs**
3 0 0 3

Course Objective

- To introduce the wide range of ethical issues in health care.
- To provide basic skills in: A) Approaching ethical issues. B) Analysis and statement of issues. C) Understanding the relevant ethical principles invoked.
- Imparting knowledge and skills that will enable students to develop ethical answers to these issues
- To acquire acquire specialized knowledge of law and IPR.
- The main objective of the IPR is to make the students aware of their rights for the protection of their invention done in their project work.

Course Outcomes

- Upon successful completion of the course, students will be able to: Recognize what constitutes an ethical concern in health care
- Understanding ethical issues in Health care.
- Understand better the complexity and multi-dimensionality of medical ethical concerns and uniqueness of each problem.
- Capacity to rationally justify your decision
- Develop the ability to reason through difficult medical/clinical ethical issues both orally, in the context of a group of their peers, and through written
- The students get awareness of acquiring the patent and copyright for their innovative works.
- They also get the knowledge of plagiarism in their innovations which can be questioned legally.

Unit:1 (15 Hrs)

- **Introduction to Bioethics:** Bioethical issues related to Healthcare & Medicine
- **Anatomy** - Cadaver ethics, Human dignity, PNDT, Disposal of cadaver, Genetic Counseling
- **Physiology -** Animal ethics, Health policy privacy.

Unit:2 (10 Hrs)

- **Biochemistry & Pathology -** Prudence of investigation confidentiality, Patients bill of rights, Disposal of investigative material, Integrity, Blood transfusion
- **Pharmacology -** Rational drug prescribing, Clinical trials, Risk minimization, Animal Ethics

Unit:3 (5 Hrs)

- **Microbiology -** Hand wash, Drug resistance minimization, Prudence of investigation confidentiality, Sterilization procedure, Biosafety and biohazard. Medico legal aspects of medical records

Unit:4 (15 Hrs)

- **Introduction to Intellectual Property:** Concept of Intellectual Property Kinds of Intellectual Property Patents, Copyrights Designs, Trademarks, Geographical Indication, Infringement of IPR, Its protection and Remedies Licensing and its types

Reference Books:

- Contemporary issues in bioethics – Beauchamp & walters (B&W) 4th edition.
- Classic philosophical questions by Gloud (8th Edition)
- Case book series and booklets by UNESCO Bioethics Core curriculum 2008
- Encyclopedia of Bioethics 5 vol set, (2003) ISBN-10: 0028657748
- Intellectual property rights- Ganguli-Tat Mc Grawhill. (2001) ISBN-10: 0074638602,
- Intellectual Property Right- Wattal- Oxford Publication House.(1997) ISBN:0195905024.

ORGANIZATIONAL BEHAVIOR

Course Code- BDLTS1-308 **L T P C** **Duration: 45 Hrs**
3 0 0 3

Course Objective

- To understand the initial insights into underlying principles and fundamental theories of organizational behavior.
- The Student should develop a sense of what falls under the domain of organizational behavior.
- He should develop an understanding of academic views on the behavior and motivations of people in organizations and the purposes of organizations.
- This course clearly takes an academic and scientific lens with the aim of understanding human behavior in organizations.

Course Outcomes

- Describe and apply motivation theories to team and organizational scenarios in order achieve a team's or an organization's goals and objectives.
- Explain the effect of personality, attitudes, perceptions and attributions on their own and other's behaviors in team and organizational settings.
- Explain types of teams and apply team development, team effectiveness, and group decision making models and techniques.
- Analyze and apply leadership theories and better understand their own leadership style.

Unit:1 (15 Hrs)

- **Organizational Behavior:** Definition - Importance - Historical Background – Fundamental concepts of OB - 21st Century corporate - Different models of OB i.e. autocratic, custodial, supportive
- **Organization Structure and Design**: Authority and Responsibility Relationships - Delegation of Authority and Decentralization - Interdepartmental Coordination - Emerging Trends in Corporate Structure, Strategy and Culture - Impact of Technology on Organizational design Mechanistic vs Adaptive Structures – Formal and Informal Organization.

Unit:2 (15 Hrs)

- **Perception Process** - Nature & Importance - Perceptual Selectivity - Perceptual Organization -Social Perception - Impression Management
- **Learning** - Process of Learning - Principles of Learning - Organizational Reward Systems - Behavioral Management

Unit:3 (10 Hrs)

- **Motivation** - Motives - Characteristics - Classification of motives - Primary Motives - Secondary motives - Morale - Definition and relationship with productivity - Morale Indicators
- **Leadership** - Definition - Importance - Leadership Styles - Models and Theories of Leadership Style

Unit:4 (5 Hrs)

- **Conflict Management** - Traditional vis-a-vis Modern view of conflict - Constructive and Destructive conflict - Conflict Process - Strategies for encouraging constructive conflict Strategies for resolving destructive conflict

Reference Books:

- Organizational Behavior, 9th Ed. - Stephen Robbins
- Human Behavior at work - Davis and Newstrom
- Organizational Behavior - Uma Sekaran
- Organizational Behavior - Fred Luthans
- Organizational Behavior - K.Aswathappa
- Human Behavior at Work - Keith Davis
- Organizational Behavior - Jit S.Chandran
- Human Relations & Organizational Behavior - R.S.Dwivedi
- Organizational Behavior - McShane

4th Semester

CONCEPT OF RENAL DISEASE & DISORDERS

Course Code- BDLTS1-401 **L T P C** **Duration: 60Hrs**
3 1 0 4

Course Objective

- Describe the purpose, significance of results related to diagnostic studies of the urinary system**.**
- Comprehend the congenital abnormalities of the urinary system.
- Describe the appropriate techniques used in the physical assessment and significant subjective and objective data related to the urinary system.
- Describe the purpose, significance of results related to diagnostic studies of the urinary system
- Comprehend the congenital abnormalities of the urinary system
- Classify and enumerate kidney diseases, including Glomerular, tub interstitial and vascular diseases

Course Outcomes

- To develop understanding regarding different disorder and its management.
- To develop knowledge in childhood anomalies' and it's significance.

Unit:1 (15 Hrs)

- **Assessment and Diagnostic studies of the Urinary system:** Physical assessment of a person with kidney disease, basics of assessment, list various diagnostic tests done for kidney diseases, Laboratory tests, imaging studies, normal values, interpretation of the tests including the roles and responsibilities of a technologist.

