



**Program Name: B.Sc. Dialysis Technology**  
**Program Code: DLS-201**

**SCHEME & SYLLABUS**  
**(Choice Based Credit System)**  
**for**  
**B. Sc.**  
**in**  
**DIALYSIS TECHNOLOGY**  
**(w. e. f. Session 2022-23)**

**Program Code: DLS-201**



**DEPARTMENT OF DIALYSIS TECHNOLOGY**

**RIMT UNIVERSITY, MANDIGOBINDGARH, PUNJAB**

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**SECTION 1**

**Vision & Mission of the University**

**VISION**

To become one of the most preferred learning places a centre of excellence to promote and nurture future leaders who would facilitate in desired change in the society

**MISSION**

- To impart teaching and learning through cutting edge technologies supported by the world class infrastructure
- To empower and transform young minds into capable leaders and responsible citizens of India instilled with high ethical and moral values

**SECTION 2****Vision and Mission of the Department****VISION**

The department aims to inculcate teaching, innovative thinking, and experiential learning voyage by disseminating theory and practice of Dialysis Practical thought to generate exceptional Technicians who make a difference to our community both locally and internationally. It aims at Continuous improvement and development of our primary stakeholder to intellectually evolve as a knowledgeable, research oriented, socially responsible, and productive citizen.

**MISSION**

- To create the environment that facilitates learning fundamentals of dialysis technology.
- To impart the knowledge in Hemodialysis machine, RO Systems and Dialyzer reuse.
- To provide better understanding of the domain of study, including wider social issues, corporate social responsibility and ethical decision making.
- To ensure continuous interaction of the students through MOU's and collaborative clinical exposure.

**SECTION 3****About the Program**

Bachelor of Technology in dialysis is an Under-Graduate Dialysis technology Program. Dialysis technology is a field of Dialysis that generally deals with the study and application of Kidney failure patients.

Our B.Sc. Program is an Outcome Based Education model which is a 4-year, 8 Semester Full time Program of 130 credits with a Choice Based Credit System (CBCS) and Grading Evaluation System. B.Sc. Dialysis technology program is structured semester wise and includes theory and practical to impart the students a holistic understanding of B.Sc. Dialysis technology subjects.

**SECTION 4****Program Educational Objectives (PEOs), Program Outcomes (POs) and Program Specific Outcomes (PSOs)****PROGRAMME EDUCATION OBJECTIVES (PEOs)**

<b>PEO1</b>	Establish their careers in the field of Dialysis technology and related areas, providing innovative and effective solutions.
<b>PEO2</b>	To Analyze, interpret and apply concepts of patient health care skill and dialysis machine handling skill.
<b>PEO3</b>	To train students with good scientific knowledge of entrepreneurial qualities and explore entrepreneurial opportunities by working effectively and professionally in teams and enabling them to evaluate their practical skill.
<b>PEO4</b>	To provide students with an academic environment aware of excellence, leadership, ethical code and guidelines, and the life-long learning needed for a successful professional career.

**PROGRAMME OUTCOMES (POs)**

<b>PO 1</b>	<b>Dialysis Therapy Knowledge:-</b> Students gain a deep knowledge regarding kidney, its related diseases, analytical skills, techniques of Hemodialysis and Peritoneal dialysis ) along with excipients, sitting session for treatment form studies including novel approaches, designing and development of dialysis machine, analysis etc.
<b>PO 2</b>	<b>Research Analysis:</b> Students could apply the knowledge of dialysis in research field to make new discoveries.
<b>PO 3</b>	<b>Design &amp; Development of dialysis machine:</b> Various design forms could be prepared by the dialysis technician in the manufacturing companies for the ease of patients and to avoid complications.
<b>PO 4</b>	<b>Conduct investigations of complex problems:</b> Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
<b>PO 5</b>	<b>Modern methods usage:</b> Create, select, and apply appropriate techniques, resources, and modern methods with an understanding of the limitations and its usage. The student also learns to handle many instruments related to their studies which would help them work in a Pharmaceutical Industry, pharmacovigilance, regulatory requirements, legal processes etc.
<b>PO 6</b>	<b>Dialysis and society:</b> Dialysis technician provides complete health care data and practices to the people of the society and guides them to be healthy. The student also learns dialysis techniques, patient counseling, ethical laws etc. Student gains expertise in dialysis therapies with all precautions and in-depth knowledge of sessions, adverse effect and other health related issues to deal with indoor and outdoor patients admitted in hospitals and also in public.
<b>PO 7</b>	<b>Environment and sustainability:</b> Understand the impact of the professional Dialysis technician in society and environment, and make an impact of it on the people of the society.
<b>PO 8</b>	<b>Ethics:</b> Apply ethical principles and commit to professional ethics and responsibilities and norms of the Dialysis technician practice. Student is also trained in ethical behavior with physician, nurses and other paramedical staff for protecting patient's health.
<b>PO 9</b>	<b>Individual and team work:</b> Function effectively as an individual, and as a member or leader in diverse teams acts as a multidisciplinary person in every context.
<b>PO 10</b>	<b>Communication:</b> Communicate effectively on dialysis therapies session with the community and with society.
<b>PO 11</b>	<b>Life-long learning:</b> Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

<b>PO 12</b>	<b>Social Interaction:</b> Being a public welfare job a dialysis technician would be able to interact With the people in a better way to cure them and make them feel healthy.
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**PROGRAMME SPECIFIC OUTCOMES (PSOs)**

<b>PSO 1</b>	Perform the different procedures required by the Dialysis unit like priming dialysis circuit, cannulation, central line insertion and peritoneal dialysis etc.
<b>PSO 2</b>	Able to apply the knowledge of the reuse of dialyzers and new advance technique used in Dialysis.
<b>PSO 3</b>	Able to do multidisciplinary jobs in the kidney care hospitals where patients undergoing hemodialysis.



**SECTION 5**

**Curriculum / Scheme with Examination Grading Scheme**

**INDUCTION PROGRAM**

<b>Induction Program (Mandatory)</b>	
Duration	03 weeks
Frequency	Induction program for students to be offered right at the start of the first year
Activities	<ul style="list-style-type: none"> <li>• Physical Activity</li> <li>• Sports, Yoga &amp; Stress Management</li> <li>• Creative Arts</li> <li>• Universal Human Values</li> <li>• Lectures by Eminent People</li> <li>• Visits to local Areas</li> <li>• Familiarization to Dept./Branch &amp; Innovations</li> </ul>

**SEMESTER WISE SUMMARY OF THE PROGRAMME: B.Sc.  
(DIALYSIS TECHNOLOGY)**

S.no.	Semester	No. of Contact Hours	Marks	Credits
1.	I	25	700	25
2.	II	21	500	21
3.	III	19	400	19
4.	IV	23	500	23
5.	V	23	500	23
6.	VI	19	500	19
7.	VII&VIII	<b>(INTERNSHIP)</b>		
	<b>Total</b>	130	3100	130

**COURSE CATEGORY-WISE CREDIT DISTRIBUTION**

S. No.	Category	Number of Credits	Percentage Weightage
1	University Core		
2	University Open		
3	Program Core	120	92.3%
4	Program Elective	10	7.62
5	Program Specialization		
6	MOOCs		
7	Project / Research Projects		
8	Thesis/Dissertation		
9	Training/Internships/Field Trips		
10	Professional Skills		
11	Any Other(Fundamental)		
<b>TOTAL CREDITS</b>		<b>130</b>	

**EXAMINATION GRADING SCHEME**

<b>Marks Percentage Range</b>	<b>Grade</b>	<b>Grade Point</b>	<b>Qualitative Meaning</b>
80-100	O	10	Outstanding
70-79	A+	9	Excellent
60-69	A	8	Very Good
55-59	B	7	Good
50-54	B	6	Above Average
0-50	C	5	Fail
ABSENT	AB	0	Fail

**Percentage Calculation: CGPA \*10**

**FIRST SEMESTER**

Course		Contact Hours/Week			Credit	Contact Hrs.	Evaluation Scheme (% of Total Marks)			Exam Duration (Hours)
Course Code	Course Title	L	T	P			Internal	External	Total	
BDLS-1101	Human Anatomy and physiology	5			5	5	40	60	100	3 Hrs
	<b>Program Elective-1</b>	5			5	5	40	60	100	3 Hrs
BDLS-1103	Biochemistry	5			5	5	40	60	100	3 Hrs
BDLS-1104	Medical Ethics	5			5	5	40	60	100	3 Hrs
BENG-1104	Effective Communication skill	3			3	3	40	60	100	3 Hrs
BDLS-1171	Human Anatomy and physiology (practical)			2	1	1	50	50	100	3 Hrs
BENG-1173	Effective Communication skill (practical)			2	1	1	50	50	100	3 Hrs
Total		23		4	25	25			700	

	Program Code	Course Title
<b>Program Elective-1</b>	BDLS-1102	Basic sciences
	BDLS-1107	First Aid

**2<sup>nd</sup> SEMESTER**

Course		Contact Hours/Week			Credit	Contact Hrs.	Evaluation Scheme (% of Total Marks)			Exam Duration (Hours)
Course Code	Course Title	L	T	P			Internal	External	Total	
BDLS-1201	Microbiology	4			4	4	40	60	100	3 Hrs
BDLS-1202	Basic Concepts of Renal Diseases	5			5	5	40	60	100	3 Hrs
BDLS-1203	Applied anatomy and physiology	4			4	4	40	60	100	3 Hrs
BDLS-1272	Applied anatomy and physiology (practical)			4	4	4	50	50	100	3 Hrs
BDLS-1273	Microbiology- (practical)			4	4	4	50	50	100	3 Hrs
Total		13		8	21	21			500	

**3<sup>rd</sup> SEMESTER**

Course		Contact Hours/Week			Credit	Contact Hrs.	Evaluation Scheme (% of Total Marks)			Exam Duration (Hours)
Course Code	Course Title	L	T	P			Internal	External	Total	
BDLS-2301	Health Care	5			5	5	40	60	100	3 Hrs
BDLS-2302	Basic Concepts of Nutrition	5			5	5	40	60	100	3 Hrs
BDLS-2303	Applied aspects of Pathology and Microbiology	5			5	5	40	60	100	3 Hrs
BDLS-2371	Applied aspects of Pathology and Microbiology-PRACTICAL			4	4	4	50	50	100	3 Hrs
Total		15			19	19			400	

**4<sup>th</sup> SEMESTER**

Course		Contact Hours/Week			Credit	Contact Hrs.	Evaluation Scheme (% of Total Marks)			Exam Duration (Hours)
Course Code	Course Title	L	T	P			Internal	External	Total	
BDLS-2401	Applied Dialysis Technology-I	5			5	5	40	60	100	3 Hrs
BDLS-2402	Applied Dialysis Technology-II	5			5	5	40	60	100	3 Hrs
BDLS-2403	Applied Anatomy Related To Dialysis Technology	5			5	5	40	60	100	3 Hrs
BDLS-2471	Applied Dialysis Technology-I Practical			4	4	4	50	50	100	3 Hrs
BDLS-2472	Applied Dialysis Technology-II- Practical			4	4	4	50	50	100	3 Hrs
Total		15		8	23	23			500	

**5<sup>th</sup> SEMESTER**

Course		Contact Hours/Week			Credit	Contact Hrs.	Evaluation Scheme (% of Total Marks)			Exam Duration (Hours)
Course Code	Course Title	L	T	P			Internal	External	Total	
BDLS-3501	Applied Dialysis Technology-3	5			5	5	40	60	100	3 Hrs
BDLS-3502	Applied physiology RelatedTo Dialysis Technology	5			5	5	40	60	100	3 Hrs
BDLS-3503	Clinical Skill Assessment	5			5	5	40	60	100	3 Hrs
BDLS-3571	Applied Dialysis Technology-3-Practical			4	4	4	50	50	100	3 Hrs
BDLS-3572	Clinical Skill Assessment Practical			4	4	4	50	50	100	3 Hrs
Total		15			23	23			500	



