



Study Scheme & Syllabus
of
B.Sc. Dialysis Technology

(Semester I -VIII)

Batch 2024 Onwards

By

Board of Studies

I K GUJRAL PUNJAB TECHNICAL UNIVERSITY
KAPURTHALA



Semester - I

Course Code	Course Type	Course Title	Load Allocations			Marks Distribution		Total Marks	Credits
			L*	T*	P	Internal	External		
BDT-101-24	Core Theory	Human Anatomy I	3	1	0	40	60	100	4
BDT-102-24	Core Theory	Human Physiology I	3	1	0	40	60	100	4
BDT-103-24	Core Theory	General Biochemistry& Nutrition	3	1	0	40	60	100	4
BDT-104-24	Core Practical/ Laboratory	Human Anatomy Part I- Practical	0	0	4	60	40	100	2
BDT-105-24	Core Practical/ Laboratory	Human Physiology Part I- Practical	0	0	4	60	40	100	2
BDT-106-24	Core Practical/ Laboratory	General Biochemistry& Nutrition - Practical	0	0	4	60	40	100	2
BTHU-103-18	Ability Enhancement Compulsory Course-(AECC)	English & Communication	1	0	0	40	60	100	1
BTHU-104-18	Ability Enhancement Compulsory Course-(AECC)	English & Communication (Lab/ Seminars)	0	0	2	30	20	50	1
HVPE-101-18	Ability Enhancement Compulsory Course-(AECC)	Human Values, De-addiction & Traffic Rules	3	0	0	40	60	100	3
HVPE-102-18	Ability Enhancement Compulsory Course-(AECC)	Human Values, De-addiction & Traffic Rules (Lab/ Seminars)	0	0	1	25	**	25	1
BMPD-202-18	Ability Enhancement Compulsory Course-(AECC)	Mentoring & Professional Development	0	0	1	25	**	25	1
		TOTAL	13	03	16	460	440	900	25



Semester - II

Course Code	Course Type	Course Title	Load Allocations			Marks Distribution		Total Marks	Credits
			L*	T*	P	Internal	External		
BDT-201-24	Core Theory	Human Anatomy II	3	1	0	40	60	100	4
BDT-202-24	Core Theory	Human Physiology II	3	1	0	40	60	100	4
BDT-203-24	Core Theory	General Microbiology	3	1	0	40	60	100	4
BDT-204-24	Core Theory	Basic Pathology and Haematology	3	1	0	40	60	100	4
BDT-205-24	Core Practical/ Laboratory	Human Anatomy Part II- Practical	0	0	4	60	40	100	2
BDT-206-24	Core Practical/ Laboratory	Human Physiology Part II- Practical	0	0	4	60	40	100	2
BDT-207-24	Core Practical/ Laboratory	General Microbiology- Practical	0	0	4	60	40	100	2
BDT-208-24	Core Practical/ Laboratory	Basic Pathology & Haematology- Practical	0	0	4	60	40	100	2
EVS-102-18	Ability Enhancement Compulsory Course-(AECC)	Environmental Studies	1	0	0	40	60	100	1
BMPD-202-18	Ability Enhancement Compulsory Course-(AECC)	Mentoring & Professional Development	0	0	1	25	**	25	1
		TOTAL	13	04	17	465	460	925	26



Semester - III

Course Code	Course Type	Course Title	Load Allocations			Marks Distribution		Total Marks	Credits
			L*	T*	P	Internal	External		
BDT-301-24	Core Theory	General Pharmacology	3	1	0	40	60	100	4
BDT-302-24	Core Theory	Applied Pathology	3	1	0	40	60	100	4
BDT-303-24	Core Theory	Applied Microbiology	3	1	0	40	60	100	4
BDT-304-24	Core Theory	Basic Concepts of Renal Diseases	3	1	0	40	60	100	4
BDT-305-24	Core Practical/ Laboratory	General Pharmacology - Practical	0	0	4	60	40	100	2
BDT-306-24	Core Practical/ Laboratory	Applied Pathology - Practical	0	0	4	60	40	100	2
BDT-307-24	Core Practical/ Laboratory	Applied Microbiology - Practical	0	0	4	60	40	100	2
BDT-308-24	Core Practical/ Laboratory	Basic Concepts of Renal Diseases - Practical	0	0	4	60	40	100	2
BDT-309-24	Ability Enhancement Compulsory Course-(AECC)	Computer Applications	2	0	0	40	60	100	1
		TOTAL	14	04	16	440	460	900	25



Semester - IV

Course Code	Course Type	Course Title	Load Allocations			Marks Distribution		Total Marks	Credits
			L*	T*	P	Internal	External		
BDT-401-24	Core Theory	Haemodialysis - I	3	1	0	40	60	100	4
BDT-402-24	Core Theory	Peritoneal Dialysis	3	1	0	40	60	100	4
BDT-403-24	Core Theory	Medical Disorders and Intensive Care	3	1	0	40	60	100	4
BDT-404-24	Core Theory	Basics of Renal Dialysis Technology	3	1	0	40	60	100	4
BDT-405-24	Core Practical/ Laboratory	Haemodialysis – Practical	0	0	4	60	40	100	2
BDT-406-24	Core Practical/ Laboratory	Peritoneal Dialysis - Practical	0	0	4	60	40	100	2
BDT-407-24	Core Practical/ Laboratory	Medical Disorders and Intensive Care - Practical	0	0	4	60	40	100	2
BDT-408-24	Core Practical/ Laboratory	Basics of Renal Dialysis Technology - Practical	0	0	4	60	40	100	2
BDT-409-24	Ability Enhancement Compulsory Course-(AECC)	Biomedical Waste Management	2	0	0	40	60	100	1
		TOTAL	14	04	16	440	460	900	25



Semester - V

Course Code	Course Type	Course Title	Load Allocations			Marks Distribution		Total Marks	Credits
			L*	T*	P	Internal	External		
BDT-501-24	Core Theory	Haemodialysis - II	3	1	0	40	60	100	4
BDT-502-24	Core Theory	Applied Dialysis Technology - I	3	1	0	40	60	100	4
BDT-503-24	Core Theory	Advance Dialysis Technology -I	3	1	0	40	60	100	4
BDT-504-24	Core Theory	Recent Advances in Dialysis Technology	3	1	0	40	60	100	4
BDT-505-24	Core Practical/ Laboratory	Haemodialysis - II - Practical	0	0	4	60	40	100	2
BDT-506-24	Core Practical/ Laboratory	Applied Dialysis Technology – I - Practical	0	0	4	60	40	100	2
BDT-507-24	Core Practical/ Laboratory	Advance Dialysis Technology -I - Practical	0	0	4	60	40	100	2
BDT-508-24	Core Practical/ Laboratory	Recent Advances in Dialysis Technology - Practical	0	0	4	60	40	100	2
BDT-509-24	Ability Enhancement Compulsory Course-(AECC)	First Aid	2	0	0	40	60	100	1
		TOTAL	14	04	16	440	460	900	25