Unit:2 (15 Hrs)

- **Classification of renal diseases:** Define renal disorders, introduction to the classification of the various types of renal disorders.
- **Glomerular diseases:** causes, types & pathology: Definition, etiology, type's pathophysiology, medical and surgical management.
- **Tubulo interstitial diseases & Renal vascular disorders, asymptomatic urinary abnormalities:** Definition, etiology, type's pathophysiology, medical and surgical management.

Unit:3 (15 Hrs)

- **Obstructive Diseases:** Acute Kidney Injury & End stage renal diseases, Obstructive Uropathies– Causes & pathology, renal calculi & renal tumors: definition, etiology, type's pathophysiology, medical and surgical management.
- **Congenital & Inherited Renal Diseases:** Peniel, scrotum, urinary bladder, Kidney: size, shape, positioning malformation: definition, cause and its management.

Unit:4 (15 Hrs)

- **Pathology of kidney in hypertension, diabetes mellitus, pregnancy:** Pathology of peritoneum – peritonitis – bacterial, tubercular & sclerosing Peritonitis, urinary tract infections, Pyelonephritis & tuberculosis pyelonephritis
- **Pathology of peritoneum, UTI & nephritis:** peritonitis, bacterial, tubercular & sclerosing Peritonitis, Pathology of urinary tract infections- common organisms involved, Pyelonephritis & tuberculous pyelonephritis: definition, etiology, types pathophysiology, medical and surgical management.
- **Dialysis In ICU:** 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.

Reference books:

- Davison A.M., (2010) Oxford textbook of Nephrology Volume 4 Oxford University PresS
- Brenner B.M., et al. (2011) Brenner and Rector's The Kidney 9th Ed, Elsevier Health Sciences.
- Schrier R.W., (2006) Diseases of the Kidney and the urinary tract (Vol I, II, & III) 8th Ed, Lippincott Williams & Wilkins
- Claude Jacobs (1996) Replacement of Renal Function by Dialysis Springer
- Nissenson, A. R., Fine R.N., (2002) Textbook of Dialysis therapy 3rd Ed Hanley

CONCEPT OF RENAL DISEASE & DISORDERS PRACTICAL

Course Code- BDLTS1 404 **L T P C** **Duration: 30 Hrs**
0 0 2 1

- Describe the purpose, significance of results related to diagnostic studies of the urinary system**.**
- Comprehend the congenital abnormalities of the urinary system.
- Describe the appropriate techniques used in the physical assessment and significant subjective and objective data related to the urinary system.
- Describe the purpose, significance of results related to diagnostic studies of the urinary system
- Comprehend the congenital abnormalities of the urinary system
- Classify and enumerate kidney diseases, including Glomerular, tub interstitial and vascular diseases

Course Outcomes

- To develop understanding regarding different disorder and its management.
- To develop knowledge in childhood anomalies' and it's significance

Experiment:

- Care of Patient with CKD
- Care of Patient with ARF
- Health teaching on prevention of UTI
- Health teaching on prevention of peritonitis

Reference books:

- Davison A.M., (2010) Oxford textbook of Nephrology Volume 4 Oxford University PresS
- Brenner B.M., et al. (2011) Brenner and Rector's The Kidney 9th Ed, Elsevier Health Sciences.
- Schrier R.W., (2006) Diseases of the Kidney and the urinary tract (Vol I, II, & III) 8th Ed, Lippincott Williams & Wilkins
- Claude Jacobs (1996) Replacement of Renal Function by Dialysis Springer
- Nissenson, A. R., Fine R.N., (2002) Textbook of Dialysis therapy 3rd Ed Hanley

NUTRITION IN DIALYSIS

Course Code-BDLTS1-402 **L T P C** **Duration: 45 Hrs**
3 0 0 3

Course Objective

- Discuss the basic nutrition and their role in growth, development, maintained and restoration
- Articulate the rationale for calculating body mass index (BMI) in nutritional assessment of dialysis patients.

Course Outcomes

- To describe basic nutrient and their role in growth, development, health maintained and restoration.
- To identify and interpret appropriate dietary plan for dialysis patient.

Unit:1 (5 Hrs)

- **Introduction Nutrition in Dialysis:** Concept and definition of terms-Nutrition, Malnutrition and Health: Scope of Nutrition, food selection, storage & preservation, prevention of food adulteration.
- **Types of nutrients:** protein, carbohydrate, lipids, vitamins, minerals, water. And their calorie values and calculation.

Unit:2 (10 Hrs)

- **Carbohydrates:** Monosaccharides: glucose, fructose, galactose. Disaccharides - Maltose, lactose, sucrose. Polysaccharide: Dextrin, starch, glycogen, resistance starch.
- **Proteins -** Sources, daily requirements, functions. Effect of too high - too low proteins on health. Digestion & absorption. Assessment of Protein quality (BV, PER, NPU). Factors affecting protein bio-availability including anti-nutritional factors.
- **Lipids -** Sources, daily requirements, functions. Digestion & Absorption. Role & nutritional significances of PUFA, MUFA, SFA, W-3 fatty acid.

Unit:3 (10 Hrs)

- **Water –** sources of drinking water, requirements, preservation of water. Vitamins - types, sources, requirements deficiencies of vitamins.
- **Energy in Human Nutrition:** Idea of Energy and its unit, Energy Balance, Assessment of Energy Requirements deficiency and excess, Determination of Energy in food, B.M.R. and its regulation, -S.D.

Unit:4 (20 Hrs)

- **Clinical Signs:** Need & Importance's, identifying signs of PEM, vitamin A deficiency and iodine deficiency, Interpretation of descriptive list of clinical signs, other disease and disorders in relation with renal conditions.
- **Nutritional anthropometry:** Need and importance, standard for reference, techniques of measuring height, weight, head, chest and arm circumference, interpretation of these measurements. Use of growth chart of dialysis patient.
- **Minimum Nutritional Requirement for dialysis patients and RDA:** Formulation of RDA and Dietary Guidelines Reference Man and Reference Woman. Adult consumption unit. Planning nutritional diet & maintenance of Intake output chats of dialysis patient.