**6<sup>th</sup> SEMESTER**

Course		Contact Hours/Week			Credit	Contact Hrs.	Evaluation Scheme (% of Total Marks)			Exam Duration (Hours)
Course Code	Course Title	L	T	P			Internal	External	Total	
	<b>Program Elective-II</b>	5			5	5	40	60	100	3 Hrs
BDLS-3602	Pathology	5			5	5	40	60	100	3 Hrs
BDLS-3603	Pharmacology related to Dialysis Technology	5			5	5	40	60	100	3 Hrs
BDLS-3671	Pathology-Practical			2	2	2	50	50	100	3 Hrs
BDLS-3672	Pharmacology related to Dialysis Technology-Practical			2	2	2	50	50	100	3 Hrs
<b>Total</b>		15		4	19	19			500	

	Program Code	Course Title
<b>Program Elective-II</b>	BDLS-3601	Sociology
	BDLS-3606	Human Values and Professionalism



**Program Name: B.Sc. Dialysis Technology**  
**Program Code: DLS-201**

**Detailed Syllabus with Course Outcomes**

**SYLLABUS**

**SEMESTER-I**

**TITLE: HUMAN ANATOMY AND PHYSIOLOGY**

**SUBJECT CODE: BDLS-1101**

**SEMESTER: I**

**CONTACT HOURS/WEEK:**

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
5		0	5

**Internal Assessment: 40**

**End Term Exam: 60**

**Duration of Exam: 3 Hrs**

**OBJECTIVES:** The course will develop understanding of the concepts related to general anatomy of Muscular, Respiratory, Circulatory, Digestive and Excretory system.

S.No.	Content	Hours
<b>Unit-1</b>	<b>INTRODUCTION OF FOLLOWING:-</b> Tissue with types and structures of Chromosomeskeletal system structure of bone joints and types of joints. SKIN (structures, types, functions of skin)	<b>10</b>
<b>Unit-2</b>	<b>RESPIRATORY SYSTEM-</b> Organs of respiratory system, Functions. Exchange of gases in the lungs regulation of respiration.	<b>8</b>
<b>Unit-3</b>	<b>Digestive system</b>  -Tongue, oral cavity, teeth, pharynx, esophagus, stomach, liver, pancreas, spleen, intestine, Absorption of food, vitamins and minerals.	<b>12</b>
<b>Unit-4</b>	<b>CIRCULATORY ORGANS</b> composition and function of blood, circulation of blood Organs and chief Organs with anatomy, structure. mechanism of deoxygenated blood and oxygenated blood, physiology of heart, Cardiac cycle, Blood pressure with types arteries and veins.	<b>20</b>

<b>Unit-5</b>	<p><b>THE EXCRETORY SYSTEM</b></p> <p>Organs – kidneys, ureter, urinary bladder, urethra.</p> <p>Histology and functions of kidney..</p> <p>Formation of urine and its composition.</p> <p>Structure of Nephron.</p>	<b>15</b>
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**COURSE OUTCOMES:** On completion of this course, the students will be able to

<b>CO1</b>	<b>BDLS -1101.1</b>	Students will able to learn the basic anatomy of various regions like limbs, thoracic and abdominal viscera, osteology, neuroanatomy, endocrine system, basic radiology which provides a foundation in completion of the course.
<b>CO2</b>	<b>BDLS -1101.2</b>	Students will able to learn the anatomy and functions of various Tissues and cells, an organization of a cellular system.
<b>CO3</b>	<b>BDLS -1101.3</b>	Students will able to Understand the functioning of lungs, heart, and blood vessels and renal system
<b>CO4</b>	<b>BDLS-1101.4</b>	Students will be train with good clinical skill related to dialysis technology which will leads to entrepreneurial qualities and employability.

**RECOMMENDED BOOKS:**

1. William Davis (P) understanding Human Anatomy and Physiology – McGraw Hill
2. Chaurasia- A Text Book of Anatomy
3. T. S. Ranganathan- A Text Book of Human Anatomy
4. Fattana, Human Anatomy (Description and applied)- Saunder's & C P Prism Publishers, Bangalore
5. Guyton (Arthur) Text Book of Physiology. Latest Ed. Prism Publishers
6. Chatterjee (CC) Human Physiology Latest Ed. Vol. 1, Medical Allied Agency
7. Choudhari (Sujith K) Concise Medical Physiology Latest Ed. New Central Book

**TITLE: BASIC SCIENCE**  
**SUBJECT CODE: BDLS-1102**  
**SEMESTER: I**  
**CONTACT HOURS/WEEK:**

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
5		0	5

**Internal Assessment: 40**

**End Term Exam: 60**

**Duration of Exam: 3 Hrs**

**OBJECTIVES:** The course will develop understanding of the concepts related to general aseptic techniques and draping of patient Injection techniques.

S. No.	Content	Hours
<b>Unit-1</b>	Aseptic techniques: physical, chemical and mechanical method of sterilization with procedure. Biomedical waste& Its management	<b>10</b>
<b>Unit-2</b>	Nursing procedures and techniques Pre-operative preparation of patient transportation, techniques of patient in conscious semi-conscious and unconscious state. To and from operation Theatre Management of pre- operative and post-operative rooms Resuscitation techniques along with the management of equipment and drugs.	<b>20</b>
<b>Unit-3</b>	Handling sterilized articles in the operation theatre Scrubbing techniques, Preparation of patients. Aseptic techniques and draping of patient Injection techniques. Muscular intra venous and insertion of LV cannulas. Foundling of sterilized syringes and needles. Types of suturing material, techniques of stitching and removal of stitches. Positioning of patients for different operations.	<b>20</b>

<b>Unit-4</b>	Basic principles of blood transfusion & fluid therapy, Cardiopulmonary resuscitation - basic cardiac life support & advanced cardiac life support, Critical care nephrology - management of renal failure in ICU	15
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**COURSE OUTCOMES:** On completion of this course, the students will be able to

<b>CO1</b>	<b>BDLS -1102.1</b>	To enable students, understand the fundamental of dialysis.
<b>CO2</b>	<b>BDLS -1102.2</b>	Students will able to learn Practice personal safety & standard precautions.
<b>CO3</b>	<b>BDLS -1102.3</b>	Students will able to understand Infectious diseases, mode of transmission, prevention & care of the patient in a Dialysis Unit and Handling complications during dialysis procedures.
<b>CO4</b>	<b>BDLS-1102.4</b>	Students will be train with good clinical skill related to dialysis technology which will leads to entrepreneurial qualities and employability.

**RECOMMENDED BOOKS:**

- Brunner & Suddarth's Textbook of Medical - Surgical Nursing
- Dr. C.P Baveja – Textbook of Microbiology.
- 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).

**TITLE: FIRST AID**

**SUBJECT CODE: BDLS-1107**

**SEMESTER: I**

**CONTACT HOURS/WEEK:**

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
5		0	5

**Internal Assessment: 40**

**End Term Exam: 60**

**Duration of Exam: 3 Hrs**

**OBJECTIVES:** The course will develop understanding of the concepts related to first Aid.

S. No.	Content	Hours
<b>Unit-1</b>	First aid basics: first aid, importance of first aid, first aider, laws of first aid, contents of an ideal first aid kit, dealing with an emergency.	15
<b>Unit-2</b>	Emergency response: CPR, steps for performing CPR, CPR for newborns and infants, recovery position, first aid in drowning, fractures of bones, causes and types of fractures, dislocation.	20
<b>Unit-3</b>	First aid in burns: Types of burns, danger of burns, first aid in dry burns and scalds, electrical burns, chemical burns, sunburn, heatstroke.	10
<b>Unit-4</b>	First aid in wounds and injuries: types of wounds- small cuts and abrasions, Head injury- nose bleed, bleeding gums, bleeding from varicose veins, Shocks- causes of shock and its first aid.	15

<b>Unit-5</b>	<p>First aid in poisoning: poisoning by swallowing, gases, injections, skin absorption, Animal bites, snake bites and insect stings.</p> <p>First aid in foreign objects entering the sense organs: foreign body in the eye, ear, nose, skin, swallowing of foreign objects.</p>	20
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**COURSE OUTCOMES:** On completion of this course, the students will be able to

<b>CO1</b>	<b>BDLS -1107.1</b>	Students will able to learn the basic life support skills including cardiopulmonary resuscitation.
<b>CO2</b>	<b>BDLS -1107.2</b>	Students will able to understand first aid in burns.
<b>CO3</b>	<b>BDLS -1107.3</b>	Students will able to learn the first aid in wounds and injuries.
<b>CO4</b>	<b>BDLS-1107. 4</b>	Students will be train with good clinical skill related to dialysis technology which will leads to entrepreneurial qualities and employability..

**RECOMMENDED BOOKS:**

- First Aid for the Basic Sciences, General Principles, Second Edition (First Aid Series)" by Tao Le and Kendall Krause
- First Aid for the Basic Sciences, General Principles, Second Edition (First Aid Series)" by Tao Le and Kendall Krause



**TITLE: BIOCHEMISTRY**

**SUBJECT CODE: BDLS-1103**

**SEMESTER: I**

**CONTACT HOURS/WEEK:**

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
5		0	5

**Internal Assessment: 40**

**End Term Exam: 60**

**Duration of Exam: 3 Hrs**

**OBJECTIVES:** The course will develop understanding of the concepts related to Cell: Morphology, structure & functions, biomolecules.

S. No.	Content	Hours
<b>Unit-1</b>	Cell: Morphology, structure & functions of cell, cell membrane, Nucleus, chromatin, Mitochondria, Endoplasmic Reticulum, Ribosomes.	15
<b>Unit-2</b>	Carbohydrates: Definition, chemical structure, functions, sources, classifications, Monosaccharide's, Disaccharides, Polysaccharides and its importance. Carbohydrate Metabolism: Glycolysis, TCA cycle, Glycogen metabolism, Gluconeogenesis, Maintenance of Blood Glucose.	20
<b>Unit-3</b>	Lipids: Definition, function, sources, classification, simple lipid, compound Lipid, derived lipid, unsaturated and saturated fatty acid. Essential fatty acids and their importance, Blood lipids and their implications, cholesterol with its importance. Lipid Metabolism: Beta oxidation, Ketone bodies, Cholesterol and atherosclerosis, obesity.	20

<b>Unit-4</b>	Proteins: Definition, sources, amino acids, structure of protein, their Classification, simple protein, conjugated protein, derived proteins and their Properties.	15
<b>Unit-5</b>	Enzymes: Definitions, mechanism of action, factors affecting enzyme action, Enzyme of clinical importance.  Water and Electrolyte, Fluid compartment, daily intake and output sodium. Nutrition :-Vitamins: Types, functions and role. Principal minerals and their functions (Ca, P, Mg, Na, K, Cl).	20

**COURSE OUTCOMES:** On completion of this course, the students will be able to

<b>CO1</b>	<b>BDLS -1103.1</b>	Students will be able to learn the biochemical properties and classification of carbohydrates.
<b>CO2</b>	<b>BDLS -1103.2</b>	Students will be able to understand biochemical properties and structure of proteins and amino acids and classify them.
<b>CO3</b>	<b>BDLS -1103.3</b>	Students will be able to learn the biochemical properties of fats and classify them, discuss digestion and absorption of fats.
<b>CO4</b>	<b>BDLS-1103.4</b>	Students will be trained with good clinical skill related to dialysis technology which will lead to entrepreneurial qualities and employability..