Semester - VI

Course Code	Course Type	Course Title	Load Allocations			Marks Distribution		Total Marks	Credits
			L*	T*	P	Internal	External		
BDT-601-24	Core Theory	Applied Dialysis Technology - II	3	1	0	40	60	100	4
BDT-602-24	Core Theory	Advance Dialysis Technology -II	3	1	0	40	60	100	4
BDT-603-24	Core Theory	Dialysis in Special Situations	3	1	0	40	60	100	4
BDT-604-24	Core Theory	Research Methodology and Biostatistics	3	1	0	40	60	100	4
BDT-605-24	Core Practical/ Laboratory	Applied Dialysis Technology – II - Practical	0	0	4	60	40	100	2
BDT-606-24	Core Practical/ Laboratory	Advance Dialysis Technology -II - Practical	0	0	4	60	40	100	2
BDT-607-24	Core Practical/ Laboratory	Dialysis in Special Situations- Practical	0	0	4	60	40	100	2
BDT-608-24	Core Practical/ Laboratory	Recent Advances in Dialysis Technology - Practical	0	0	4	60	40	100	2
BDT-609-24	Ability Enhancement Compulsory Course-(AECC)	Hospital Management and Medical Ethics	2	0	0	40	60	100	1
		TOTAL	14	04	16	440	460	900	25



SYLLABUS OF THE PROGRAM

The syllabus has been upgraded as per provision of the UGC module and demand of the academic environment. The contents of the syllabus have been duly arranged unit wise and included in such a manner so that due importance is given to requisite intellectual and laboratory skills. The application part of the respective contents has been appropriately emphasized.



Semester		First							
Course Code	Course Type	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits
			L*	T*	P	Internal	External		
BDT-101-24	Core Theory	Human Anatomy I	3	1	0	40	60	100	4

Course Outcomes:

CO1: Gain comprehensive knowledge of human anatomy, including the structure, function, and classification of cells, tissues, skin, bones, and joints.

CO2: Understand the muscular system, including muscle types, muscle groups, and the movements they produce, along with detailed knowledge of muscles in different body regions.

CO3: Acquire a thorough understanding of the respiratory and circulatory systems, including the anatomy and function of the respiratory tract, lungs, heart, and blood vessels.

CO4: Develop a detailed understanding of the digestive system, including the anatomy and function of the gastrointestinal tract and associated organs such as the liver, gall bladder, pancreas, and salivary glands.

Module 1

13 hours

Introduction to Anatomy, Terminology, Cell and Cell division, Tissues of body, Skin.

Skeletal System: Classification of bones, Parts of developing long bone and its blood supply, Joints: Classification of joints, Synovial Joint. Appendicular skeleton: Bones of upper Limb, Bones of lower limb, Axial skeleton.

Module 2

11 hours

Muscular System: Muscle Types, Muscle groups and movements, Muscles of Upper limb, Muscles of lower limb, Muscles of Neck, Muscles of back, Muscles of abdomen.

Joints: Shoulder, Hip, Knee, Movements and muscle groups producing movements at other joints.

Module 3

11 hours

Respiratory System: Introduction to Respiratory system, Larynx, Thoracic cage and diaphragm, Lung & Pleura, Trachea & Bronchopulmonary segments, Mediastinum.

Circulatory System: Types of blood vessels, Heart & Pericardium, Coronary Circulation, Overview of Mediastinum, Blood vessels of Thorax.



Module 4

10 hours

Digestive System: Pharynx, Oesophagus, Stomach, Small and Large Intestine, Liver & Gall Bladder, Spleen, Pancreas, Salivary glands.



Semester		First							
Course Code	Course Type	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits
			L*	T*	P	Internal	External		
BDT-102-24	Core Theory	Human Physiology I	3	1	0	40	60	100	4

Course Outcomes: - At the end of the Course, the student will be able to

CO1: Develop a foundational understanding of general physiology, including the principles of homeostasis, cellular transport mechanisms, and the composition, properties, and functions of blood and body fluids.

CO2: Gain in-depth knowledge of the cardiovascular system, including the anatomical and physiological properties of the heart, cardiac cycle, cardiac output, heart sounds, blood pressure, electrocardiogram (ECG), and different types of shock.

CO3: Acquire comprehensive insights into the digestive system, including the organization, innervation, blood supply, composition and functions of digestive juices, and the processes involved in the digestion and absorption of carbohydrates, proteins, and fats.

CO4: Understand the respiratory system's physiological anatomy, functions, and mechanisms, including the non-respiratory functions of the lungs, mechanisms of respiration, lung volumes and capacities, and the transport and regulation of respiratory gases (O₂ and CO₂).

Module 1:

13 hours

General Physiology: Introduction to physiology, Homeostasis, Transport Across cell membrane.

Blood: Composition, properties and functions of Blood, Erythropoiesis, Blood Groups– ABO and RH grouping, Coagulation of blood & Anticoagulants, Anaemias: Causes and classification, Body Fluid: Compartments, Composition.

Module 2:

10 hours

Cardiovascular System: Heart-Physiological Anatomy, Properties of cardiac muscle, Cardiac Cycle-Events –systole, diastole, Cardiac Output-Definition and factors affecting it, Heart sounds-normal heart sounds, its causes, Blood Pressure-Definition, normal value, Physiological variations, its measurement, ECG- normal waves, Shock-Definition, Types.



Module 3:

07 hours

Digestive system: General Introduction, organization, innervations & blood supply of Digestive System, Composition and functions of all Digestive juices, Movements of Digestive System (Intestine), Digestion & Absorption of Carbohydrate, Proteins & Fats.

Module 4:

05 hours

Respiratory System: Physiological anatomy, functions of respiratory system, non- respiratory functions of lung, Mechanism of respiration, Lung Volumes & capacities, Transport of Respiratory Gases O₂, Transport of Respiratory Gases CO₂, Regulation of Respiration.