Reference book

- Jelliffe, D. B. : Assessment of the Nutritional Status of the Community; World Health Organisation.
- Sain, D. R. Lockwood, R., Scrimshaw, N. S. : Methods the Evaluation of the Impact of Food and Nutrition Programmes, United Nations University.
- Ritchie, J.A.S. : Learning Bettor Nutrion FAO, Rome.
- Gopalon. C,: Nutrition Foundation of India, Special Publication service.
- Beghin, 1. Cap. M: Dujardan. B. : A Guide to Nutrition Status Assessment.
- W. H. 0. Geneva. Gopaldas, t. Seshadri, S. : Nutrition Monitoring a Assessment: Oxford University Press.
- Mason, J. B., Habicht, J. P.; Tabatabai. H. Valverde. U. :Nutrational Surveillance, W.H.O.

MDT DIRECTED CLINICAL EDUCATION – II (ONE MONTH IN VACATION)

Course code- BDLTS1-403 **(Total-450 hrs)**

Students will gain additional skills in medical equipment and radiation safety techniques. Students apply knowledge from previous clinical learning experience under the supervision of a senior technologist. Students are tested on intermediate technical skills.

SEMINAR

Course Code- BDLTS1-405 **L T P C**

0 0 6 3

For seminar/presentation there will be a maximum of 50 marks. Seminar / presentations will be evaluated by the teachers of the dept. The marks obtained in the same will be kept confidentially with the Head of the Dept. and will be submitted along with the internal assessment marks.

HUMAN RIGHTS & PROFESSIONAL VALUES /PURSUIT OF INNER SELF EXCELLENCE (POIS)

Course Code- BDLTS1-406 **L T P C** **Duration: 45 Hrs**

3 0 0 3

Course Objective

- To understand interaction between society and educational institutions.
- To sensitize the citizens so that the norms and values of human rights and duties of education programmes are realized.
- To encourage research activities.
- To encourage research studies concerning the relationship between Human Rights and Duties Education.
- To inculcate moral values in students – Self-Discipline, Time Management, Develop attitude of Service with humility, Empathy, Compassion, brotherhood, Respect for teachers, colleagues & society members.
- Develop Effective means of communication & presentation skills in students
- To develop wisdom in students for deciding their career based on their areas of interest and inner skills.
- Introduce techniques for Relaxation, Meditation & Connecting with inner self.

Course Outcomes

- This course will aim at making the learners acquire conceptual clarity and develop respect for norms and values of freedom, equality, fraternity and justice.
- It will include awareness of civil society organizations and movements promoting human rights. This will make the students realize the difference between the values of human rights and their duties

- Students will become self-dependent, more decisive and develop intuitive ability for their study and career related matter.
- Student's ability to present their ideas will be developed.
- Enhanced communication skills, public speaking & improved Presentation ability.
- Students will be able to explore their inner potential and inner ability to become a successful researcher or technician & hence become more focused

Unit:1 (10 Hrs)

- **Background** - Introduction, Meaning, Nature and Scope, Development of Human Rights, Theories of Rights, Types of Rights.
- **Human rights at various level**- Human Rights at Global Level UNO,
- **Instruments**: U.N. Commission for Human Rights, European Convention on Human Rights.

- **Spiritual Values for human excellence** : The value of human integration; Compassion, universal love and brotherhood (Universal Prayer) ; Heart based living ; Silence and its values, Peace and non-violence in thought, word and deed ; Ancient treasure of values - Shatsampatti , Patanjali's Ashtanga Yoga ,Vedic education - The role of the Acharya , values drawn from various cultures and religious practices - Ubuntu, Buddism, etc.; Why spirituality? Concept – significance ; Thought culture

Unit:2 (10 Hrs)

- **Human rights in India** - Development of Human Rights in India, Human Rights and the Constitution of India, Protection of Human Rights Act 1993. National Human Rights Commission, State Human Rights Commission, Composition Powers and Functions, National Commission for Minorities, SC/ST and Woman.

- **Ways and Means :** Correlation between the values and the subjects ;Different teaching techniques to impart value education; Introduction to Brighter Minds initiative; Principles of Communication; Inspiration from the lives of Masters for spiritual values - Role of the living Master

Unit:3 (10 Hrs)

- **Human Rights Violations** -Human Rights Violations against Women, Children, Violations against Minorities SC/ST and Trans-genders, Preventive Measures.
- **Professional values**- Integrity, Objectivity, Professional competence and due care, Confidentiality.

- **Integrating spiritual values and life:** Relevance of VBSE (Value Based Spiritual Education) in contemporary life ; Significant spiritual values ; Spiritual destiny ; Principles of Self-management; Designing destiny

Unit:4 (15 Hrs)

- **Personal values-** ethical or moral values, Attitude and behavior- professional behavior, treating people equally.
- **Code of conduct**- professional accountability and responsibility, misconduct, Cultural issues in the healthcare environment.

- **Experiencing through the heart for self-transformation (Heart fullness Meditation):** Introduction to Relaxation; Why, what and how HFN Meditation?; Journal writing for Self-Observation ; Why, what and how HFN Rejuvenation (Cleaning)? ; Why, what and how HFN connect to Self (Prayer)?; Pursuit of inner self excellence ; Collective Consciousness-concept of egregore effect

Reference book

- Jagannath Mohanty Teaching of Humans Rights New Trends and Innovations Deep & Deep Publications Pvt. Ltd. NewDelhi2009
- Ram Ahuja: Violence Against Women Rawat Publications Jewahar Nager Jaipur.1998
- Sivagami Parmasivam Human Rights Salem 2008
- Hingorani R.C.: Human Rights in India: Oxford and IBA New Delhi.
- The Art of Learning: A Journey in the Pursuit of Excellence, Josh Waitzkin, Simon and Schuster, 2007
- Reality at Dawn. By Shri Ram Chandra, Published by ISRC

BIOSTATISTICS AND RESEARCH METHODOLOGY

Course Code- BDLTS1 407 **L T P C** **Duration: 45 Hrs**
3 0 0 3

Course Objective

- To enable students to present, analyze and interpret data.
- To enable students to use concepts of probability in business situations.
- To enable students to make inferences from samples drawn from large datasets.
- To enable students to apply univariate and multivariate statistical techniques.

Course Outcomes

- To understand the importance & Methodology for research
- To learn in detail about sampling, probability and sampling distribution, significance tests correlation and regression, sample size determination, study design and multivariate analysis.

Unit 1 (10 hrs.)