**RECOMMENDED BOOKS:**

- Biochemistry –by U Sathyanarayana & U Chakrapani
- Textbook of Medical Biochemistry by D.M Vasudeva & Shrekumari.
- Textbook of Medical Biochemistry- by MN Chatterjea & Rana Shinde
- Textbook of Medical Laboratory technology by Godkar and Godkar.
- Biochemistry- by Pankaja Naik

**TITLE: MEDICAL ETHICS**  
**SUBJECT CODE: BDLS-1104**  
**SEMESTER: I**  
**CONTACT HOURS/WEEK:**

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
5		0	5

**Internal Assessment: 40**

**End Term Exam: 60**

**Duration of Exam: 3 Hrs**

**OBJECTIVES:** The course will develop understanding of the concepts related to ethics in medical field.

S.No.	Content	Hours
<b>Unit-1</b>	Values Classification Personal Professional Organization, Ethical Concept: Autonomy, Beneficence, Non malfeasance, Veracity, Fidelity, Informed consent	15
<b>Unit-2</b>	Ethical theory: Classic – Deontology, Teleology, Contemporary – Ethic of care, Feminist ethics, Justice ethics, Value ethics, Ethical issues: Health care as a sight, Association of resources Abortion, End of life issue	15
<b>Unit-3</b>	Ethical practice: Professional organization position, Barrier of ethical practice, Ethical decision making: Definition of dilemma, Decision making models.	15
<b>Unit-4</b>	Euthanasia and physician-assisted dying; end-of-life care; Physicians, patients and other: autonomy, truth telling & confidentiality; emerging issues: impact of medical advances on society; Use of genetic evidence in civil and criminal court cases; Challenges to public policy – to regulate or not to regulate; improving public understanding to correct misconceptions.	15
<b>Unit-5</b>	Introduction to Biosafety; biological safety cabinets; containment of biohazard; precautions for medical	15

	workers; precautions in patient care; Biosafety levels of microorganisms; mitigation of antibiotic resistance; radiological safety; measurement of radiation; guidelines for limiting radiation exposure; maximum reasonable dose; precautions against contamination; Institutional Biosafety committee.	
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**COURSE OUTCOMES:** On completion of this course, the students will be able to

<b>CO1</b>	<b>BDLS -1104.1</b>	Students will be able to: Recognize what constitutes an ethical concern in health care.
<b>CO2</b>	<b>BDLS -1104.2</b>	Students will be able to understand ethical issues in Health care and capacity to rationally justify your decision.
<b>CO3</b>	<b>BDLS -1104.3</b>	Students will be able to learn understand better the complexity and multi-dimensionality of medical ethical concerns and uniqueness of each problem.
<b>CO4</b>	<b>BDLS-1104. 4</b>	Students will be train with good clinical skill related to dialysis technology which will leads to entrepreneurial qualities and employability.

**RECOMMENDED BOOKS:**

- Koutsoyianni's : Modern Micro Economics
- Ahuja, H.L. : Advanced Economic Theory
- Stonies and Hague : A Textbook of Economic Theory

**TITLE: EFFECTIVE COMMUNICATION SKILL**

**SUBJECT CODE: BENG-1104**

**SEMESTER: I**

**CONTACT HOURS/WEEK:**

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
3		0	3

**Internal Assessment: 40**

**End Term Exam: 60**

**Duration of Exam: 3 Hrs**

**OBJECTIVES:** The course will develop understanding of the concepts related to soft skill required in dialysis technician.

S.No.	Content	Hours
<b>Unit-1</b>	Functional Grammar Patterns and parts of speech, subject, predicate, Noun, Pronoun, Adjective, Adverb, Verb, Verb Phrases, Conjunction, Interjection, Articles, Preposition, Tenses function.	15
<b>Unit-2</b>	Vocabulary: Prefix, Suffix, compound words, conversion, synonyms, Antonyms, Homophones and Homonyms, Medical abbreviations.  Communication: Meaning and importance of communication, elements of human communication, Barriers to effective communication, channels of communication, Language as a tool of communication, 7(s of communication, Tips effective communication.	25
<b>Unit-3</b>	Requisites of sentence writing Fragmented sentences, a good sentence, expletives, garbled sentences, rambling sentences, loaded sentences, parallel comparison, series, loose and periodic sentences, Ellipsis. Requisites of Paragraph writing Structure of Paragraph, Coherence and unity, Development of Paragraph, Inductive error, Deductive error, expository and Argumentative writing.	25

**COURSE OUTCOMES:** On completion of this course, the students will be able to

<b>CO1</b>	<b>BENG -1104.1</b>	Students will able to Think critically, analytically, creatively and communicate confidently in English in social and professional contexts with improved skills of fluency and accuracy.
<b>CO2</b>	<b>BENG -1104.2</b>	Students will able to write grammatically correct sentences employing appropriate vocabulary suitable to different contexts. Comprehend and analyze different academic texts.
<b>CO3</b>	<b>BENG -1104.3</b>	Students will able to learn how to make notes effectively and handle academic writing tasks such as Paragraph writing and Essay writing and effectively handle formal correspondence like e-mail drafting and letter writing.
<b>CO4</b>	<b>BENG-1104. 4</b>	Students will be train with good clinical skill related to dialysis technology which will leads to entrepreneurial qualities and employability.

**RECOMMENDED BOOKS:**

**Text Book:** 1. O' Connor, I.D., Better English Pronunciation - Cambridge, Cambridge University.2009

**Reference:** 1. Water F.V.A , Proficiency Course in English – Hodder and Strongton, London.1994 2. ToneDaniel, I.M. , English Pronouncing Dictionary – Dent and sons Ltd. London.2004

**TITLE: ANATOMY AND PHYSIOLOGY- PRACTICAL**

**SUBJECT CODE: BDLS-1171**

**SEMESTER: I**

**CONTACT HOURS/WEEK:**

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
		2	1

**Internal Assessment: 40**

**End Term Exam: 60**

**Duration of Exam: 3 Hrs**

**OBJECTIVES:** The course will develop understanding of the concepts related to practical skill of anatomy and physiology.

S. No.	Content	Hours
<b>Section -A</b>	<p><b>General Histology Slides –</b></p> <ul style="list-style-type: none"> <li>• Epithelial Tissue,</li> <li>• Connective Tissue</li> <li>• Hyaline Cartilage,</li> <li>• Fibro Cartilage,</li> <li>• Elastic Cartilage,</li> <li>• T.S. &amp; L.S. of Bone,</li> <li>• Blood Vessels,</li> <li>• Tonsil,</li> <li>• Spleen,</li> <li>• Thymus,</li> <li>• Lymph node,</li> <li>• Skeletal and Cardiac Muscle</li> <li>• Peripheral Nerve and Optic Nerve</li> </ul>	30
<b>Section -B</b>	<p><b>Systemic Histology Slides:</b></p> <ul style="list-style-type: none"> <li>• Renal: Kidney, ureter, urinary bladder</li> <li>• Cerebrum</li> <li>• Demonstration of all bones - Showing parts, joints,</li> <li>• X-rays of all normal bones and joints.</li> </ul>	

	<ul style="list-style-type: none"> <li>• Demonstration of heart and normal angiograms.</li> <li>• Demonstration of Brain</li> <li>• Radiographs of abdomen-IVP, retrograde cystogram.</li> </ul>	
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**COURSE OUTCOMES:** On completion of this course, the students will be able to

<b>CO1</b>	<b>BDLS -1171.1</b>	Students will able to learn the basic anatomy of various regions like limbs, thoracic and abdominal viscera, osteology, neuroanatomy, endocrine system, basic radiology which provides a foundation in completion of the course.
<b>CO2</b>	<b>BDLS -1171.2</b>	Students will able to learn the anatomy and functions of various Tissues and cells, an organization of a cellular system.
<b>CO3</b>	<b>BDLS -1171.3</b>	Students will able to understand the functioning of lungs, heart, and blood vessels of Renal system.
<b>CO4</b>	<b>BDLS-1171. 4</b>	Students will be train with good clinical skill related to dialysis technology which will leads to entrepreneurial qualities and employability.

**RECOMMENDED BOOKS:**

1. William Davis (P) understanding Human Anatomy and Physiology – McGraw Hill
2. Chaurasia- A Text Book of Anatomy
3. T. S. Ranganathan- A Text Book of Human Anatomy
4. Fattana, Human Anatomy (Description and applied)- Saunder's & C P Prism Publishers, Bangalore
5. Guyton (Arthur) Text Book of Physiology. Latest Ed. Prism Publishers
6. Chatterjee (CC) Human Physiology Latest Ed. Vol. 1, Medical Allied Agency



**TITLE: EFFECTIVE COMMUNICATION SKILL-PRACTICAL**

**SUBJECT CODE: BENG-1173**

**SEMESTER: I**

**CONTACT HOURS/WEEK:**

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
		2	1

**Internal Assessment: 40**

**End Term Exam: 60**

**Duration of Exam: 3 Hrs**

**OBJECTIVES:** The course will develop understanding of the concepts related to soft skill required in dialysis technician.

S.No.	Content	Hours
<b>Section-1</b>	<ul style="list-style-type: none"> <li>• Tool of Communication</li> <li>• Basic communication covering the following topics.Meeting People.</li> <li>• Asking Questions.Making Friends.</li> <li>• Pronunciations covering the following topics.</li> <li>• Pronunciation (Consonant Sounds) Pronunciation and Nouns. ...</li> <li>• Advanced Learning.</li> <li>• Listening Comprehension / Direct and Indirect Speech.Figures of Speech.</li> </ul>	30

**COURSE OUTCOMES:** On completion of this course, the students will be able to

<b>CO1</b>	<b>BENG -1173.1</b>	Students will able to Think critically, analytically, creatively and communicate confidently in English in social and professional contexts with improved skills of fluency and accuracy.
<b>CO2</b>	<b>BENG -1173.2</b>	Students will able to write grammatically correct sentences employing appropriate vocabulary suitable to different contexts. Comprehend and analyze different academic texts.
<b>CO3</b>	<b>BENG-1173.3</b>	Students will able to learn how to make notes effectively and handle academic writing tasks such as Paragraph writing and Essay writing and effectively

		handle formal correspondence like e-mail drafting and letter writing.
CO4	BENG-1173. 4	Students will be train with good clinical skill related to dialysis technology which will leads to entrepreneurial qualities and employability.

**RECOMMENDED BOOKS:**

**Text Book:** 1. O' Connor, I.D., Better English Pronunciation - Cambridge, Cambridge University.2009

**Reference:** 1. Water F.V.A , Proficiency Course in English – Hodder and Stronghton, London.1994 2. ToneDaniel, I.M. , English Pronouncing Dictionary – Dent and sons Ltd. London.2004



**Program Name: B.Sc. Dialysis Technology**  
**Program Code: DLS-201**

**SYLLABUS**

**SEMESTER-II**

**TITLE: MICROBIOLOGY**  
**SUBJECT CODE: BDLS-1201**  
**SEMESTER: II**  
**CONTACT HOURS/WEEK:**

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
5			5

**Internal Assessment: 40**

**End Term Exam: 60**

**Duration of Exam: 3 Hrs**

**OBJECTIVES:** To make the student familiar with microbial growth, nutrition, biochemical test and in-depth knowledge of preparation of various sterilization techniques.