Semester		First							
Course Code	Course Type	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits
			L*	T*	P	Internal	External		
BDT-103-24	Core Theory	General Biochemistry & Nutrition	3	1		40	60	100	4

Course Outcomes: - At the end of the Course, the student will be able to

CO1: Understand the basic structure, classification, and functions of carbohydrates, proteins, and nucleic acids.

CO2: Gain knowledge of enzyme classification, mechanisms, factors affecting activity, and biological oxidation.

CO3: Comprehend carbohydrate and protein metabolism, including glycolysis, TCA cycle, and the regulation of blood glucose.

CO4: Learn the importance of vitamins, minerals, nutrition science, and pre-examination skills related to sample handling and disposal.

Module 1:

10 hours

Introduction and scope of biochemistry. **Carbohydrates:** Definition, Functions, Properties, Outline of classification with examples (Definition of Monosaccharides, Disaccharides, Polysaccharides and their examples). **Chemistry of Proteins:** Amino acids (total number of amino acids, essential and non-essential Amino acids). Definition, Classification of Proteins Structural organization of protein, Denaturation of Proteins. **Chemistry of Nucleic acid:** Nucleosides and Nucleotides, Watson and Crick model of DNA, RNA- its type along with functions.

Module 2:

10 hours

Elementary knowledge of enzymes: Classification, mechanism of enzyme action, Factors Affecting Activity of enzymes, enzyme specificity, Enzyme inhibition, Isoenzymes and their diagnostic importance. **Biological oxidation:** Brief concept of biological oxidation: Definition of Oxidative phosphorylation Electron transport chain. Inhibitors and uncouples briefly.

Module 3:

15 hours



Metabolism of Carbohydrate: Glycolysis, TCA cycle, Definition and significance of glycogenesis and glycogenolysis. Definition and significance of HMP shunt, definition and significance of gluconeogenesis. Regulation of blood Glucose level, Diabetes Mellitus, Glycosuria. Glucose Tolerance Test. **Metabolism of Proteins:** Transamination, Trans methylation reactions. Urea cycle, Functions of glycine, tyrosine, phenylalanine, tryptophan and Sulphur containing amino acids.

Module 4:

10 hours

Vitamins and Minerals: RDA, Sources, functions and deficiency manifestations of Fat-soluble vitamins. RDA, Sources, functions and deficiency manifestations of Water-soluble vitamins. RDA, Sources, functions and deficiency manifestations of Calcium, Phosphorous, Iron, Iodine.

Principle and applications of: Colorimeters, pH Meter

Pre-examination Skills: Collection and preservation of samples (Anticoagulants), transportation & Separation of biological specimens, Sample rejection criteria, Disposal of Biological Waste materials. **Nutrition:** History of Nutrition, Nutrition as a science, Food groups, RDA, Balanced diet, diet planning, Assessment of nutritional status. **Energy:** Units of energy, Measurements of energy and value of food, Energy expenditure, Total energy/calorie requirement for different age groups and diseases, Satiety value, Energy imbalance- obesity, starvation, Limitations of the daily food guide, Role of essential nutrients in the balanced diet.



Semester		First							
Course Code	Course Type	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits
			L*	T*	P	Internal	External		
BDT-104-24	Core Practical/ Lab	Human Anatomy I- Practical	0	0	4	60	40	100	2

List of Experiments:

1. Introduction to Anatomy, Terminology, Cell and Cell division, Tissues of body, Skin
2. Histology of types of epithelium.
3. Demo of all bones showing parts, radiographs of normal bones and joints.
4. Histology of skeletal, smooth and cardiac muscle.
5. Demonstration of heart and vessels in the body.
6. Demonstration of parts of respiratory system.
7. Histology of lungs and trachea.
8. Demonstration of parts of Urinary system.
9. Histology of Kidney, ureter and Urinary Bladder.

Suggested Books: -

1. Manipal Manual of Anatomy for Allied Health Sciences courses: Madhyastha S.
2. G.J. Tortora& N.P Anagnostakos: Principles of Anatomy and Physiology
3. B.D. Chaurasia: Handbook of General Anatomy



Semester		First							
Course Code	Course Type	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits
			L*	T*	P	Internal	External		
BDT-105-24	Core Practical/Lab	Human Physiology I-Practical	0	0	4	60	40	100	2

List of Experiments

1. Study of Microscope and its uses.
2. Collection of Blood and study of Hemocytometer.
3. Determination of Blood Groups
4. Determination of Bleeding Time, Determination of Clotting Time
5. Pulse & Blood Pressure Recording, Auscultation for Heart Sounds
6. Artificial Respiration – Demonstration.
7. Determination of Vital Capacity.
8. Study of Normal Electrocardiogram.

Suggested Books: -

1. Textbook of Medical Physiology, Guyton, 2nd South Asia Edition.
2. Textbook of Physiology Volume I & II (for MBBS) – Dr. A. K. Jain.
3. Comprehensive textbook of Medical Physiology Volume I & II – Dr. G. K. Pal



Semester		First							
Course Code	Course Type	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits
			L *	T*	P	Internal	External		
BDT-106-24	Core Practical /Lab	General Biochemistry & Nutrition - Practical	0	0	4	60	40	100	2

List of Experiments:

1. Introduction to Personnel protective equipment used in laboratory and their importance. (LCD)
2. Handling of colorimeters – operation and maintenance (LCD)
3. Serum electrolytes measurement (only demo)
4. Demonstration of semi-automated / fully automated blood analyzer
5. Demonstration of tests for carbohydrates (Monosaccharides, disaccharides and polysaccharides)
6. Precipitation Reactions of protein (only demonstration)
7. Test on bile salts (only demonstration)
8. Tests on Normal constituents of Urine (only demo)
9. Tests on Abnormal constituents of Urine (only demo)

Suggested Books:

1. Textbook of Medical Laboratory Technology, Volume 2, 3rd Edition by Praful Ghodkar
2. Medical Laboratory Technology (Volume 1): Procedure Manual for Routine Diagnostic, Kanai Mukharjee
3. Medical Laboratory Technology (Volume 2): Procedure Manual for Routine Diagnostic, Kanai Mukharjee
4. Medical Laboratory Technology (Volume 3): Procedure Manual for Routine Diagnostic, Kanai Mukharjee
5. Essentials of Biochemistry, Second Edition, Dr. (Prof) Satyanarayan.



Semester		First							
Course Code	Course Type	Course Title	Load Allocations			Marks Distribution		Total Marks	Credits
			L*	T*	P	Internal	External		
BTHU-103-18	Ability Enhancement Compulsory Course (ACCE)	English & Communication	1	0	0	40	60	100	3

Course Outcomes: - At the end of the Course, the student will be able to

CO1: Develop a solid understanding of grammar, vocabulary, and writing skills, including various forms of written communication.