- **Introduction:** Statistics, Biostatistics, Frequency distribution
- **Measures of central tendency**: Mean, Median, Mode-
- **Measures of dispersion:** Dispersion, Range, standard deviation,

- **Correlation:** Definition, Karl Pearson's coefficient of correlation, Multiple correlation

Unit 2 (10 hrs.)

- **Regression:** Curve fitting by the method of least squares, fitting the lines y= a + bx and x = a + by, Multiple regression, standard error of regression
- **Probability:** Definition of probability, Binomial distribution, Normal distribution, Poisson's distribution, properties – problems Sample, Population, large sample, small sample, Null hypothesis, alternative hypothesis, sampling, essence of sampling, types of sampling, Error-I type, Error-II type, Standard error of mean (SEM)
- **Parametric test:** t-test(Sample, Pooled or Unpaired and Paired) , ANOVA, (One way and Two way), Least Significance difference

Unit 3 (15 hrs.)

- **Non Parametric tests:** Wilcoxon Rank Sum Test, Mann-Whitney U test, Kruskal-Wallis test, Friedman Test
- **Introduction to Research:** Need for research, Need for design of Experiments, Experiential Design Technique, plagiarism

Unit 4 (10 hrs.)

- **Graphs:** Histogram, Pie Chart, Cubic Graph, response surface plot, Counter Plot graph
- **Designing the methodology:** Sample size determination and Power of a study, Report writing and presentation of data, Protocol, Cohorts studies, Observational studies, Experimental studies, Designing clinical trial, various phases.

Reference Book

- Mausner & bahn : Epidemiology-An Introductory text, 2nd Ed.,W.B. Saunders Co.
- Richard f. Morton & j. Richard hebd : A study guide to Epidemiology and Biostatistics, 2nd Ed., University Park Press, Baltimore.
- Sylvia W Smoller, J Smoller, Biostatistics & Epidemiology A Primer for health and Biomedical professionals, 4th edition, Springs, 2015

5th Semester

APPLIED DIALYSIS TECHNOLOGY – I

Course Code- BDLTS1-501 **L T P C** **Duration: 60 Hrs**
4 0 0 4

Course Objective

- Students explain the history of Dialysis and nephrology.
- Students' understanding of the underlying anatomy and physiology on which peritoneal dialysis is based.
- Understands and demonstrate the Physiology of Dialysis
- Describes, procedure of Venipuncture and demonstrate it
- Able to maintain Records and Reports and demonstrate the procedure.

Course Outcomes

- Describes the anatomy and Physiology
- Performs Physiological principles of Dialysis
- Demonstrated Procedures as Venipuncture, Cannulation and maintenance of Sterilization of Equipment's and Dialysis Unit
- Demonstrate maintenance of Records and Reports

Unit:1 (15 Hrs)

- **History of Dialysis –**Indian History of dialysis
- **History of Nephrology :** Acute Kidney Injury, Renal angiogram , Biopsy and Transplant
- **Anatomy & Physiology of dialysis:** Peritoneal Anatomy (Basic), The peritoneal membrane as a "dialyzer.", The three-pore model. Peritoneal Physiology, Diffusion Ultra diffusion , Absorption, Clinical Assessment.
- **Principles of Dialysis, quantification of adequacy:** Principles of diffusion, filtration, ultrafiltration, convection, and osmosis. Solute transport and fluid movement during dialysis. Principles of fluid dynamics. Hemodialysis& Peritoneal Dialysis. Measuring dialysis adequately: Urea reduction ratio - Urea Kinetic Modeling. Pre –dialysis and post dialysis - BUN Measurement. Measurement of KT/V.

Unit:2 (15 Hrs)

- **Vascular Access – Temporary & Permanent:** Types of vascular access – Fistulae, Grafts, Catheters. Pre- dialysis assessments for all types of vascular access. Methods of needle insertion for AVFs and grafts. Pre - dialysis assessment, accessing procedure, exit site care, and monitoring of catheters.
- **Types of Dialysis:** Genesis of dialysis, invention and the process involved in the evolution of dialysis, indication of dialysis. Types of dialysis and classification. Dialysis for acute kidney injury, dialysis for chronic kidney disease. Introduction to Continuous renal replacement therapy (CRRT).

Unit:3 (15 Hrs)

- **Equipment, Accessories& Function** (hemodialysis machine, peritoneal dialysis machine): Types of equipment used in the dialysis process. Parts of a dialysis machine, tubing's and the water supply for dialysis. Overview of the various equipment, accessories and working of a dialysis machine-The technology, functioning, calibration, and sterilization of dialysis machine according to their: Type/ brand, Frequency and duration of use, Importance of Calibration and Sterilization , Recording (Calibration, Sterilization and set up details),Planning and Organizing Scheduled Maintenance, Various indicators, alarms and sensors of the dialysis machine. Corrective steps to be taken when a particular alarm goes off

Unit:4 (15 Hrs)

- **Infection control and sterilization:** Morphology of microorganisms, Sterilization and Disinfection, Microbiology of vascular access infection (femoral, jugular, subclavian catheters), Sampling methodologies for culture & sensitivity, Principles and Practice of Biomedical waste management
- **Renal data maintenance:** Records and reports maintained in the dialysis unit. Need for maintenance of records and report. The technologist's responsibility in maintenance of records and report. Medico legal aspects of maintenance of records

Recommended Text Books:

- Water quality in hemodialysis by E.Bonnie-Schorn, A, Grassmann, I. Uhlenbusch-Korwer, C.Weber, J.Vienken
- Brenner B.M., et al. (2011) Brenner and Rector's The Kidney 9th Ed, Elsevier Health Sciences
- Schrier R.W., (2006) Diseases of the Kidney and the urinary tract (Vol I, II, & III) 8th Ed, Lippincott Williams & Wilkins.
- Claude Jacobs (1996) Replacement of Renal Function by Dialysis Springer.
- Nissenson, A. R., Fine R.N., (2002) Textbook of Dialysis therapy 3rd Ed Hanley &Belfus.
- Orientation to National Kidney Foundation Hemodialysis Program – Training Manual by Gay Martin.
- Orientation to National Kidney Foundation Hemodialysis Program – Training Manual by Gay Martin.
- Dialysis Technology – A Manual for Dialysis Technicians by Jim Curtis, Philip

APPLIED DIALYSIS TECHNOLOGY – I PRACTICAL

Course Code- BDLTS1-504 **L T P C** **Duration: 60Hrs**
0 0 4 2

Course Objective

- Students explain the history of Dialysis and nephrology.
- Students' understanding of the underlying anatomy and physiology on which peritoneal dialysis is based.
- Understands and demonstrate the Physiology of Dialysis
- Describes, procedure of Venipuncture and demonstrate it
- Able to maintain Records and Reports and demonstrate the procedure.