S.No.	Content	Hours
<b>Unit-1</b>	Sterilisation and Disinfection Principles and use of equipment's of sterilization namely hot air oven, autoclave and serum inspissator, pasteurization, antiseptic and disinfectants. Classification of microorganisms, size, shape and structure of bacteria. Use of microscope in the study of bacteria.	25
<b>Unit-2</b>	Growth and nutrition:-Nutrition, growth and multiplications of bacteria, use of culture media in diagnostic bacteriology. Culture media, Use of culture media in diagnostic bacteriology, anti microbial sensitivity test.	25
<b>Unit-3</b>	Immunity, vaccines, types of vaccine and immunization schedule, principles and 39 interpretation of common serological tests namely Widal, VDRL, ASLO, CRP, RF & ELISA. Rapid tests for HIV and HBs Ag (excluding technical details).	25

**COURSE OUTCOMES:** On completion of this course, the students will be able to

<b>CO1</b>	<b>BDLS -1201.1</b>	Students will able to learn understand the morphological characters of bacteria, To differentiate between innate and adaptive immunity, and explain the main defense lines as well as biological barrier to the infections.
<b>CO2</b>	<b>BDLS -1201.2</b>	Students will able to learn preparation of smear, fixation and staining of bacterial smears and its quality control methods.
<b>CO3</b>	<b>BDLS -1201.3</b>	Students will able to learn the use of microscope, autoclave, hot air oven, water bath, steamer, filters.
<b>CO4</b>	<b>BDLS-1201. 4</b>	Students will be train with good clinical skill related to dialysis technology which will leads to entrepreneurial qualities and employability.

**RECOMMENDED BOOKS:**

1. Anathanarayana & Panikar: Medical Microbiology – Revised 8th Edition  
University Press.
2. Robert Cruickshank: Medical Microbiology – The Practice of Medical  
Microbiology.
3. Chatterjee: Parasitology – Interpretation to Clinical medicine.
4. Rippon: Medical Mycology.

**TITLE: BASIC CONCEPT OF RENAL DISEASE**

**SUBJECT CODE: BDLS-1202**

**SEMESTER: II**

**CONTACT HOURS/WEEK:**

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
5			5

**Internal Assessment: 40**

**End Term Exam: 60**

**Duration of Exam: 3 Hrs**

**OBJECTIVES:** The course will develop understanding of the concepts related to Renal Diseases.

S. No.	Content	Hours
<b>Unit-1</b>	<p><b>Basic Renal Disorders :</b></p> <ul style="list-style-type: none"> <li>• Glomerular Diseases– causes, types &amp; pathology</li> </ul> <p>Definition, etiology, pathophysiology of each type, medical and surgical management</p> <ul style="list-style-type: none"> <li>• Post Infectious Glomerulonephritis</li> <li>• Acute Renal Failure</li> </ul> <p>Definition, etiology, pathophysiology of each type, medical and surgical management</p> <ul style="list-style-type: none"> <li>• Chronic Renal Failure – Chronic Kidney Disease (CKD)</li> </ul> <p>Definition, etiology, pathophysiology of each type, medical and surgical management</p>	15
<b>Unit-2</b>	<p><b>Acid – Base, fluids and Electrolyte Disorders :</b></p> <ul style="list-style-type: none"> <li>• Metabolic Acidosis, Metabolic Alkalosis &amp; Respiratory Acidosis, Respiratory Alkalosis</li> <li>• Disorders Of Sodium</li> <li>• Disorders Of Potassium Metabolism</li> <li>• Disorders Of Calcium And Phosphorus Homeostasis</li> <li>• Edema and The Clinical Use Of Diuretics</li> </ul>	15

<b>Unit-3</b>	<b>The Kidney in Systemic diseases :</b> <ul style="list-style-type: none"> <li>• Renal function in Congestive heart failure</li> <li>• Renal function in Liver diseases</li> <li>• Renal involvement in Systemic vasculitis</li> <li>• Renal manifestations in SLE and other Rheumatic disorders</li> </ul>	
<b>Unit-4</b>	<b>Diabetic Nephropathy :</b> <ul style="list-style-type: none"> <li>• Epidemiology</li> <li>• Pathogenesis</li> <li>• Diagnosis</li> <li>• Management</li> <li>• Prevention</li> </ul>	
<b>Unit-5</b>	<b>Renal Biopsy :</b> <ul style="list-style-type: none"> <li>• Indications</li> <li>• Contraindications</li> <li>• Procedure</li> <li>• Pre and Post biopsy care</li> </ul>	

**COURSE OUTCOMES:** On completion of this course, the students will be able to

<b>CO1</b>	<b>BDLS -1202.1</b>	Students will able to understand regarding different disorder and its management.
<b>CO2</b>	<b>BDLS -1202.2</b>	Students will able to gain knowledge about childhood anomalies' and it's significance.
<b>CO3</b>	<b>BDLS -1202.3</b>	Students will able to learn about Care of Patient with ARF and CRF.
<b>CO4</b>	<b>BDLS-1202. 4</b>	Students will be train with good clinical skill related to dialysis technology which will leads to entrepreneurial qualities and employability.

**RECOMMENDED BOOKS:**

1. Basic Pathology - Robbins, 9th Edition, Saunders, 2012.
2. Primer on Kidney diseases - Greenberg, 5th Edition, Elsevier Health Sciences, 2009.

**TITLE: APPLIED ANATOMY AND PHYSIOLOGY**

**SUBJECT CODE: BDLS-1203**

**SEMESTER: II**

**CONTACT HOURS/WEEK:**

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
4			4

**Internal Assessment: 40**

**End Term Exam: 60**

**Duration of Exam: 3 Hrs**

**OBJECTIVES:** Students will equip themselves with topics nervous system, reproductive system and urinary system.

S.No.	Content	Hours
<b>Unit-1</b>	Spine and thorax: Back muscles, Superficial layer, Deep muscles of back, their origin, Insertion, action and nerve supply.	<b>10</b>
<b>Unit-2</b>	Head and neck: Cranium, Facial Muscles—origin, insertion, actions, nerve supply Temporal mandibular Joints—structure, types of movement.	<b>10</b>
<b>Unit-3</b>	Nervous system: Classification of nervous system, Nerve—structure, classification, microscopy with examples. Neurons, classification with examples. Simple reflex arc. Parts of a typical spinal nerve/Dermatome: Central nervous system—disposition, parts and functions Cerebrum Cerebellum, Midbrain & brain stem Blood supply & anatomy of brain Spinal cord anatomy, blood supply, nerve pathways Pyramidal, extra pyramidal system, Thalamus, hypothalamus Structure and features of meninges Ventricles of brain, CSF circulation Development of nervous system & defects Cranial nerves— (course, distribution, functions and palsy) Sympathetic nervous system,	<b>20</b>



	its parts and components	
<b>Unit-4</b>	Nervous system: Classification of nervous system, Nerve–structure, classification, microscopy with examples. Neurons, classification with examples. Simple reflex arc. Parts of a typical spinal nerve/Dermatome: Central nervous system–disposition, parts and functions Cerebrum Cerebellum, Midbrain & brain stem Blood supply & anatomy of brain Spinal cord anatomy, blood supply, nerve pathways Pyramidal, extra pyramidal system, Thalamus, hypothalamus Structure and features of meninges Ventricles of brain, CSF circulation Development of nervous system & defects Cranial nerves– (course, distribution, functions and palsy) Sympathetic nervous system, its parts and components	<b>20</b>
<b>Unit-5</b>	Urinary and Reproductive system Urinary system. Pelvic floor, innervations Kidney, Ureter, bladder, urethra, Genital system–male and female: Reproductive system of male Reproductive system of female. Endocrine system Pituitary gland Thyroid Parathyroid	<b>10</b>

**COURSE OUTCOMES:** On completion of this course, the students will be able to

<b>CO1</b>	<b>BDLS -1203.1</b>	This course is aimed to make the student to gain knowledge in basic anatomy of various regions like limbs, thoracic and abdominal viscera, osteology, neuroanatomy, endocrine system, basic radiology which provides foundation in completion of the course.
<b>CO2</b>	<b>BDLS -1203.2</b>	Students will able to understand about the Gastro Intestinal Tract, location, surfaces, lobes, relations, and blood supply of Kidney.
<b>CO3</b>	<b>BDLS -1203.3</b>	Students will able to understand functions of physiological anatomy of Thyroid, Adrenal, Parathyroid, Pituitary glands and Pancreas.
<b>CO4</b>	<b>BDLS-1203. 4</b>	Students will be train with good clinical skill related to dialysis technology which will leads to entrepreneurial qualities and employability.

**RECOMMENDED BOOKS:**

1. William Davis (P) understanding Human Anatomy and Physiology – McGraw Hill
2. Chaurasia- A Text Book of Anatomy
3. T. S. Ranganathan- A Text Book of Human Anatomy
4. Fattana, Human Anatomy (Description and applied)- Saunder's & C P Prism Publishers, Bangalore Bhalla. V. K. Financial Management and Policy: Text and Cases, Anmol Publications Pvt

**TITLE: APPLIED ANATOMY AND PHYSIOLOGY-PRACTICAL**

**SUBJECT CODE: BDLS-1272**

**SEMESTER: II**

**CONTACT HOURS/WEEK:**

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
		4	4

**Internal Assessment: 40**

**End Term Exam: 60**

**Duration of Exam: 3 Hrs**

**OBJECTIVES:** This course aims to give practical skill to students aninsight into morphology of different types of tissues.

S.No.	Content	Hours
SECTION-A	<ul style="list-style-type: none"> <li>• Histology of types of epithelium</li> <li>• Histology of serous, mucous &amp; mixed salivary gland</li> <li>• Histology of the 3 types of cartilage Demo of all bones showing parts, radiographs of normal bones &amp; joints</li> <li>• Histology of compact bone (TS &amp; LS) Demonstration of all muscles of the body</li> <li>• Histology of skeletal (TS &amp; LS), smooth &amp; cardiac muscle</li> <li>• Demonstration of parts of respiratory system. Normal radiographs of chest Histology of lung and trachea</li> <li>• Demonstration of section of male and female pelvis with organs in situ</li> <li>• Histology of testis, vas deferens, epididymis, prostate, uterus, fallopian tubes, ovary Radiographs of pelvis – hysterosalpingogram</li> <li>• Histology of thin and thick skin Demonstration and histology of eyeball Histology of cornea &amp; retina.</li> </ul>	30

**COURSE OUTCOMES:** On completion of this course, the students will be able to

<b>CO1</b>	<b>BDLS -1272.1</b>	This course is aimed to make the student to gain knowledge about Role of social factors in health and disease.
<b>CO2</b>	<b>BDLS -1272.2</b>	Students will able to understand about the Concepts of social groups, influence of formal and informal groups on health and sickness.
<b>CO3</b>	<b>BDLS -1272.3</b>	Students will able to understand hospital and rehabilitation setup
<b>CO4</b>	<b>BDLS-1272. 4</b>	Students will be train with good clinical skill related to dialysis technology which will leads to entrepreneurial qualities and employability.

**RECOMMENDED BOOKS:**

1. Sachdeva & Vidyabhushan, Introduction to the study of sociology.
2. Indrani T.K., Text book of sociology for graduates nurses and Physiotherapy students, JPBrothers, New Delhi 10

**TITLE: MICROBIOLOGY-PRACTICAL**

**SUBJECT CODE: BDLS-1273**

**SEMESTER: II**

**CONTACT HOURS/WEEK:**

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
		4	4

**Internal Assessment: 40**

**End Term Exam: 60**

**Duration of Exam: 3 Hrs**

**OBJECTIVES:** To make the student familiar with microbial growth, nutrition, biochemical test and in-depth knowledge of preparation of various sterilization techniques.