CO2: Enhance writing and reading skills through summary writing, creative writing, and practical exercises in formal speech and pronunciation.

CO3: Understand the communication process, including barriers and nuances of effective communication, and improve speaking and presentation skills.

CO4: Improve listening and reading efficiency, non-verbal communication, and rapport-building skills, particularly in professional settings.

Module 1:

15 hours

Basics of Grammar: Vocabulary, Synonyms, Antonyms, Prefix and Suffix, Homonyms, Analogies and Portmanteau words, Active, Passive, Direct and Indirect speech, Prepositions, Conjunctions and Euphemisms **Writing Skills:** Letter Writing, Email, Essay, Articles, Memos, one-word substitutes, note making and Comprehension

Module 2:

08 hours

Writing and Reading, Summary writing, Creative writing, newspaper reading Practical Exercise, Formal speech, Phonetics, semantics and pronunciation

Module 3:

10 hours

Introduction to communication skills: Communication process, Elements of communication, Barriers of communication and how to overcome them, Nuances for communicating with patients and their attenders in hospitals. **Speaking:** Importance of speaking efficiently, Voice culture, Preparation of speech. Secrets of good Delivery, Audience psychology, handling, Presentation skills, Individual feedback for each student, Conference/Interview technique.



Module 4:

12 hours

Listening: Importance of listening, Self-assessment, Action plan execution, Barriers in listening, Good and persuasive listening. **Reading:** What is efficient and fast reading, Awareness of existing reading habits, tested techniques for improving speed, Improving concentration and comprehension through systematic study. **Non-Verbal Communication:** Basics of non-verbal communication, Rapport building skills using neuro- linguistic programming (NLP), Communication in Optometry practice.



Semester		First							
Course Code	Course Type	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits
			L*	T*	P	Internal	External		
BTHU-104-18	Core Practical /Lab	English & Communication (Lab/ Seminars)	0	0	2	30	20	50	1

List of Experiments:

1. Interactive practice sessions in Language Lab on Oral Communication
2. Listening Comprehension
3. Self-Introduction,
4. Group Discussion and Role Play
5. Common Everyday Situations:
6. Conversations and Dialogues
7. Communication at Workplace
8. Interviews Formal Presentations,
9. Effective Communication/ Mis-communication Public Speaking

Suggested Books:

1. Graham Lock, Functional English Grammar: Introduction to second Language Teachers. Cambridge University Press, New York, 1996.
2. Gwen Van Servellen. Communication for Health care professionals: Concepts, practice and evidence, Jones & Bartlett Publications, USA, 2009



Semester		First							
Course Code	Course Type	Course Title	Load Allocations			Marks Distribution		Total Marks	Credits
			L*	T*	P	Internal	External		
HVPE-101-18	Ability Enhancement Compulsory Course (ACCE)	Human Values, De-addiction & Traffic Rules	3	0	0	40	60	100	3

Course Outcomes: - At the end of the Course ,the student will be able to

CO1: Understand the need, guidelines, and process of value education, including self-exploration and the concepts of happiness and prosperity.

CO2: Gain insight into human harmony, understanding the coexistence of the self ('I') and the body, and the means to achieve personal harmony and well-being.

CO3: Comprehend the values and harmony in family and society, focusing on trust, respect, and universal human goals for a harmonious social order.

CO4: Grasp the holistic understanding of harmony in nature and existence, and apply this understanding to professional ethics, humanistic education, and sustainable development practices.

Module 1:

06 hours

Course Introduction – Need, Basic Guidelines, Content and Process for Value Education

- Understanding the need, basic guidelines, content and process for Value Education
- Self-Exploration–what is it? – its content and process; ‘Natural Acceptance’ and Experiential Validation-as the mechanism for self-exploration Continuous Happiness and Prosperity- A look at basic Human Aspirations Right understanding, Relationship and Physical Facilities- the basic requirements for fulfilment of aspirations of every human being with their correct priority
- Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario
- Method to fulfil the above human aspirations: understanding and living in harmony at various levels

Module 2:

06 hours

Understanding Harmony in the Human Being – Harmony in Myself

- Understanding human being as a co-existence of the sentient ‘I’ and the material ‘Body’
- Understanding the needs of Self (‘I’) and ‘Body’ – *Sukh* and *Suvidha* Understanding the Body as an instrument of ‘I’ (I being the doer, seer and enjoyer)
- Understanding the characteristics and activities of ‘I’ and harmony in ‘I’



Understanding the harmony of I with the Body: *Sanyam* and *Swasthya*; correct appraisal of Physical needs, meaning of Prosperity in detail Programs to ensure *Sanyam* and *Swasthya*

Practice Exercises and Case Studies will be taken up in Practice Sessions.

Module 3:

10 hours

Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship

- Understanding harmony in the Family- the basic unit of human interaction
Understanding values in human-human relationship; meaning of *Nyaya* and program for its fulfilment to ensure *Ubhay-tripti*;
- Trust (*Vishwas*) and Respect (*Samman*) as the foundational values of relationship
- Understanding the meaning of *Vishwas*; Difference between intention and competence
- Understanding the meaning of *Samman*, Difference between respect and differentiation; the other salient values in relationship
- Understanding the harmony in the society (society being an extension of family): *Samadhan*, *Samridhi*, *Abhay*, *Sah-astitva* as comprehensive Human Goals
- Visualizing a universal harmonious order in society- Undivided Society (*Akhand Samaj*), Universal Order (*Sarvabhaum Vyawastha*)- from family to world family! Practice Exercises and Case Studies will be taken up in Practice Sessions.

Module 4:

06 hours

Listening: Importance of listening, Self-assessment, Action plan execution, Barriers in listening, Understanding Harmony in the Nature and Existence – Whole existence as Co-existence

- Understanding the harmony in the Nature
- Interconnectedness and mutual fulfilment among the four orders of nature-recyclability and self-regulation in nature
- Understanding Existence as Co-existence (*Sah-astitva*) of mutually interacting units in all-pervasive space
- Holistic perception of harmony at all levels of existence

Practice Exercises and Case Studies will be taken up in Practice Sessions.

Module 5:

06 hours

Implications of the above Holistic Understanding of Harmony on Professional

- Natural acceptance of human values Definitiveness of Ethical Human Conduct
- Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order
- Competence in professional ethics:
Ability to utilize the professional competence for augmenting universal human order,
Ability to identify the scope and characteristics of people-friendly and eco-



friendly production systems,
Ability to identify and develop appropriate technologies and management patterns for above production systems.