Course Outcomes

- Describes the anatomy and Physiology
- Performs Physiological principles of Dialysis
- Demonstrated Procedures as Venipuncture, Cannulation and maintenance of Sterilization of Equipment's and Dialysis Unit
- Demonstrate maintenance of Records and Reports

Experiment:

- A.V. Cannulation
- A.V. Fistula
- Initiation of dialysis through central venous catheters – Internal
- Jugular – Femoral – Subclavian vein Packing and sterilization of dialysis trays
- Termination Dialysis

Reference book:

- Water quality in hemodialysis by E.Bonnie-Schorn, A, Grassmann, I. Uhlenbusch-Korwer, C.Weber, J.Vienken
- Brenner B.M., et al. (2011) Brenner and Rector's The Kidney 9th Ed, Elsevier Health Sciences
- Schrier R.W., (2006) Diseases of the Kidney and the urinary tract (Vol I, II, & III) 8th Ed, Lippincott Williams & Wilkins.
- Claude Jacobs (1996) Replacement of Renal Function by Dialysis Springer.
- Nissenson, A. R., Fine R.N., (2002) Textbook of Dialysis therapy 3rd Ed Hanley &Belfus.
- Orientation to National Kidney Foundation Hemodialysis Program – Training Manual by Gay Martin.
- Orientation to National Kidney Foundation Hemodialysis Program – Training Manual by Gay Martin.

- Dialysis Technology – A Manual for Dialysis Technicians by Jim Curtis, Philip Varughese

ADVANCE DIALYSIS TECHNOLOGY - I

Course Code- BDLTS1-502 **L T P C** **Duration: 60 Hrs**
4 0 0 4

Course Objective

- Students Learn about Types of Dialysis and its Implications
- Comprehend the various modalities of renal replacement therapy with the knowledge of merits and demerits of each
- Differentiate between peritoneal dialysis, SLED, CRRT, High efficiency dialysis & Hemodialysis in terms of purpose, indications, advantages, disadvantages and the responsibilities of a technologist.

Course Outcomes

- Practice and perform independently the water maintenance for the Hemodialysis room
- Independently maintain the Hemodialysis machine with respect to disinfection and priming.

Unit:1 (15 Hrs)

- **Hemodialysis:** The process of Haemodialysis, vascular access, Starting Haemodialysis, priming of the dialyser, alarms and the settings of a dialyser, completion of Haemodialysis, closing the Haemodialysis**.** Cleaning of the tubing and dialyser and the dialysis machine**.**
- **Complications of Haemodialysis Acute & chronic Complications of Haemodialysis:** acute complications – monitoring, prevention for acute complications. Chronic complications – list, prevention strategies, monitoring for chronic complications.

Unit:2 (15 Hrs)

- **Preparation and positioning of patient for dialysis, Patient Assessment – Pre, intra & post dialysis & Machine and patient monitoring during Hemodialysis:** Introduction to patient assessment, Understanding a treatment plan, Equipment preparation – Dialysate - Dialyser and Blood lines, Decisions regarding the appropriate size and type of catheter/ IV tubing to be used Connecting patients to the machine- Initiation of dialysis - Removing fluid - Replacing fluid - Drawing blood samples - Testing blood samples.
- **Measuring dialysis adequately:** Urea reduction ratio - Urea Kinetic Modelling. Pre –dialysis and post dialysis - BUN Measurement. Factors affecting dialysis treatment, communicating and documenting the findings prior to the dialysis process.
- **Starting the dialysis treatment:** Monitoring during dialysis - Patient Monitoring (blood pressure, temperature, rate of blood flow, proper mixture of dialysate, presence of air bubbles)- Technical Monitoring.

Unit:3 (15 Hrs)

- **Importance of reporting, HD Complications during dialysis:** Clinical complications - Technical Complications- Procedure to disconnect the patient - procedure for removing the IV

cannula- Post dialysis procedures, Post dialysis patient evaluation, Recording of the Treatment, Recording changes in Patient's condition, Preparation of status and progress reports, Equipment clean up and Maintenance, Recording the dialysis procedure on the medical report/chart of the patient.

- **Dialysate delivery system:** Definition of a delivery system, types of delivery systems.
- **Composition of dialysate:** Various dialysate compositions, its uses and indications. Method for obtaining various compositions of dialysate
- **Anticoagulation** Use of anticoagulation in the dialysis setting, various anticoagulants used Monitoring during use of anticoa. Method of administration Calculation of anticoagulant use & complications. Heparin free dialysis - need and indication. Regional citrate anticoagulation.
- **High flux / high efficiency dialysis:** Definition of high flux / high efficiency dialysis, differences between high flux dialysis and Haemodialysis, used and indications for high flux dialysis, complications of high flux dialysis, precautions and contraindications. Care during a high flux dialysis.

Unit:4 (15 Hrs)

- **Peritoneal Dialysis:** Acute and Chronic Peritoneal Dialysis. PD – Transport kinetics, ultrafiltration, UF, Intermittent PD, Continuous Ambulatory Peritoneal Dialysis, Automated Peritoneal Dialysis, Dialysis Solutions, Novel uses of PD. Adequacy of peritoneal dialysis chronic peritoneal Dialysis - KT/V Creatinine clearance. PET - Peritoneal Equilibrium test and interpretation.
- **Infectious and noninfectious complications of PD Introduction to complications in peritoneal dialysis. List of Complications:** Catheter Infections Peritonitis Inadequate flow or drainage of the dialysis fluid Lesions Ultrafiltration failure. Management of exit site infection, Early Exit Site Care. Chronic Care of the Healed Exit Site Diagnosing Exit Site Infections Treatment of exit-site infections Technique to culture exit site infection Medical management of CAPD peritonitis Initiation of therapy based on gram stain results Antibiotic selection. Medications in dialysis, Nutrition management in dialysis patients**.** Common drugs used for a patient on dialysis, Use of antibiotics during and post dialysis, considerations to be taken, Erythropoietin use in patients on dialysis - dosage and administration, Antihypertensive use - considerations during dialysis**,** Vaccines for patients on haemodialysis - need and the schedule, Introduction to nutrition and RDA's. Renal diet, Teaching for a patient on renal diet, Diet & method of cooking to be employed, Planning a renal diet for a patient with CRF