S.No.	Content	Hours
<b>SECTION-1</b>	<ol style="list-style-type: none"> <li>1. Compound microscope.</li> <li>2. Demonstration of sterilization equipment's: hot air oven, autoclave, bacterial filters.</li> <li>3. Spotters: Disposable syringe, Sterile cotton swab, Bacteriological loop, Sterile tube, McIntosh fildes Jar, Autoclave</li> <li>4. Demonstration of commonly used culture media, nutrient broth, nutrient agar, blood agar, spread plate method.</li> <li>5. Streaking</li> <li>6. Grams staining.</li> <li>7. Acid fast staining.</li> <li>8. Antibiotic susceptibility test.</li> </ol>	30

**COURSE OUTCOMES:** On completion of this course, the students will be able to

<b>CO1</b>	<b>BDLS -1273.1</b>	Students will able to learn understand the morphological characters of bacteria, To differentiate between innate and adaptive immunity, and explain the main defense lines as well as biological barrier to the infections.
<b>CO2</b>	<b>BDLS -1273.2</b>	Students will able to learn preparation of smear, fixation and staining of bacterial smears and its quality control methods.
<b>CO3</b>	<b>BDLS -1273.3</b>	Students will able to learn the use of microscope, autoclave, hot air oven, water bath, steamer, filters.
<b>CO4</b>	<b>BDLS-1273. 4</b>	Students will be train with good clinical skill related to dialysis technology which will leads to entrepreneurial qualities and employability.

**RECOMMENDED BOOKS:**

1. Anathanarayana & Panikar: Medical Microbiology – Revised 8th Edition University Press.
2. Robert Cruickshank: Medical Microbiology – The Practice of Medical Microbiology.
3. Chatterjee: Parasitology – Interpretation to Clinical medicine.
4. Rippon: Medical Mycology.

**TITLE: HEALTH CARE**  
**SUBJECT CODE: BDLS-2301**  
**SEMESTER: III**  
**CONTACT HOURS/WEEK:**

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
5			5

**Internal Assessment: 40**

**End Term Exam: 60**

**Duration of Exam: 3 Hrs**

**OBJECTIVES:** The course will enable the students to understand health care system and its importance.

S.No.	Content	Hours
<b>Unit-1</b>	Introduction to Health-Definition of health, determinants of health, health indicators of India, health team concept. National health policy, National health programmes (Briefly objectives and scope) Population of India and family welfare programme in India.	20
<b>Unit-2</b>	Introduction to Nursing-What is nursing? Nursing principles, inter-personnel relationships. Bandaging: basic turns, bandaging extremities, triangular bandages and their application. Nursing position, prone, lateral, dorsal, dorsal recumbent, Fowler's positions, comfort measures, bed making, rest and sleep. Lifting and transporting patients: lifting patients up in the bed, transferring from bed to wheel chair, transferring from bed to stretcher. Bed side management: giving and taking bed pan, urinal. Observation of stools, urine, sputum g) Use and care of catheters, enema giving. Methods of giving nourishment: feeding, tube feeding, drips, transfusion. Care of	30

	rubber goods. Recording of body temperature, respiration and pulse. Simple aseptic techniques, sterilization and disinfection. Surgical dressing: observation of dressing procedures.	
<b>Unit-3</b>	First Aid- Syllabus as for Certificate Course of Red Cross Society of St. John's Ambulance Brigade	5

**COURSE OUTCOMES:** On completion of this course, the students will be able to

<b>CO1</b>	<b>BDLS -2301.1</b>	Students will able to promote healthy living and to facilitate prevention, early detection and management of non-communicable diseases.
<b>CO2</b>	<b>BDLS -2301.2</b>	Students will able to ensure provision of state-of-the-art Emergency Care Services, including medical, surgical (especially Trauma and Burn Care), pediatric and obstetric emergency care for all.
<b>CO3</b>	<b>BDLS -2301.3</b>	Students will able to learn providing social health protection and equal access to quality health care has significant positive effects on individual and public health, economic growth and development.
<b>CO4</b>	<b>BDLS-2301. 4</b>	Students will be train with good clinical skill related to dialysis technology which will leads to entrepreneurial qualities and employability.

**RECOMMENDED BOOKS:**

Preventive and Social Medicine by J.Park Text Book of P& SM by Park and Park, counseling & Communicate skills for medical and health, Bayne- Orient Longman Pvt. Ltd



**TITLE: BASIC CONCEPTS OF NUTRITION**

**SUBJECT CODE: BDLS-2302**

**SEMESTER: III**

**CONTACT HOURS/WEEK:**

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
5			5

**Internal Assessment: 40**

**End Term Exam: 60**

**Duration of Exam: 3 Hrs**

**OBJECTIVES:** This course provides complete skill to understand basic concepts of nutrition and Diet.

S.No.	Content	Hours
<b>Unit-1</b>	Introduction to science of nutrition-Definition, Food pattern and its relation to health. Factors influencing food habits. Superstitions, culture, religion, income, composition of family, age, occupation, special group etc. Food selection, storage and preservation. Prevention of food adulteration	15
<b>Unit-2</b>	Classification of nutrients-Macronutrients and micronutrients Types, sources, requirements and deficiency of proteins. Sources, requirements and deficiency of carbohydrates, Types, sources, requirements and deficiency of fats. Sources, requirement and storage of drinking water. Types, sources, requirements and deficiency of minerals. Types, sources, requirements and deficiency of vitamins.	15
<b>Unit-3</b>	Planning of diets-Need for planning of diets. Concepts of balanced diet. Food groups and balanced diet. Influence of age, sex, occupation & physiological state. Recommended dietary intake .Steps in planning balanced diet. Concepts of balanced diet for dialysis patients. Recommended dietary intake for dialysis patients. Planning diet for dialysis patients. Steps in planning balanced diet for dialysis patients.	15

**COURSE OUTCOMES:** On completion of this course, the students will be able to

<b>CO1</b>	<b>BDLS -2302.1</b>	Student will able to calculate body mass index (BMI) in nutritional assessment of dialysis patients.
<b>CO2</b>	<b>BDLS -2302.2</b>	Student will learn basic nutrient and their role in growth, development, health maintained and restoration.
<b>CO3</b>	<b>BDLS -2302.3</b>	Student will learn to interpret appropriate dietary plan for dialysis patient.
<b>CO4</b>	<b>BDLS-2302. 4</b>	Students will be train with good clinical skill related to dialysis technology which will leads to entrepreneurial qualities and employability.

**RECOMMENDED BOOKS:**

Handbook of Nutrition in Kidney Disease by Anitasaxena

Text book of nutrition by Dr. ankita gupta

**TITLE: APPLIED ASPECTS OF PATHOLOGY AND MICROBIOLOGY**

**SUBJECT CODE: BDLS-2303**

**SEMESTER: III**

**CONTACT HOURS/WEEK:**

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
5			5

**Internal Assessment: 40**

**End Term Exam: 60**

**Duration of Exam: 3 Hrs**

**OBJECTIVES:** This course provides complete skill to understand disease conditions related to urinary system and their diagnosis.

S.No.	Content	Hours
<b>Unit-1</b>	Congenital abnormalities of urinary system- Classification of renal diseases. Glomerular diseases: causes, types & pathology .Tubulo-interstitial diseases. Renal vascular disorders. End stage renal diseases: causes & pathology. Pathology of kidney in hypertension, diabetes mellitus, pregnancy.	20
<b>Unit-3</b>	Pathology of peritoneum, peritonitis, bacterial, tubular & sclerosing peritonitis, dialysis induced changes. Pathology of urinary tract infections. Pyelonephritis & tuberculous pyelonephritis	15
<b>Unit-4</b>	Microbiology Hepatotropic viruses in detail: mode of transfusion, universal precautions vaccinations. Human immunodeficiency virus (HIV), mode of transfusion, universal precautions.	20

<b>Unit-5</b>	Opportunistic infections. Microbiology of urinary tract infections, Microbiology of vascular accessinfection (femoral, jugular, subclavian catheters), Sampling methodologies for culture & sensitivity.	15
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**COURSE OUTCOMES:** On completion of this course, the students will be able to

<b>CO1</b>	<b>BDLS -2303.1</b>	Student gains knowledge of general and systemic pathology.
<b>CO2</b>	<b>BDLS -2303.2</b>	Student learns about patients handling with Viral infection and its isolation.
<b>CO3</b>	<b>BDLS -2303.3</b>	Students will be able to understand regarding different disorder and its management and their identification test.
<b>CO4</b>	<b>BDLS-2303. 4</b>	Students will be train with good clinical skill related to dialysis technology which will leads to entrepreneurial qualities and employability.

**RECOMMENDED BOOKS:**

Practical Pathology by Dr. Ganga S Pilli

Todd & Sanford, Clinical Diagnosis & Management by Laboratory Methods

**TITLE: APPLIED ASPECTS OF PATHOLOGY AND MICROBIOLOGY-PRACTICAL**

**SUBJECT CODE: BDLS-2371**

**SEMESTER: III**

**CONTACT HOURS/WEEK:**

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
		4	4

**Internal Assessment: 40**

**End Term Exam: 60**

**Duration of Exam: 3 Hrs**

**OBJECTIVES:** This course provides complete skill to understand disease conditions related to urinary system and their diagnosis.

S. No.	Content	Hours
<b>SECTION -A</b>	<ol style="list-style-type: none"> <li>1. Focusing, handling and care of Microscopes</li> <li>2. Hanging drop</li> <li>3. Simple stain</li> <li>4. Gram stain</li> <li>5. ZN stain</li> <li>6. Sterilization and Disinfection</li> <li>7. Biochemical Test</li> <li>8. MIC</li> <li>9. MBC</li> </ol>	30

**COURSE OUTCOMES:** On completion of this course, the students will be able to

<b>CO1</b>	<b>BDLS -2371.1</b>	Student gains knowledge of handling and care of Microscopes
<b>CO2</b>	<b>BDLS -2371.2</b>	Student learns about patients handling with Viral infection and its isolation.
<b>CO3</b>	<b>BDLS -2371.3</b>	Students will be able to understand regarding different disorder and its management and their identification test.

<b>CO4</b>	<b>BDLS-2371. 4</b>	Students will be train with good clinical skill related to dialysis technology which will leads to entrepreneurial qualities and employability.
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**RECOMMENDED BOOKS:**

Practical Pathology by Dr. Ganga S Pilli

Todd & Sanford, Clinical Diagnosis & Management by Laboratory Methods



**Program Name: B.Sc. Dialysis Technology**  
**Program Code: DLS-201**

**SYLLABUS**

**SEMESTER-IV**

**TITLE: APPLIED DIALYSIS TECHNOLOGY-I**

**SUBJECT CODE: BDLS-2401**

**SEMESTER: IV**

**CONTACT HOURS/WEEK:**

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
5			5

**Internal Assessment: 40**

**End Term Exam: 60**

**Duration of Exam: 3 Hrs**

**OBJECTIVES:** The objective of the paper is to help the students in understanding concepts and complications in dialysis treatment.

S.No.	Content	Hours
<b>Unit-1</b>	Indications of dialysis, History & types of dialysis, Theory of hemodialysis: diffusion, osmosis, ultrafiltration & solvent drag, Hemodialysis apparatus: types of dialyzer & membrane, dialysate. Physiology of peritoneal dialysis.	20
<b>Unit-2</b>	Dialysis machines: mechanism of functioning & management: Hemodialysis machine. Peritoneal dialysis machine. Biochemical investigations required for renal dialysis. Adequacy of dialysis: a) Hemodialysis. b) Peritoneal dialysis. c) Peritoneal equilibration test (PET). Anti coagulation.	25



**COURSE OUTCOMES:** On completion of this course, the students will be able to

<b>CO1</b>	<b>BDLS -2401.1</b>	Students gain knowledge of anticoagulants.
<b>CO2</b>	<b>BDLS -2401.2</b>	Students will be able to learn about Working of Dialysis machine.
<b>CO3</b>	<b>BDLS -2401.3</b>	Students will be able to understand regarding different vascular access.
<b>CO4</b>	<b>BDLS-2401. 4</b>	Students will be trained with good clinical skill related to dialysis technology which will lead to entrepreneurial qualities and employability.