- Case studies of typical holistic technologies, management models and production systems.



Semester		First							
Course Code	Course Type	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits
			L *	T*	P	Internal	External		
HVPE-102-18	Core Practical /Lab	Human Values, De-addiction & Traffic Rules (Lab/ Seminars)	0	0	1	25	**	25	1

List of Experiments:

One each seminar will be organized on Drug De-addiction and Traffic Rules. Eminent scholar and experts of the subject will be called for the Seminar at least once during the semester. It will be binding for all the students to attend the seminar

Suggested Books:

1. Ivan Illich, 1974, *Energy & Equity*, The Trinity Press, Worcester, and HarperCollins, USA
2. E.F. Schumacher, 1973, *Small is Beautiful: a study of economics as if people mattered*, Blond& Briggs, Britain.
3. A Nagraj, 1998, *Jeevan Vidya ek Parichay*, Divya Path Sansthan, Amarkantak.
4. Sussan George, 1976, *How the Other Half Dies*, Penguin Press. Reprinted 1986, 1991
5. PL Dhar, RR Gaur, 1990, *Science and Humanism*, Commonwealth Purblishers.
6. A.N. Tripathy, 2003, *Human Values*, New Age International Publishers.
7. Subhas Palekar, 2000, *How to practice Natural Farming*, Pracheen(Vaidik) Krishi Tantra Shodh, Amravati.
8. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, *Limits to Growth Club of Rome's report*, Universe Books.
9. E G Seebauer & Robert L. Berry, 2000, *Fundamentals of Ethics for Scientists & Engineers*, Oxford University Press
10. M Govindrajran, S Natrajan & V.S. Senthil Kumar, *Engineering Ethics (including Human Values)*, Eastern Economy Edition, Prentice Hall of India Ltd.
11. B P Banerjee, 2005, *Foundations of Ethics and Management*, Excel Books.
12. B L Bajpai, 2004, *Indian Ethos and Modern Management*, New Royal Book Co., Lucknow. Reprinted 2008.



Semester		First							
Course Code	Course Type	Course Title	Load Allocations			Marks Distribution		Total Marks	Credits
			L*	T*	P	Internal	External		
BMPD-102-18	Ability Enhancement Compulsory Course (ACCE)	Mentoring & Professional Development	0	0	1	25	**	25	1

Course Outcomes: - At the end of the Course, the student will be able to

CO1: Enhance learning through expert lectures, video lectures, aptitude tests, and quizzes on general and technical topics.

CO2: Develop communication and presentation skills through group discussions, student presentations, and team-building exercises.

CO3: Gain practical knowledge of computer fundamentals as integrated with various activities.

CO4: Participate in sports, NSS/NCC, and student society activities to foster holistic development and teamwork.

Module 1:

1. Expert and video lectures
2. Aptitude Test
3. Group Discussion
4. Quiz (General/Technical)
5. Presentations by the students
6. Team building Exercises
- 7* A part of above six points practicals on Fundamentals of Computers are also added as per Annexure-I

Module 2:

1. Sports/NSS/NCC
2. Society Activities of various students chapter i.e. ISTE, SCIE, SAE, CSI, Cultural Club, etc.



SEMESTER-II



Semester		Second							
Course Code	Course Type	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits
			L*	T*	P	Internal	External		
BDT-201-24	Core Theory	Human Anatomy II	3	1	0	40	60	100	4

Course Outcomes:

CO1: Understand the structure and function of the nervous system, including the brain, spinal cord, cranial and spinal nerves, and sensory organs.

CO2: Gain knowledge of the endocrine system, including the structure and functions of key endocrine glands like the pituitary, adrenal, thyroid, and parathyroid glands.

CO3: Comprehend the anatomy of the male and female reproductive systems, including the structure of the testis, uterus, ovaries, and associated reproductive organs.

CO4: Learn the anatomy and functions of the urinary system, including the kidneys, ureters, urinary bladder, and urethra.

Module 1

15 hours

Nervous system: Neuron, classification of NS, Meninges, ventricles, CSF, Gross features of cerebrum, midbrain, pons, medulla oblongata, cerebellum, name of basal nuclei, Blood supply of brain, cranial nerves, Spinal cord and spinal nerves, Autonomic nervous system, Visual & auditory pathways. Sensory Organs: Skin & its appendages, Structure of eye & lacrimal apparatus, name of extraocular muscles. Structure of ear: external, middle & inner ear.

Module 2

10 hours

Endocrine glands: Name of all endocrine glands, gross structure & functions of pituitary gland, adrenal gland, thyroid gland and parathyroid gland.

Module 3

10 hours

Reproductive system: Parts of male reproductive system, gross structure of testis, vas deferens, epididymis, prostate, Parts of female reproductive system, gross structure of uterus, ovary, fallopian tube, mammary gland.



Module 4

10 hours

Urinary System: Parts of Urinary system, location and gross structure of kidney, ureter, urinary bladder, urethra.



Semester		Second							
Course Code	Course Type	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits
			L*	T*	P	Internal	External		
BDT-202-24	Core Theory	Human Physiology II	3	1	0	40	60	100	4

Course Outcomes: - At the end of the Course, the student will be able to

CO1: Understand the structure and functions of the excretory system, including kidney functions, glomerular filtration, and the micturition reflex.

CO2: Gain knowledge of the reproductive system, covering spermatogenesis, ovulation, the menstrual cycle, and the functions of testosterone, oestrogen, and progesterone.

CO3: Comprehend the central nervous system, including neuron structure, nerve fibre properties, synapses, reflex arcs, tracts, and the functions of various brain regions and the autonomic nervous system.

CO4: Learn about nerve muscle physiology, including muscle classification, skeletal muscle structure, the neuromuscular junction, and excitation-contraction coupling.

Module 1:

10 hours

Excretory System: Kidneys-structure of nephron, functions of kidney Glomerular filtration Rate (GFR) and factors affecting it, Counter Current Mechanism, Bladder-its innervation, micturition reflex.

Module 2:

10 hours

Reproductive System: Male Reproductive System-Stages of spermatogenesis, function of Testosterone, Female Reproductive System-Ovulation, menstrual cycle, functions of Estrogen and progesterone.