Reference book

- **Davison A.M., (2010) Oxford textbook of Nephrology Volume 4 Oxford University Press.**
- Brenner B.M., et al. (2011) Brenner and Rector's The Kidney 9th Ed, Elsevier Health Sciences
- 3. Schrier R.W., (2006) Diseases of the Kidney and the urinary tract (Vol I, II, & III) 8th Ed, Lippincott Williams & Wilkins.
- Claude Jacobs (1996) Replacement of Renal Function by Dialysis Springer.
- Nissenson, A. R., Fine R.N., (2002) Textbook of Dialysis therapy 3rd Ed Hanley & Belfus.

● Khanna,R., Krediet R.T.,(2009) Nolph and Gokal's Textbook of Peritoneal Dialysis, 3rd Ed Springer. Feehally J., Floege, J., Johnson R.J., (2007) Comprehensive Clinical Nephrology 3rd Ed Mosby

ADVANCE DIALYSIS TECHNOLOGY – I PRACTICAL

Course Code- BDLTS1 505 **L T P C** **Duration: 60 Hrs**

0 0 4 2

Course Objective

- Students Learn about Types of Dialysis and its Implications
- Comprehend the various modalities of renal replacement therapy with the knowledge of merits and demerits of each
- Differentiate between peritoneal dialysis, SLED, CRRT, High efficiency dialysis & Hemodialysis in terms of purpose, indications, advantages, disadvantages and the responsibilities of a technologist.

Course Outcomes

- Practice and perform independently the water maintenance for the Hemodialysis room
- Independently maintain the Hemodialysis machine with respect to disinfection and priming

Experiment:

- Setting up a dialysis machine for dialysis
- Preparation of concentrates – depending on the situation
- Reuse of dialysis apparatus
- Isolated ultrafiltration.
- Performance of peritoneal dialysis exchange – manually
- Setting up of automated peritoneal dialysis equipment

Reference book

● **Davison A.M., (2010) Oxford textbook of Nephrology Volume 4 Oxford University Press.**
● Brenner B.M., et al. (2011) Brenner and Rector's The Kidney 9th Ed, Elsevier Health Sciences
● 3.Schrier R.W., (2006) Diseases of the Kidney and the urinary tract (Vol I, II, & III) 8th Ed, Lippincott Williams & Wilkins.
● Claude Jacobs (1996) Replacement of Renal Function by Dialysis Springer.
● Nissenson, A. R., Fine R.N., (2002) Textbook of Dialysis therapy 3rd Ed Hanley & Belfus.
● Khanna,R., Krediet R.T.,(2009) Nolph and Gokal's Textbook of Peritoneal Dialysis, 3rd Ed Springer. Feehally J., Floege, J., Johnson R.J., (2007) Comprehensive Clinical Nephrology 3rd Ed Mosby

COMMUNITY ORIENTATION & CLINICAL VISIT (INCLUDING RELATED PRACTICAL'S TO THE PARENT COURSE)

Course Code- BDLTS1-503 **L T P C** **Duration: 360 Hrs**

0 0 8 4

Students will gain additional skills in interventional procedures, cardiac pharmacology and recent advancements. Students apply knowledge from previous clinical learning experience under the supervision of a senior technologist. Students are tested on intermediate pharmacological and invasive techniques.

BASICS OF CLINICAL SKILL LEARNING

Course Code- BDLTS1-506 **L T P C** **Duration: 45 Hrs**

3 0 0 3

Course Objective

- To Understand the basic ideas on how to check for Vital Signs of the Patient**.**
- This course the Student will learn how to handle the patients and their positioning.
- They will also learn on the Basics of Nasal-Gastric Tube.
- The Students will learn on Administration of IV, IV and Medication.
- Also they will know about Cleanliness in the Asepsis.

Course Outcomes

- After successful accomplishment of the course, the students would be able to Measure Vital Signs, do basic physical Examination of the patients, NG tube basics, Administration of Medicines.
- The students will learn about Asepsis, and the Cleanliness related to asepsis and on mobility of the patients.

Unit:1 (10 Hrs)

- **Measuring vital signs:** temperature: axillaries temperature, pulse: sites of pulse, measurement, respiratory, blood pressure, pain: pain scale
- **Physical examination:** observation, auscultation (chest),palpation, percussion, history taking

Unit:2 (20 Hrs)

- **Feeding: entral feeding, ng tube:** measurement, procedure, care, removal of nasal-gastric tube, nasal-gastric tube feeding, and parenteral nutrition.
- **Administrations:** oral, intravenous, intramuscular, subcutaneous, recapping of syringe, loading of drugs, calculation of drugs, venipuncture, iv infusion, cannula, attachment of iv infusion

set, fluid collection, heparin lock, maintenance of iv set, performing nebulizer therapy, inhaler, oxygen therapy (nasal, prongs, nasal catheter, venturi mask, face mask).

Unit: 3(10 Hrs)

- **Asepsis:** hand wash techniques, (medical, surgical) universal precaution, protecting
- **Equipments:** using sterile gloves, opening a sterile package and establishing a sterile field, sterile dressing changes, surgical attire, wound dressing, suture removal, cleaning and application of sterile dressing, wearing and removal of personal protective equipment.

Unit: 4 (5 Hrs)

- **Mobility and support:** Moving and positioning, range of Motion exercises (Active & Passive) Assisting for Transfer, Application of Restraints.

Reference Book:

- Jansen van Vuuren, M. V. (2005). A framework for a skills laboratory curriculum in an undergraduate medical programme in South Africa (Doctoral dissertation, University of the Free State).

HOSPITAL OPERATION MANAGEMENT

Course Code- BDLTS1-507 **L T P C** **Duration: 45 Hrs**

3 0 0 3

Course Objective:

- To promote scientific management of hospitals and advancement of health care systems so as to make it rational, responsive and cost efficient.
- To promote the development of high quality hospital care in the community and the country.
- It has to provide a satisfactory environment to the patient and also to the doctors for clinical research.