**RECOMMENDED BOOKS:**

1. Oxford textbook of Nephrology
2. The Kidney – Brenner (Vol I/II)
3. Diseases of the Kidney and the urinary tract – Schrier (Vol I, II, & III)
4. Textbook of Dialysis therapy – Nissenson
5. Textbook of Peritoneal Dialysis – Ram Gokal
6. Handbook of dialysis – John T. Daugirdas

**TITLE: APPLIED DIALYSIS TECHNOLOGY-II**

**SUBJECT CODE: BDLS-2402**

**SEMESTER: IV**

**CONTACT HOURS/WEEK:**

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
5			5

**Internal Assessment: 40**

**End Term Exam: 60**

**Duration of Exam: 3 Hrs**

**OBJECTIVES:** The objective of the paper is to help the students in understanding concepts and issues in dialysis treatment.

S.No.	Content	Hours
<b>Unit-1</b>	Dialysis in special situations: Patients with congestive cardiac failure. Advanced liver disease. Patients positive for HIV, HBSAg & HCV. Failed transplant. Poisoning cases. Pregnancy.	20
<b>Unit-2</b>	Dialysis in infants & children. Special dialysis procedures: Continuous therapies in hemodialysis. Different modalities of peritoneal dialysis. Haemodiafiltration. Haemoperfusion. SLED.MARS. Plasmapheresis:	20
<b>Unit-3</b>	Special problems in dialysis patients: Psychology & rehabilitation. Diabetes, Hypertension, Infections, Bone diseases, Aluminum toxicity, Renal anemia management: chronic dialysis.	20

**COURSE OUTCOMES:** On completion of this course, the students will be able to

<b>CO1</b>	<b>BDLS -2402.1</b>	Student gain knowledge of Special dialysis procedures.
<b>CO2</b>	<b>BDLS -2402.2</b>	Student learns about Dialysis in infants & children.
<b>CO3</b>	<b>BDLS -2402.3</b>	Student gain knowledge of Renal anemia management.
<b>CO4</b>	<b>BDLS-2402. 4</b>	Students will be train with good clinical skill related to dialysis technology which will leads to entrepreneurial qualities and employability.

**RECOMMENDED BOOKS:**

1. Oxford textbook of Nephrology
2. The Kidney – Brenner (Vol I/II)
3. Diseases of the Kidney and the urinary tracy – Schrier (Vol I, II, & III)
4. Textbook of Dialysis therapy – Nissenson
5. Textbook of Peritoneal Dialysis – Ram Gokal
6. Handbook of dialysis – John T. Daugirdas

**TITLE: APPLIED ANATOMY RELATED TO DIALYSIS TECHNOLOGY**

**SUBJECT CODE: BDLS-2403**

**SEMESTER: IV**

**CONTACT HOURS/WEEK:**

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
5			5

**Internal Assessment: 40**

**End Term Exam: 60**

**Duration of Exam: 3 Hrs**

**OBJECTIVES:** The purpose of the course is to offer the students relevant and actual knowledge of urinary system and its disorders.

S.No.	Content	Hours
<b>Unit-1</b>	Anatomy of urinary system: structural anatomy of kidney, bladder, ureter, urethra, prostate. Histology of kidney. Blood supply of kidney. Development of kidney.	25
<b>Unit-2</b>	Anatomy of peritoneum including concept of abdominal hernias. Anatomy of vascular system: Upper limb vessels: course, distribution, branches, origin & abnormalities. Neck vessels: course, distribution, branches, origin & abnormalities. Femoral vessels: course, distribution, branches, origin & abnormalities.	30

**COURSE OUTCOMES:** On completion of this course, the students will be able to

<b>CO1</b>	<b>BDLS -2403.1</b>	Student gain knowledge in basic anatomy of various regions like limbs, thoracic and abdominal viscera, neuroanatomy, endocrine system, basic radiology which provides foundation in completion of the course.
<b>CO2</b>	<b>BDLS -2403.2</b>	Students will able to understand about the Gastro Intestinal Tract, location, surfaces, lobes, relations, and blood supply of Kidney.
<b>CO3</b>	<b>BDLS -2403.3</b>	Students will able to understand anatomy of Thyroid, Adrenal, Parathyroid, Pituitary glands and Pancreas.
<b>CO4</b>	<b>BDLS-2403. 4</b>	Students will be train with good clinical skill related to dialysis technology which will leads to entrepreneurial qualities and employability.

**RECOMMENDED BOOKS:**

1. William Davis (P) understanding Human Anatomy and Physiology – McGraw Hill
2. Chaurasia- A Text Book of Anatomy
3. T. S. Ranganathan- A Text Book of Human Anatomy
4. Fattana, Human Anatomy (Description and applied)- Saunder's & C P Prism Publishers, Bangalore
5. Guyton (Arthur) Text Book of Physiology. Latest Ed. Prism Publishers
6. Chatterjee (CC) Human Physiology Latest Ed. Vol. 1, Medical Allied Agency
7. Choudhari (Sujith K) Concise Medical Physiology Latest Ed. New Central Book

**TITLE: APPLIED DIALYSIS TECHNOLOGY-I -PRACTICAL**

**SUBJECT CODE: BDLS-2471**

**SEMESTER: IV**

**CONTACT HOURS/WEEK:**

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
		4	4

**Internal Assessment: 40**

**End Term Exam: 60**

**Duration of Exam: 3 Hrs**

**OBJECTIVES:** The objective of the paper is to help the students in understanding concepts and complications in dialysis treatment.

S. No.	Content	Hours
<b>SECTION-1</b>	Charts / Slides / Spotters  1. Dialysis Team (Doctors, Technologist, Nurses, Technician, Renal Dietician – Rights, Responsibilities and Relationship with Patients)  2. Basic chemistry of Body fluids and Electrolytes  3. Dialysis machine working  4. Water Treatment System  5. Dialyser Membranes – Types and Biocompatibility  6. Types of Dialysers  7. Composition of Dialysate  8. Anticoagulation	30

**COURSE OUTCOMES:** On completion of this course, the students will be able to

<b>CO1</b>	<b>BDLS -2471.1</b>	Students gain knowledge of anticoagulants.
<b>CO2</b>	<b>BDLS -2471.2</b>	Students will able to learn about Working of Dialysis machine.
<b>CO3</b>	<b>BDLS -2471.3</b>	Students will able to understand regarding different vascular access.
<b>CO4</b>	<b>BDLS-2471. 4</b>	Students will be train with good clinical skill related to dialysis technology which will leads to entrepreneurial qualities and employability.

**RECOMMENDED BOOKS:**

1. Oxford textbook of Nephrology
2. The Kidney – Brenner (Vol I/II)
3. Diseases of the Kidney and the urinary tracy – Schrier (Vol I, II, & III)
4. Textbook of Dialysis therapy – Nissenson
5. Textbook of Peritoneal Dialysis – Ram Gokal
6. Handbook of dialysis – John T. Daugirdas

**TITLE: APPLIED DIALYSIS TECHNOLOGY-II-PRACTICAL**

**SUBJECT CODE: BDLS-2472**

**SEMESTER: IV**

**CONTACT HOURS/WEEK:**

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
		4	4

**Internal Assessment: 40**

**End Term Exam: 60**

**Duration of Exam: 3 Hrs**

**OBJECTIVES:** The objective of the paper is to help the students in understanding concepts and issues in dialysis treatment.

S. No.	Content	Hours
<b>SECTION-1</b>	<ul style="list-style-type: none"> <li>● Dialysis Unit priming (Setting)</li> <li>● A.V. Cannulation &amp; Termination</li> <li>● A.V. Fistula / A.V. Grafting</li> <li>● Dialysis catheterization (Internal Jugular – Femoral – Subclavian vein</li> <li>● Packing) including sterilization.</li> </ul>	30

**COURSE OUTCOMES:** On completion of this course, the students will be able to

<b>CO1</b>	<b>BDLS -2472.1</b>	Student gain knowledge of Special dialysis procedures.
<b>CO2</b>	<b>BDLS -2472.2</b>	Student learns about Dialysis in infants & children.
<b>CO3</b>	<b>BDLS -2472.3</b>	Student gain knowledge of Renal anemia management.
<b>CO4</b>	<b>BDLS-2472. 4</b>	Students will be train with good clinical skill related to dialysis technology which will leads to entrepreneurial qualities and employability.



**RECOMMENDED BOOKS:**

1. Oxford textbook of Nephrology
2. The Kidney – Brenner (Vol I/II)
3. Diseases of the Kidney and the urinary tract – Schrier (Vol I, II, & III)
4. Textbook of Dialysis therapy – Nissenson
5. Textbook of Peritoneal Dialysis – Ram Gokal
6. Handbook of dialysis – John T. Daugirdas



**Program Name: B.Sc. Dialysis Technology**  
**Program Code: DLS-201**

**SYLLABUS**

**SEMESTER-V**

**TITLE: APPLIED DIALYSIS TECHNOLOGY-III**

**SUBJECT CODE: BDLS-3501**

**SEMESTER: V**

**CONTACT HOURS/WEEK:**

<b>Lecture (L)</b>	<b>Tutorial (T)</b>	<b>Practical (P)</b>	<b>Credit (C)</b>
<b>5</b>			<b>5</b>

**Internal Assessment: 40**

**End Term Exam: 60**

**Duration of Exam: 3 Hrs**

**OBJECTIVES:** The purpose of the course is to offer the students relevant and actual knowledge of vascular access and types of dialysis treatment.

<b>S. No.</b>	<b>Content</b>	<b>Hours</b>
<b>Unit-1</b>	Vascular access for hemodialysis & associated complications. Peritoneal access devices: types of catheter, insertion techniques & associated complications.	20
<b>Unit-2</b>	Complications of dialysis: Hemodialysis: acute & long term complications. Peritoneal dialysis: mechanical & metabolic complications. Peritonitis & exit site infection.	25
<b>Unit-3</b>	Recent advances in dialysis hemodialysis-Nocturnal, Online dialysis, Daily dialysis. Telemedicine in dialysis practice.	15

**COURSE OUTCOMES:** On completion of this course, the students will be able to

<b>CO1</b>	<b>BDLS -3501.1</b>	Student gain knowledge of Recent advances in hemodialysis.
<b>CO2</b>	<b>BDLS -3501.2</b>	To develop knowledge about Telemedicine in dialysis practice
<b>CO3</b>	<b>BDLS -3501.3</b>	To develop understanding regarding different problems in dialysis patients.
<b>CO4</b>	<b>BDLS-3501. 4</b>	Students will be train with good clinical skill related to dialysis technology which will leads to entrepreneurial qualities and employability.

**RECOMMENDED BOOKS:**

1. Oxford textbook of Nephrology
2. The Kidney – Brenner (Vol I/II)
3. Diseases of the Kidney and the urinary tracy – Schrier (Vol I, II, & III)
4. Textbook of Dialysis therapy – Nissenson
5. Textbook of Peritoneal Dialysis – Ram Gokal
6. Handbook of dialysis – John T. Daugirdas

**TITLE: APPLIED PHYSIOLOGY RELATED TO DIALYSIS TECHNOLOGY**

**SUBJECT CODE: BDLS-3502**

**SEMESTER: V**

**CONTACT HOURS/WEEK:**

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
5			5

**Internal Assessment: 40**

**End Term Exam: 60**

**Duration of Exam: 3 Hrs**

**OBJECTIVES:** The objective of this paper is to help the students to acquire conceptual knowledge of urine formation and physiology of renal system.