Module 3:

15 hours

Central Nervous System: Structure of neuron, functions of nervous system, Classification and properties of nerve fibers, Synapse- structure and types, Receptors-Definition, classification, properties, Reflex Arc, Ascending and Descending tracts- names and functions, Functions of Hypothalamus, Functions of Cerebellum and Basal Ganglia, Functions of Cerebral Cortex, Autonomic Nervous System- Actions of sympathetic and parasympathetic system, and their comparison.



Module 4:

05 hours

Nerve Muscle Physiology: Classification of Muscle, structure of skeletal muscle, Neuromuscular Junction, Excitation Contraction Coupling.



Semester		Second							
Course Code	Course Type	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits
			L*	T*	P	Internal	External		
BDT-203-24	Core Theory	General Microbiology	3	1		40	60	100	4

Course Outcomes: - At the end of the Course, the student will be able to

CO1: Understand general microbiology concepts including infection types, routes of infection, normal flora, and antimicrobial mechanisms, as well as staining and culture techniques for laboratory diagnosis.

CO2: Learn the principles of sterilization and disinfection, hospital-acquired infections, universal safety precautions, and biomedical waste management.

CO3: Gain insights into immunology, including antigen-antibody reactions, immune responses, innate and acquired immunity, hypersensitivity, autoimmunity, and immunoprophylaxis.

CO4: Comprehend bacteriology and virology, including bacterial morphology, classification, transmission, prevention methods, and the general properties, classification, and pathogenesis of viruses, with a focus on specific pathogens like HIV and hepatitis.

Module 1:

15 hours

General Microbiology: Infection, parasite, host, vector, fomite, contagious disease, infectious disease, epidemic, endemic, pandemic, Zoonosis, Epizootic, Attack rate Normal flora of the human body Routes of infection and spread, endogenous and exogenous infections at reservoir of infections Antimicrobials: mode of action, interpretation of susceptibility tests, resistance spectrum of activity Staining techniques: Gram staining, Acid fast staining, Culture methods Laboratory diagnosis of infection

Module 2:

05 hours

Sterilization & Disinfection: Definition of Asepsis, Sterilization and Disinfection Hospital Acquired infection, Universal safety precautions and Biomedical waste Disposal & Management.

Module 3:

10 hours

Immunology: Antigen- Antibody-reaction & application for Diagnosis, Immune response- Normal / Abnormal, Innate Immunity & acquired immunity (Vaccination) Hyper sensitivity & auto-immunity, Serological tests, Immunoprophylaxis.



Module 4:

15 hours

Bacteriology: Morphology, Classification according to the Pathogenicity, Mode of Transmission, methods of prevention, Collection and transport of samples for laboratory diagnosis, Interpretation of laboratory reports Staphylococci, Streptococci, & Pneumococci Neisseria, Mycobacterium: Tuberculosis, V. Cholerae and other medically important Vibrio's.

Virology: General Properties, Basic structure and broad Classification of Viruses. Pathogenesis and Pathology of viral infection (HIV, Hepatitis)



Semester		Second							
Course Code	Course Type	Course Title	Load Allocations			Marks Distribution		Total Marks	Credits
			L*	T*	P	Internal	External		
BDT-204-24	Core Theory	Basic Pathology and Haematology	3	1	0	40	60	100	4

Course Outcomes: - At the end of the Course, the student will be able to

CO1: Understand basic concepts in cellular adaptations, including cell injury, cell death, and the inflammatory process, along with immune system disorders.

CO2: Gain knowledge of infectious diseases, including bacterial, viral, fungal, parasitic, and syphilis infections, with specific examples.

CO3: Comprehend the principles of neoplasia, including tumor nomenclature, growth, metastasis, and the differences between benign and malignant tumors, as well as oncogenes and tumor suppressor genes.

CO4: Learn about hematology, including the structure and function of blood components, coagulation mechanisms, blood grouping, blood bank basics, and aspects of anemia and leukemia.

Module 1:

15 hours

Basic Concepts in Cellular Adaption's: Cell injury and Cell death, Cellular response to stress and other stimuli, Overview of Cell injury and Cell death

Basic Principles in Inflammatory Process: General features including inflammatory mediators and Basic Mechanisms of disorders of Immunity, General features of the immune system, Disorders of the Immune System, Acute and Chronic inflammation

Module 2:

10 hours

Infectious Diseases: Infectious diseases, Bacterial Infections (Typhoid, Tuberculosis and Leprosy) Viral infections (HIV, HbSAg and Polio) Viral infections (HIV, HbSAg and Polio) Specific Examples of Fungal, Parasitic and Syphilis infections

Module 3:

10 hours

Neoplasia: Nomenclature, Rudimentary aspects on Tumor growth and Metastasis, Definition of Neoplasia, Differences between Benign and Malignant Tumors, Staging and Grading of Tumors (Basic Aspects), Oncogenes and Tumor Suppressor genes.

Module 4:

15 hours



Haematology: Structure and functions of Formed elements Objective use of anticoagulants, Mechanisms of Haemostasis Tests to monitor Coagulation, Blood Grouping and Blood Bank (Basic aspects on Blood Components) Fixatives and Basic details in Cytology, Aspiration Cytology of Bone marrow Basic concepts in Anaemia, Cellular aspects of Leukaemia.



Semester		Second							
Course Code	Course Type	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits
			L*	T*	P	Internal	External		
BDT-205-24	Core Practical/ Lab	Human Anatomy II- Practical	0	0	4	60	40	100	2

List of Experiments:

1. Demonstration of parts of Urinary system
2. Demonstration of parts of Reproductive system
3. Demonstration of parts of Nervous System: Brain and Spinal Cord, Cranial & Spinal Nerves
4. Demonstration of various Sensory Organs: Eye, Ear (Demonstration from models)

Suggested Books:-

4. Manipal Manual of Anatomy for Allied Health Sciences courses: Madhyastha S.
5. G.J. Tortora& N.P Anagnostakos: Principles of Anatomy and Physiology
6. B.D. Chaurasia: Handbook of General Anatomy



Semester		Second							
Course Code	Course Type	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits
			L*	T*	P	Internal	External		
BDT-206-24	Core Practical/Lab	Human Physiology I- Practical	0	0	4	60	40	100	2

List of Experiments

1. To Examine Cranial nerve
2. To Examine Photopupillary reflex
3. To Examine Deep tendon reflex
4. To Examine Superficial Reflex
5. To Examine Sensory system
6. To Examine the Motor system
7. To Examine Eye Reflex
8. To study Histology slides of Different types of Muscle tissue
9. To identify the Urinary System organs using models and describe the function of the kidney
10. To Examine Hearing