Course Outcomes:

- Understand and apply resource management concepts (personnel, finance, and material resources) and the processes and strategies needed in specific hospital sectors.
- Communicate effectively and develop their leadership and teambuilding abilities.
- Apply modern change management and innovation management concepts to optimize structures.
- Analyze existing hospital service policies and enhance their alignment within the local and national context

Unit 1 (15 hrs.)

- **Medico-legal cases:** introduction, laws associated with medico-legal cases, three core contents in medico-legal cases w.r.t doctors, patient & profession,
- **Considerations of ethics:** consent, confidentiality, mental health, end of life and organ transportation, research & clinical trials

Unit 2 (10 hrs.)

- **Hospital information system (his):** hospital information system management, software applications in registration, billing, investigations, reporting, medical records management, security and ethical challenges.

Unit 3 (10 hrs.)

- **Equipment operations management:** hospital equipment repair and maintenance, types of maintenance, job orders, equipment maintenance log books, amcs.

Unit 4 (10 hrs.)

- **Role of medical records in health care management:** computers for medical records, developments of computerized medical record information processing system(emr's), computer stored (vs) manual hand written record, advantages of emr (vs) manual

Reference Book

- Hospital Operations: Principles of High Efficiency Health Care William S. Lovejoy
- Handbook of Healthcare Operations Management Brian T. Denton

6th Semester

APPLIED DIALYSIS TECHNOLOGY - II

Course Code- BDLTS1-601 **L T P C** **Duration: 60 Hrs**
4 0 0 4

Course Objective

- Enumerate on the various complications of Hemodialysis in terms of the technologist's responsibility in prevention and worsening of the complications
- Dialysis in special Cases
- Students learns about various conditions and their association in Dialysis
- Student demonstrated Skills in Follow up care and quality maintenance in terms of renal dialysis treatment Modalities and Procedures

Course Outcomes

- Train patients in performing peritoneal dialysis, and personal care.
- Practice personal safety & standard precautions.
- Handling complications during dialysis procedures.
- Maintain quality and safety.

Unit:1 (10 Hrs)

- **Acute and chronic dialysis prescription/ consideration:** Common drugs for patients with ARF & CRF, Actions, side effects
- **Special considerations:** Patients with Renal anemia, Congestive cardiac failure (CCF), advanced liver disease, Positive with HIV, HBSAG & HCV. Failed Transplant, Poisoning cases & pregnancy.

Unit:2 (15 Hrs)

- **Dialysis in Neonates, infants, children & adolescence:** Dialysis for infants and neonates, vascular access in this special group, dialysis settings, Monitoring for complications and management of complications. Role of technician in nosocomial infection & infection control.
- **Special Problems in dialysis patients:** Cardiovascular diseases, Diabetes, Hypertension, Infections (HBV, HCV, HIV), Bone diseases, Aluminum toxicity. Role of technician in nosocomial infection & infection control.

Unit:3 (15 Hrs)

- **Psychosocial aspects & patient education Psychological impact of a chronic disease:** Psychology of patient with disease prognosis, the financial implications of the disease, the family and its role in the care of the patient with CRF. Patient education on diet, prevention of complications, drug compliance. Rehabilitation for acute and chronic CKD or dialysis patient.

Unit:4 (20 Hrs)

- **Instruct patients about in-home treatment and precaution:** Identification of the type of patient for whom in house treatment is possible and in line with doctor's advice, procedure of in-house treatment options, pros and cons of in-house treatment options, the relevant protocol and procedures to be followed to carry out the process.
- **General principle of hospital:** practice Hospital structure and organization, Care of Patient , Basic Assessment Skills, First aid & Basic Life Support, Maintenance of Hygiene & Infection Control Practices, Principles of asepsis, Maintenance of Medications in the department, Specialized Investigations - Care of Patients, Medico - Legal Issues.
- **Quality assurance in dialysis:** Standards of practice, Various risks to quality and safety, JCI recommendations, NABH recommendations. Infection control policies and procedures in the dialysis unit.

Reference book:

- Brenner B.M., et al. (2011) Brenner and Rector's The Kidney 9th Ed, Elsevier Health Science
- Schrier R.W., (2006) Diseases of the Kidney and the urinary tract (Vol I, II, & III) 8th Ed, Lippincott Williams & Wilkins.
- Claude Jacobs (1996) Replacement of Renal Function by Dialysis Springer.
- Nissenson, A. R., Fine R.N., (2002) Textbook of Dialysis therapy 3rd Ed Hanley &Belfus.
- Orientation to National Kidney Foundation Hemodialysis Program – Training Manual by Gay Martin.
- Dialysis Technology – A Manual for Dialysis Technicians by Jim Curtis, Philip Varughese.

APPLIED DIALYSIS TECHNOLOGY – II PRACTICAL

Course Code- BDLTS1-604 **L T P C** **Duration: 60 Hrs**
0 0 4 2

Course Objective

- Enumerate on the various complications of Hemodialysis in terms of the technologist's responsibility in prevention and worsening of the complications
- Dialysis in special Cases
- Students learns about various conditions and their association in Dialysis
- Student demonstrated Skills in Follow up care and quality maintenance in terms of renal dialysis treatment Modalities and Procedures

Course Outcomes

- Train patients in performing peritoneal dialysis, and personal care.
- Practice personal safety & standard precautions.
- Handling complications during dialysis procedures.
- Maintain quality and safety.

Experiment:

- Dialysis Unit priming (Setting)
- A.V. Cannulation & Termination
- A.V. Fistula / A.V. Grafting
- Dialysis catheterization (Internal Jugular – Femoral – Subclavian vein
- Packing) including sterilization**.**

Reference Book

- Brenner B.M., et al. (2011) Brenner and Rector's The Kidney 9th Ed, Elsevier Health Science
- Schrier R.W., (2006) Diseases of the Kidney and the urinary tract (Vol I, II, & III) 8th Ed, Lippincott Williams & Wilkins.
- Claude Jacobs (1996) Replacement of Renal Function by Dialysis Springer.
- Nissenson, A. R., Fine R.N., (2002) Textbook of Dialysis therapy 3rd Ed Hanley &Belfus.
- Orientation to National Kidney Foundation Hemodialysis Program – Training Manual by Gay Martin.
- Dialysis Technology – A Manual for Dialysis Technicians by Jim Curtis, Philip Varughese.