S.No.	Content	Hours
<b>Unit-1</b>	Mechanism of urine formation, Glomerular filtration rate (GFR), Clearance studies. Physiological values of urea, creatinine, electrolytes, calcium, phosphorous, uric acid, magnesium, glucose; 24 hours urinary indices – urea, creatinine, electrolytes, calcium, magnesium.	25
<b>Unit-2</b>	Physiology of renal circulation a) Factors contributing & modifying renal circulation. b) Autoregulation. Hormones produced by kidney & physiologic alterations in pregnancy. Homeostasis: coagulation cascade, coagulation factors, auto regulation, BT, CT, PT, PTT, thrombin time	25
<b>Unit-3</b>	Acid base balance: basic principles & common abnormalities like hypokalemia, hyponatremia, hyperkalemia, hypernatremia, hypocalcemia, hypocalcaemia, pH, etc. Basic nutrition in renal diseases.	15

**COURSE OUTCOMES:** On completion of this course, the students will

<b>CO1</b>	<b>BDLS -3502.1</b>	Enable to understand about the Gastro Intestinal Tract, location, surfaces, lobes, relations, and blood supply of Kidney.
<b>CO2</b>	<b>BDLS -3502.2</b>	Enables to understand Physiology of Thyroid, Adrenal, Parathyroid, Pituitary glands and Pancreas.
<b>CO3</b>	<b>BDLS -3502.3</b>	Enables to understand Physiology of kidney and the nephron and its functions.
<b>CO4</b>	<b>BDLS-3502. 4</b>	Students will be train with good clinical skill related to dialysis technology which will leads to entrepreneurial qualities and employability.

**RECOMMENDED BOOKS:**

1. William Davis (P) understanding Human Anatomy and Physiology – McGraw Hill
2. Chaurasia- A Text Book of Anatomy
3. T. S. Ranganathan- A Text Book of Human Anatomy
4. Fattana, Human Anatomy (Description and applied)- Saunder's & C P Prism Publishers, Bangalore
5. Guyton (Arthur) Text Book of Physiology. Latest Ed. Prism Publishers
6. Chatterjee (CC) Human Physiology Latest Ed. Vol. 1, Medical Allied Agency
7. Choudhari (Sujith K) Concise Medical Physiology Latest Ed. New Central Book

**TITLE: CLINICAL SKILL ASSESSMENT**

**SUBJECT CODE: BDLS-3503**

**SEMESTER: V**

**CONTACT HOURS/WEEK:**

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
5			5

**Internal Assessment: 40**

**End Term Exam: 60**

**Duration of Exam: 3 Hrs**

**OBJECTIVES:** The course aims at providing fundamental knowledge and exposure to the concepts, theories and practices in the field of dialysis technician.

S. No.	Content	Hours
<b>Unit-1</b>	Soft skill & communication, Role of Dialysis Technician, Principle of Hemodialysis, Vascular Access, Anticoagulation in hemodialysis.	15
<b>Unit-2</b>	Dialyzer and extracorporeal circuit, Dialysate composition in Hemodialysis, Dialysis machines Water Treatment for hemodialysis.	15
<b>Unit-3</b>	Complication of Hemodialysis and management, Infection control in hemodialysis unit, Understanding of acute peritoneal dialysis and maintenance peritoneal dialysis, Extracorporeal detoxification.	25

**COURSE OUTCOMES:** On completion of this course, the students will be able to

<b>CO1</b>	<b>BDLS -3503.1</b>	Students will gain knowledge about the Principles hemodialysis
<b>CO2</b>	<b>BDLS -3503.2</b>	Students will gain knowledge about Soft skill & communication
<b>CO3</b>	<b>BDLS -3503.3</b>	Students will understand about Vascular access
<b>CO4</b>	<b>BDLS-3503. 4</b>	Students will be train with good clinical skill related to dialysis technology which will leads to entrepreneurial qualities and employability.

**RECOMMENDED BOOKS:**

- 1.Oxford textbook of Nephrology
2. The Kidney – Brenner (Vol I/II)
3. Diseases of the Kidney and the urinary tracy – Schrier (Vol I, II, & III)
4. Textbook of Dialysis therapy – Nissenson
5. Textbook of Peritoneal Dialysis – Ram Gokal
- 6.Handbook of dialysis – John T. Daugirdas



**TITLE: APPLIED DIALYSIS TECHNOLOGY-III-PRACTICAL**

**SUBJECT CODE: BDLS-3571**

**SEMESTER: V**

**CONTACT HOURS/WEEK:**

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
		<b>4</b>	<b>4</b>

**Internal Assessment: 40**

**End Term Exam: 60**

**Duration of Exam: 3 Hrs**

**OBJECTIVES:** The purpose of the course is to offer the students relevant and actual knowledge of vascular access and types of dialysis treatment.

S.No.	Content	Hours
<b>SECTION-1</b>	<ul style="list-style-type: none"> <li>● Setting up a dialysis machine for dialysis</li> <li>● Preparation of concentrates – depending on the situation</li> <li>● Reuse of dialysis apparatus</li> <li>● Isolated ultrafiltration.</li> <li>● Performance of peritoneal dialysis exchange – manually</li> <li>● Setting up of automated peritoneal dialysis equipment</li> </ul>	30

**COURSE OUTCOMES:** On completion of this course, the students will be able to

<b>CO1</b>	<b>BDLS -3571.1</b>	Student gain knowledge of Recent advances in hemodialysis.
<b>CO2</b>	<b>BDLS -3571.2</b>	To develop knowledge about Telemedicine in dialysis practice
<b>CO3</b>	<b>BDLS -3571.3</b>	To develop understanding regarding different problems in dialysis patients.
<b>CO4</b>	<b>BDLS-3571. 4</b>	Students will be train with good clinical skill related to dialysis technology which will leads to entrepreneurial qualities and employability.

**RECOMMENDED BOOKS:**

1. Oxford textbook of Nephrology
2. The Kidney – Brenner (Vol I/II)
3. Diseases of the Kidney and the urinary tracy – Schrier (Vol I, II, & III)
4. Textbook of Dialysis therapy – Nissenson
5. Textbook of Peritoneal Dialysis – Ram Gokal
6. Handbook of dialysis – John T. Daugirdas

**TITLE: CLINICAL SKILL ASSESSMENT-PRACTICAL**

**SUBJECT CODE: BDLS-3572**

**SEMESTER: V**

**CONTACT HOURS/WEEK:**

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
		4	2

**Internal Assessment: 40**

**End Term Exam: 60**

**Duration of Exam: 3 Hrs**

**OBJECTIVES:** The course aims at providing fundamental knowledge and exposure to the concepts, theories and practices in the field of dialysis technician.

S.No.	Content	Hours
<b>SECTION-1</b>	<ol style="list-style-type: none"> <li>1. Hemodialysis unit</li> <li>2. Demineralization plant</li> <li>3. Machine</li> <li>4. Initiation of Dialysis</li> <li>5. Conduction of Dialysis</li> <li>6. Dialysis – closure</li> <li>7. Washing, cleaning, reuse</li> <li>8. Maintenance of hygiene in Dialysis unit</li> <li>9. Access – care</li> <li>10. Anticoagulation</li> </ol>	30

**COURSE OUTCOMES:** On completion of this course, the students will be able to

<b>CO1</b>	<b>BDLS -3572.1</b>	Students will gain knowledge about the Principles hemodialysis
<b>CO2</b>	<b>BDLS -3572.2</b>	Students will gain knowledge about Soft skill & communication
<b>CO3</b>	<b>BDLS -3572.3</b>	Students will understand about Vascular access
<b>CO4</b>	<b>BDLS-3572. 4</b>	Students will be train with good clinical skill related to dialysis technology which will leads to entrepreneurial qualities and employability.

**RECOMMENDED BOOKS:**

- 1.Oxford textbook of Nephrology
2. The Kidney – Brenner (Vol I/II)
3. Diseases of the Kidney and the urinary tracy – Schrier (Vol I, II, & III)
4. Textbook of Dialysis therapy – Nissenson
5. Textbook of Peritoneal Dialysis – Ram Gokal
- 6.Handbook of dialysis – John T. Daugirdas



**Program Name: B.Sc. Dialysis Technology**  
**Program Code: DLS-201**

**SYLLABUS**

**SEMESTER-VI**

**TITLE: SOCIOLOGY**  
**SUBJECT CODE: BDLS-3601**  
**SEMESTER: VI**  
**CONTACT HOURS/WEEK:**

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
5			5

**Internal Assessment: 40**

**End Term Exam: 60**

**Duration of Exam: 3 Hrs**

**OBJECTIVES:** This course aims to give practical skill to students aninsight into social behavior with patients.

S. No.	Content	Hours
<b>SECTION-A</b>	<p><b>INTRODUCTION</b></p> <p>Meaning, definition and scope of sociology.</p> <p>Its relation to anthropology, psychology, social psychology.</p> <p>Methods of sociological investigations: case study, social survey, questionnaire, interview.</p>	15
<b>SECTION-B</b>	<p><b>SOCIAL GROUPS</b></p> <p>Concepts of social groups, influence of formal and informal groups on health and sickness.</p> <p>The role of primary groups and secondary groups in the hospital and rehabilitation setup.</p> <p><b>SOCIAL FACTORS IN HEALTH AND DISEASE</b></p> <p>Meaning of social factors.</p> <p>Role of social factors in health and disease.</p>	15

<b>SECTION-C</b>	<b>Conflict Management</b> - Traditional vis-a-vis Modern view of conflict - Constructive and Destructive conflict - Conflict Process - Strategies for encouraging constructive conflict Strategies for resolving destructive conflict	15
<b>SECTION-D</b>	Scope Of Social Psychology-Applications and Importance of Social Psychology, Groups: Definition and Type- Primary And Secondary Groups Social Interaction, Social and Inter-Personal Relations. Inter-personal attraction – Love and Companionship.Prosocial-behavior. Modes of empathy: self – other differentiation and development of empathy. Social influence: attitude and conformity. Definition - Characteristics and Classification of Crowd. Leadership: Definition and characteristics, Defense Mechanisms, frustration and conflict, sources of frustration and conflict, types of conflicts. Aggression and Types of aggression.	20

**COURSE OUTCOMES:** On completion of this course, the students will be able to

<b>CO1</b>	<b>BDIS -3601.1</b>	This course is aimed to make the student to gain knowledge about Role of social factors in health and disease.
<b>CO2</b>	<b>BDIS -3601.2</b>	Students will able to understand about the Concepts of social groups, influence of formal and informal groups on health and sickness.
<b>CO3</b>	<b>BDIS -3601.3</b>	Students will enables to understand hospital and rehabilitation setup
<b>CO4</b>	<b>BDIS-3601. 4</b>	Students will be train with good clinical skill related to sociology which will leads to employability.