Suggested Books: -

1. Textbook of Medical Physiology, Guyton, 2nd South Asia Edition.
2. Textbook of Physiology Volume I & II (for MBBS) – Dr. A. K. Jain.
3. Comprehensive textbook of Medical Physiology Volume I & II – Dr. G. K. Pal



Semester		Second							
Course Code	Course Type	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits
			L *	T*	P	Internal	External		
BDT-207-24	Core Practical /Lab	General Microbiology - Practical	0	0	4	60	40	100	2

List of Experiments:

1. Introduction & visit to microbiology lab + Morphology of bacteria + Identification of bacteria (Culture plates & Basic biochemical reactions)
2. Gram stain, Acid fast Stain
3. Spotters, Instruments, Culture media inoculated & uninoculated
4. Applied Immunology (Bacterial) Serological tests — CRP, ASO, RPR, Widal Applied Immunology (Virology) Serological tests: HIV, HBsAg (Rapid Tests)
5. Stool Examination for eggs + Parasitology specimens

Suggested Books:

1. Ananthanarayanan (R), Textbook of Microbiology, Orient Longman Ltd., 10th Edn, 2017.
2. Mackie and McCartney Practical Medical Microbiology, Relx India Pvt ltd, 14th Edn, 2018.
3. Baveja CP, Textbook of Microbiology, APC, 6th edn, 2021.
4. Sriram Kumar (S), Textbook of Microbiology, All win Publication, 151 Edn, 2019.



Semester		Second							
Course Code	Course Type	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits
			L*	T*	P	Internal	External		
BDT-208-24	Core Practical /Lab	Basic Pathology and Haematology - Practical	0	0	4	60	40	100	2

List of Experiments:

1. Demo of coagulation profile
2. Phlebotomy techniques
3. Blood Grouping and Rh typing
4. Urine Routine
5. Hb, TLC, DLC
6. Gross Specimens
7. Slides

Suggested Books:

1. Mohan (H), Textbook of Pathology, Jaypee Pub, 5th Edi, 2019.
2. Kumar, Robbins & Cotran Pathologic Basis of Disease, WB Saunders, 106 Edi, 2020.
3. Kawthalkar(S), Essentials of Clinical Pathology, Jaypee Brothers, 2'd edi, 2018.
4. Nayak (R), Essentials of Hematology & Clinical Pathology, Jaypee Brothers, Edi, 2017.
5. Sengupta, Synopsis of Clinical Pathology & Microbiology, CBS Pub, 8th Edi, 2017.



Semester		Second							
Course Code	Course Type	Course Title	Load Allocations			Marks Distribution		Total Marks	Credits
			L*	T*	P	Internal	External		
EVS-102-18	Ability Enhancement Compulsory Course (ACCE)	Environmental Studies	3	0	0	40	60	100	1

Course Outcomes: - At the end of the Course, the student will be able to

CO1: Understand the basic concepts of environmental studies, including ecosystems, energy flow, and the structure and functions of various ecosystems.

CO2: Gain knowledge about natural resources, including renewable and non-renewable resources, their uses, conservation strategies, and related issues like water and land degradation.

CO3: Comprehend biodiversity, its types, conservation strategies, and the impacts of environmental pollution and global climate change on ecosystems and human health.

CO4: Apply practical skills through fieldwork, including visits to conservation sites, documentation of biodiversity, and assessment of local environmental issues.

Module 1:

04 hours

Introduction to Environmental Studies Multidisciplinary nature of Environmental Studies: Scope & Importance Need for Public Awareness Ecosystems Concept of an Ecosystem: Structure & functions of an ecosystem (Producers, Consumers & Decomposers) Energy Flow in an ecosystem: Food Chain, Food web and Ecological Pyramids Characteristic features, structure & functions of following Ecosystems: • Forest Ecosystem • Aquatic Ecosystem (Ponds, Lakes, River & Ocean)

Module 2:

08 hours

Natural Resources Renewable & Non-renewable resources Forest Resources: Their uses, functions & values (Biodiversity conservation, role in climate change, medicines) & threats (Overexploitation, Deforestation, Timber extraction, Agriculture Pressure), Forest Conservation Act Water Resources: Their uses (Agriculture, Domestic & Industrial), functions & values, Overexploitation and Pollution of Ground & Surface water resources (Case study of Punjab), Water Conservation, Rainwater Harvesting, Land Resources: Land as a resource; Land degradation, soil erosion and desertification. Energy Resources: Renewable & non-renewable energy resources, use of alternate energy resources (Solar, Wind, Biomass, Thermal), Urban problems related to Energy.

Module 3:

08 hours



Biodiversity & its conservation Types of Biodiversity: Species, Genetic & Ecosystem India as a mega biodiversity nation, Biodiversity hot spots and biogeographic regions of India Examples of Endangered & Endemic species of India, Red data book Environmental Pollution & Social Issues Types, Causes, Effects & Control of Air, Water, Soil & Noise Pollution Nuclear hazards and accidents & Health risks Global Climate Change: Global warming, Ozone depletion, Acid rain, Melting of Glaciers & Ice caps, Rising sea levels Environmental disasters: Earthquakes, Floods, Cyclones, Landslides.

Module 4:

16 hours

Field Work Visit to a National Park, Biosphere Reserve, Wildlife Sanctuary Documentation & preparation of a Biodiversity (flora & fauna) register of campus/river/forest Visit to a local polluted site: Urban/Rural/Industrial/Agricultural Identification & Photography of resident or migratory birds, insects (butterflies) Public hearing on environmental issues in a village.