ADVANCE DIALYSIS TECHNOLOGY - II

Course Code- BDLTS1-602 **L T P C** **Duration: 60 Hrs**
4 0 0 4

Course Objective

- Students learn about Advancements in Dialysis.
- Practice independently SLED, CRRT and high efficiency dialysis.
- Learn different Advanced Renal therapies.

Course Outcomes

- Demonstrate Knowledge about Advancements in Renal Dialysis and in renal therapies.
- Demonstrate peritoneal dialysis, and its self care.
- Involves family centered approach while providing patient care.
- Handling complications during dialysis procedures.

Unit:1 (15 Hrs)

- **New generation dialysis:** Recent advances in hemodialysis, Nocturnal dialysis, online dialysis, Daily dialysis, Telemedicine in dialysis practices.
- **Water treatment-pretreatment, deionizer, Reverse Osmosis:** Purpose of water treatment for dialysis. Components of a dialysis Centre's water treatment system. Advantages and disadvantages of water softeners, carbon tanks, reverse osmosis, deionization, and ultraviolet irradiation in the treatment of water for dialysis. Monitoring of water treatment systems –

disinfection, microbiological testing, water sampling and chemical monitoring. Method for microbiological testing of the water treatment system.

Unit:2 (15 Hrs)

- **Typical water treatment monitoring schedule, reverse osmosis process and system:** definition of RO, cartridge pre-filter, reverse osmosis pump and monitor assembly, RO membranes, Quality assessment mechanisms, JCI requirements, ISO requirements, checklists and tools used for optimal compliance.

Unit:3 (15 Hrs)

- **Dialysis reuse:** History of dialyzer reprocessing. Reason for dialysis reprocessing. Steps involved in dialyzer reprocessing. Hazards of dialyzer reprocessing. Documentation for dialyzer reprocessing.

Unit:4 (15 Hrs)

- **Dialyzer Membranes:** Introduction to dialyzer membranes. Composition of the dialyzer membranes, types its use and sizes of the various membranes. Principles on which the dialyzer membranes work.
- **Renal Therapies (continuous):** Definition, indications, uses, method of initiation of dialysis, contraindications of therapy. Complications of therapy and ways to prevent complications. Monitoring during MARS dialysis, SLED and CRRT. Technologist's roles and responsibilities during MARS dialysis CRRT & SLED. Continuous therapies in hemodialysis, Hemo perfusion, Plasma Pheresis.

Recommended Text Books:

- Water quality in hemodialysis by E.Bonnie-Schorn, A, Grassmann, I. Uhlenbusch-Korwer, C.Weber, J.Vienken
- Brenner B.M., et al. (2011) Brenner and Rector's The Kidney 9th Ed, Elsevier Health Sciences
- Schrier R.W., (2006) Diseases of the Kidney and the urinary tract (Vol I, II, & III) 8th Ed, Lippincott Williams & Wilkins.
- Claude Jacobs (1996) Replacement of Renal Function by Dialysis Springer.
- Nissenson, A. R., Fine R.N., (2002) Textbook of Dialysis therapy 3rd Ed Hanley &Belfus.
- Orientation to National Kidney Foundation Hemodialysis Program – Training Manual by Gay Martin.

ADVANCE DIALYSIS TECHNOLOGY – II PRACTICAL

Course Code- BDLTS1-605 **L T P C** **Duration: 60 Hrs**

0 0 4 2

Course Objective

- Students learn about Advancements in Dialysis.
- Practice independently SLED, CRRT and high efficiency dialysis.
- Learn different Advanced Renal therapies.

Course Outcomes

- Demonstrate Knowledge about Advancements in Renal Dialysis and in renal therapies.
- Demonstrate peritoneal dialysis, and its self care.
- Involves family centered approach while providing patient care.
- Handling complications during dialysis procedures

Experiment:

- First assistant in minor procedures
- Dialysis Reuse
- CPR Demonstrations
- Prepare Presentations based on various kinds of data collection

Recommended Text Books:

- Water quality in hemodialysis by E.Bonnie-Schorn, A, Grassmann, I. Uhlenbusch-Korwer, C.Weber, J.Vienken
- Brenner B.M., et al. (2011) Brenner and Rector's The Kidney 9th Ed, Elsevier Health Sciences
- Schrier R.W., (2006) Diseases of the Kidney and the urinary tract (Vol I, II, & III) 8th Ed, Lippincott Williams & Wilkins.
- Claude Jacobs (1996) Replacement of Renal Function by Dialysis Springer.
- Nissenson, A. R., Fine R.N., (2002) Textbook of Dialysis therapy 3rd Ed Hanley & Belfus.
- Orientation to National Kidney Foundation Hemodialysis Program – Training Manual by Gay Martin.

MDT DIRECTED CLINICAL EDUCATION – IV

Course Code- BDLTS1-603 **Duration: 240 Hrs**

Students will gain additional skills in diagnosis in pediatric cases and pediatric interventional procedures. Students apply knowledge from previous clinical learning experience under the supervision of a senior technologist. Students are tested on intermediate clinical diagnostic and therapeutic skills.

INTERNSHIP

Guidelines:

- The internship shall commence after the student has completed and passed all subjects up to VI semesters.
- The internship is compulsory.
- The duration of the internship shall be one year.
- The degree of Bachelor in Allied Health Sciences shall be awarded after the satisfactory completion of the internship.

Evaluation of Internees:

Formative Evaluation:

Day to day assessment of the internees during their internship postings should be done by the Head of the Department/Faculty assigned. The objective is that all the interns must acquire necessary minimum skills required for carrying out day to day professional work competently. This can be achieved by maintaining Records /Log Book by all internees. This will not only provide demonstrable evidence of the processes of training but more importantly of the internee's own acquisition of competence as related to performance.

Summative Evaluation:

It shall be based on the observation of the Sr. Technical staff / Faculty of the department concerned and Record / Log book maintained by the interns. Based on these two evaluations, the Head of the Department shall issue a certificate of satisfactory completion of training, following which the university shall award the degree or declare him/her eligible for it.

To implement the project work uniformly for all the specialties in view of the curriculum and training to be acceptable internationally and the students to get opportunity for higher studies and employment.

Internship Programme: 05 days for orientation programme 120 days in Dialysis Unit 30 days in Nephrology Ward 60days in Nephrology OT 30 days for Nephrology OPD