**RECOMMENDED BOOKS:**

1. Sachdeva & Vidyabhushan, Introduction to the study of sociology.
2. Indrani T.K., Text book of sociology for graduates nurses and Physiotherapy students, JPBrothers, New Delhi 10

**TITLE: HUMAN VALUES AND PROFESSIONALISM**

**SUBJECT CODE: BDLS-3606**

**SEMESTER: VI**

**CONTACT HOURS/WEEK:**

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
5			5

**Internal Assessment: 40**

**End Term Exam: 60**

**Duration of Exam: 3 Hrs**

**OBJECTIVES:** The course will develop understanding of the concepts related to 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

S. No.	Content	Hours
Unit-1	<ul style="list-style-type: none"> <li>● <b>Background</b> - Introduction, Meaning, Nature and Scope, Development of Human Rights, Theories of Rights, Types of Rights.</li> <li>● <b>Human rights at various level-</b> Human Rights at Global Level UNO,</li> <li>● <b>Instruments:</b> U.N. Commission for Human Rights, European Convention on Human Rights.</li> <li>● <b>Spiritual Values for human excellence :</b> 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, Buddhism, etc.; Why spirituality? Concept – significance ; Thought culture</li> </ul>	20



<p><b>Unit-2</b></p>	<ul style="list-style-type: none"> <li>● <b>Human rights in India</b> - 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.</li> <li>● <b>Ways and Means</b> : 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</li> </ul>	<p>20</p>
	<ul style="list-style-type: none"> <li>● <b>Human Rights Violations</b> -Human Rights Violations against Women, Children, Violations against Minorities SC/ST and Trans-genders, Preventive Measures.</li> <li>● <b>Professional values</b>- Integrity, Objectivity, Professional competence and due care, Confidentiality.</li> <li>● <b>Integrating spiritual values and life:</b> Relevance of VBSE (Value Based Spiritual Education) in contemporary life ; Significant spiritual values ; Spiritual destiny ; Principles of Self-management; Designing destiny</li> </ul>	<p>15</p>
	<ul style="list-style-type: none"> <li>● <b>Personal values</b>- ethical or moral values, Attitude and behavior- professional behavior, treating people equally.</li> <li>● <b>Code of conduct</b>- professional accountability and responsibility, misconduct, Cultural issues in the healthcare environment.</li> <li>● <b>Experiencing through the heart for self-transformation (Heart fullness Meditation):</b> 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</li> </ul>	<p>20</p>

	egregore effect.	
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**COURSE OUTCOMES:** On completion of this course, the students will be able to

<b>CO1</b>	<b>BDLS -3606.1</b>	Student's ability to present their ideas will be developed.
<b>CO2</b>	<b>BDLS -3606.2</b>	Students will able to learn about Fundamental rights and duties.
<b>CO3</b>	<b>BDLS -3606.3</b>	Students will be able to explore their inner potential and inner ability to become a successful researcher or technician & hence become more focused
<b>CO4</b>	<b>BDLS-3606. 4</b>	Students will be train with good clinical skill related to dialysis technology which will leads to entrepreneurial qualities and employability.

**RECOMMENDED BOOKS:**

- 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.

**TITLE: PATHOLOGY**

**SUBJECT CODE: BDLS-3602**

**SEMESTER: VI**

**CONTACT HOURS/WEEK:**

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
5			5

**Internal Assessment: 40**

**End Term Exam: 60**

**Duration of Exam: 3 Hrs**

**OBJECTIVES:** The course will develop understanding of the concepts related to various diseases and their pathophysiology.

S. No.	Content	Hours
<b>Unit-1</b>	Histopathology-Introduction to histopathology. Receiving of specimen in the laboratory. Grossing techniques. Mounting techniques: various mountants. Maintenance of records and filing of the slides. Use & care of microscope. Staining of tissues: H & E Staining. Bio-medical waste management	25
<b>Unit-2</b>	Clinical pathology-Introduction to clinical pathology. Collection, transport, preservation, and processing of various clinical specimens. Urine Examination: collection and preservation of urine, physical, chemical, microscopic examination, Examination of body fluids. Examination of cerebro spinal fluid (CSF). Sputum examination. Examination of faeces.	25
<b>Unit-3</b>	Hematology-Introduction to hematology. Normal constituents of blood, their structure and function. Collection of blood samples. Anticoagulants used in hematology. Instruments and glassware used in hematology, preparation and use of glassware. Laboratory	25

	<p>safety guidelines. SI units and conventional units in hospital laboratory. Hb, PCV. ESR. Normal homeostasis. Bleeding time, clotting time, prothrombin time, activated partial thromboplastin time. Blood bank Introduction. Blood grouping and Rh types. Cross matching.</p>	
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**COURSE OUTCOMES:** On completion of this course, the students will be able to

<b>CO1</b>	<b>BDLS -3602.1</b>	Student gain knowledge of general and systemic pathology.
<b>CO2</b>	<b>BDLS -3602.2</b>	Student will learn about patients handling with Viral infection and its isolation.
<b>CO3</b>	<b>BDLS -3602.3</b>	Students will be able to understand regarding different disorder and its management and their identification test.
<b>CO4</b>	<b>BDLS-3602. 4</b>	Students will be train with good clinical skill related to dialysis technology which will leads to entrepreneurial qualities and employability.

**RECOMMENDED BOOKS:**

1. Todd & Sanford, Clinical Diagnosis & Management

by Laboratory Methods. 2. Practical Pathology P.

Chakraborty Gargi Chakraborty

**TITLE: PHARMACOLOGY RELATED TO DIALYSIS TECHNOLOGY**

**SUBJECT CODE: BDLS-3603**

**SEMESTER: VI**

**CONTACT HOURS/WEEK:**

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
5			5

**Internal Assessment: 40**

**End Term Exam: 60**

**Duration of Exam: 3 Hrs**

**OBJECTIVES:** The Objective of the course is to give theoretical & Practical Knowledge of drugs related to kidney failure treatment.

S.No.	Content	Hours
<b>Unit-1</b>	IV fluid therapy with special emphasis in renal diseases. Diuretics: classification, actions, dosage, side effects & contraindications. Anti hypertensive's: classification, actions, dosage, side effects & contraindications, special reference during dialysis, vasopressors, drugs used in hypotension. Drugs & dialysis: dose & duration of administration of drugs. Dialyzable drugs: phenobarbitone, lithium, methanol etc. Vitamin D & its analogues, phosphate binders, iron, folic acid & other vitamins of therapeutic value.	25
<b>Unit-2</b>	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. Hemodialysis concentrates: composition & dilution (acetate & bicarbonates).	25
<b>Unit-3</b>	Peritoneal dialysis fluid in particular hypertonic solutions: composition, Potassium exchange resins with special emphasis on	10

	mode of administration.	
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**COURSE OUTCOMES:** On completion of this course, the students will be able to

<b>CO1</b>	<b>BDLS -3603.1</b>	Student gain Knowledge of dose & duration of administration of drugs.
<b>CO2</b>	<b>BDLS -3603.2</b>	Students will able to learn regarding different disorder and its management and their identification test.
<b>CO3</b>	<b>BDLS -3603.3</b>	Students will able to learn about IV fluid therapy.
<b>CO4</b>	<b>BDLS-3603. 4</b>	Students will be train with good clinical skill related to dialysis technology which will leads to entrepreneurial qualities and employability.

**RECOMMENDED BOOKS:**

- Test Book of Biochemistry for Medical Students Vasudevan (DM) & Sree Kumari (S)
- Transfusion Medicine, 3e (PB) Mc Cullough
- Practical Transfusion Medicine, 4e (HB) Murphy

**TITLE: PATHOLOGY-PRACTICAL**

**SUBJECT CODE: BDLS-3671**

**SEMESTER: VI**

**CONTACT HOURS/WEEK:**

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
		2	2

**Internal Assessment: 40**

**End Term Exam: 60**

**Duration of Exam: 3 Hrs**

**OBJECTIVES:** The course will develop understanding of the concepts related to various diseases and their pathophysiology.

S. No.	Content	Hours
<b>SECTION-1</b>	<p><b>I. HAEMATOLOGY</b></p> <ol style="list-style-type: none"> <li>Sickling test-Demonstration</li> <li>Bone Marrow Smear preparation &amp; staining procedure- Demonstration</li> <li>Demonstration of Malarial Parasite.</li> <li>Blood grouping. , Cross matching, Blood Transfusion and immunohaematology.</li> <li>Coomb’s Test (Demonstration).</li> </ol> <p><b>II. CLINICAL PATHOLOGY</b></p> <ol style="list-style-type: none"> <li>Visit to pathology laboratory – Postings in batches - 15 days for 2 hours</li> <li>Urine examination</li> </ol> <ul style="list-style-type: none"> <li>Physical</li> <li>Chemical – Reducing substances ketone bodies, proteins and blood</li> <li>Microscopy</li> <li>Dipstick method – Demonstration</li> <li>Semen Analysis Demonstration</li> </ul>	30

**COURSE OUTCOMES:** On completion of this course, the students will be able to

<b>CO1</b>	<b>BDLS -3671.1</b>	Student gain knowledge of general and systemic pathology.
<b>CO2</b>	<b>BDLS -3671.2</b>	Student will learn about patients handling with Viral infection and its isolation.
<b>CO3</b>	<b>BDLS -3671.3</b>	Students will able to understand regarding different disorder and its management and their identification test.
<b>CO4</b>	<b>BDLS-3671. 4</b>	Students will be train with good clinical skill related to dialysis technology which will leads to entrepreneurial qualities and employability.

**RECOMMENDED BOOKS:**

1.Todd & Sanford, Clinical Diagnosis & Management

by Laboratory Methods.2. Practical Pathology P.

Chakraborty Gargi Chakraborty



**TITLE: PHARMACOLOGY RELATED TO DIALYSIS TECHNOLOGY-  
PRACTICAL**

**SUBJECT CODE: BDLS-3672**

**SEMESTER: VI**

**CONTACT HOURS/WEEK:**

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
		2	2

**Internal Assessment: 40**

**End Term Exam: 60**

**Duration of Exam: 3 Hrs**

**OBJECTIVES:** The Objective of the course is to give theoretical & Practical Knowledge of drugs related to kidney failure treatment.

S. No.	Content	Hours
<b>SECTION-1</b>	<p><b>Spotters And Charts :</b></p> <ol style="list-style-type: none"> <li>1. Diuretics</li> <li>2. Anti hypertensives</li> <li>3. Antibiotics</li> <li>4. Steroids</li> <li>5. IV Fluids in Renal patient</li> <li>6. Iron therapy in Dialysis</li> <li>7. Vitamin-D analogues, Phosphate binders</li> <li>8. Erythropoiesis Stimulating Agents</li> <li>9. Chemicals used in Dialysis unit including composition and mechanism of action</li> <li>10. Hemodialysis Concentrates</li> <li>11. Peritoneal Dialysis Fluids</li> <li>12. Replacement Fluids used for CRRT</li> <li>13. Chemicals used for Sterilization including Formaldehyde, Hydrogen Peroxide, Sodium Hypochlorite, Citrosterile, Renalin and its mechanism of action</li> </ol>	30

	14. Vaccines used in Dialysis patients – Hepatitis B 15. Immunosuppressive medications used in Renal Transplantation	
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**COURSE OUTCOMES:** On completion of this course, the students will be able to

<b>CO1</b>	<b>BDLS -3672.1</b>	Student gain Knowledge of dose & duration of administration of drugs.
<b>CO2</b>	<b>BDLS -3672.2</b>	Students will able to learn regarding different disorder and its management and their identification test.
<b>CO3</b>	<b>BDLS -3672.3</b>	Students will able to learn about IV fluid therapy.
<b>CO4</b>	<b>BDLS-3672. 4</b>	Students will be train with good clinical skill related to dialysis technology which will leads to entrepreneurial qualities and employability.

**RECOMMENDED BOOKS:**

- Test Book of Biochemistry for Medical Students Vasudevan (DM) & Sree Kumari (S)
- Transfusion Medicine, 3e (PB) Mc Cullough
- Practical Transfusion Medicine, 4e (HB) Murphy