Suggested Books:

1. Carson, R. 2002. Silent Spring. Houghton Mifflin Harcourt.
2. Gadgil, M., & Guha, R. 1993. This Fissured Land: An Ecological History of India. Univ. of California Press.
3. Gleeson, B. and Low, N. (eds.) 1999. Global Ethics and Environment, London, Routledge.
4. Gleick, P. H. 1993. Water in Crisis. Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute, Oxford Univ. Press.
5. Groom, Martha J., Gary K. Meffe, and Carl Ronald Carroll. Principles of Conservation Biology. Sunderland: Sinauer Associates, 2006.
6. Grumbine, R. Edward, and Pandit, M.K. 2013. Threats from India's Himalaya dams. Science, 339: 36--- 37.
7. McCully, P. 1996. Rivers no more: the environmental effects of dams(pp. 29--- 64). ZedBooks.
8. McNeill, John R. 2000. Something New Under the Sun: An Environmental History of the Twentieth Century.
9. Odum, E.P., Odum, H.T. & Andrews, J. 1971. Fundamentals of Ecology. Philadelphia: Saunders.
10. Pepper, I.L., Gerba, C.P. & Brusseau, M.L. 2011. Environmental and Pollution Science. Academic Press.
11. Rao, M.N. & Datta, A.K. 1987. Waste Water Treatment. Oxford and IBH Publishing Co. Pvt. Ltd.
12. Raven, P.H., Hassenzahl, D.M. & Berg, L.R. 2012. Environment. 8th edition. John Wiley & Sons.
13. Rosencranz, A., Divan, S., & Noble, M. L. 2001. Environmental law and policy in India. Tripathi 1992.
14. Sengupta, R. 2003. Ecology and economics: An approach to sustainable development. OUP.
15. Singh, J.S., Singh, S.P. and Gupta, S.R. 2014. Ecology, Environmental Science and Conservation. S. Chand Publishing, New Delhi.
16. Sodhi, N.S., Gibson, L. & Raven, P.H. (eds). 2013. Conservation Biology: Voices from the Tropics. John Wiley & Sons.
17. Thapar, V. 1998. Land of the Tiger: A Natural History of the Indian Subcontinent.
18. Warren, C. E. 1971. Biology and Water Pollution Control. WB Saunders.
19. Wilson, E. O. 2006. The Creation: An appeal to save life on earth. New York: Norton.



Semester		Second							
Course Code	Course Type	Course Title	Load Allocations			Marks Distribution		Total Marks	Credits
			L*	T*	P	Internal	External		
BMPD-202-18	Ability Enhancement Compulsory Course (ACCE)	Mentoring & Professional Development	0	0	1	25	**	25	1

Course Outcomes: - At the end of the Course, the student will be able to

CO1: Enhance learning through expert lectures, video lectures, aptitude tests, and quizzes on general and technical topics.

CO2: Develop communication and presentation skills through group discussions, student presentations, and team-building exercises.

CO3: Gain practical knowledge of computer fundamentals as integrated with various activities.

CO4: Participate in sports, NSS/NCC, and student society activities to foster holistic development and teamwork.

Module 1:

1. Expert and video lectures
2. Aptitude Test
3. Group Discussion
4. Quiz (General/Technical)
5. Presentations by the students
6. Team building Exercises

7* A part of above six points practicals on Fundamentals of Computers are also added as per Annexure-I

Module 2:

1. Sports/NSS/NCC
2. Society Activities of various students chapter i.e. ISTE, SCIE, SAE, CSI, Cultural Club, etc.



SEMESTER-III



Semester		Third							
Course Code	Course Type	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits
			L*	T*	P	Internal	External		
BDT-301-24	Core Theory	General Pharmacology	3	1	0	40	60	100	4

Course Outcomes: - At the end of the Course, the student will be able to

CO1. Understand Basic Pharmacological Principles

Describe drug classifications, sources, routes of administration, pharmacokinetics (absorption, distribution, metabolism, excretion), and pharmacodynamics (drug-receptor interactions).

CO2. Apply Knowledge of Drugs Used in Dialysis and Renal Disorders

Explain the pharmacology of commonly used drugs in chronic kidney disease and dialysis, including diuretics, antihypertensives, erythropoietin, phosphate binders, and anticoagulants.

CO3. Analyse Drug Doses and Adjustments in Renal Failure

Understand dose modification in patients with impaired renal function and the dialyzability of medications used in dialysis patients.

CO4. Identify and Manage Adverse Drug Reactions

Recognize common adverse drug effects, drug interactions, allergic reactions, and the importance of pharmacovigilance, especially in patients undergoing dialysis.

CO5. Demonstrate Safe Drug Handling and Administration Skills

Practice principles of safe drug administration, dosage calculations, prescription interpretation, and drug storage relevant to the dialysis setting.

Module 1:

7 hours

Introduction to Pharmacology

- Definition, scope, and branches of pharmacology
- Sources and classification of drugs



- Routes of drug administration (oral, IV, IM, SC, transdermal, etc.)
- Dosage forms and drug dosage calculations

Module 2:

7 hours

Pharmacokinetics

- Absorption
- Distribution
- Metabolism (first-pass effect, liver role)
- Excretion (renal and hepatic routes)
- Biological half-life and plasma protein binding

Module 3:

7 hours

Pharmacodynamics

- Drug-receptor interactions
- Dose-response relationship
- Agonists and antagonists
- Therapeutic index and potency
- Adverse drug reactions (ADR)
- Drug allergy and toxicity

Module 4:

7 hours

Autonomic Nervous System Pharmacology

- Sympathetic and parasympathetic drugs
- Adrenergic and cholinergic drugs
- Clinical uses and side effects

Module 5:

7 hours

Drugs Used in Renal Disorders

- Diuretics (Loop, Thiazides, Potassium-sparing)
- Antihypertensives: ACE inhibitors, ARBs, beta-blockers
- Erythropoiesis-stimulating agents (ESAs)
- Phosphate binders
- Sodium bicarbonate, iron, and vitamin D analogs
- Anticoagulants used in dialysis (heparin, low molecular weight heparin)



- Drugs used in hyperkalemia

Module 6:

7 hours

Drug Interactions and Precautions in Dialysis

- Drug dosing in renal failure
- Dialyzability of drugs
- Drug storage and dispensing
- Drug administration safety and calculations
- Adverse drug monitoring during dialysis



Semester		Third							
Course Code	Course Type	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits
			L*	T*	P	Internal	External		
BDT-302-24	Core Theory	Applied Pathology	3	1	0	40	60	100	4

Course Outcomes: - At the end of the Course, the student will be able to

CO1. Understand Basic Pathological Processes

- Describe fundamental concepts such as inflammation, necrosis, degeneration, and tissue repair.
- Explain the cellular response to injury and the pathological basis of disease.

CO2. Explain the Hematological and Immunological Basis of Disease

- Identify types and causes of anemia, leukemia, and bleeding disorders.
- Explain the role of the immune system in disease, including hypersensitivity and autoimmune conditions.

CO3. Analyze Pathological Changes in Renal Diseases

- Recognize the pathology of common renal conditions like glomerulonephritis, nephrotic/nephritic syndrome, and diabetic nephropathy.
- Understand the morphological and functional changes in acute and chronic kidney disease (CKD/AKI).

CO4. Correlate Pathology with Dialysis Practice

- Interpret pathological findings relevant to patients undergoing dialysis.
- Correlate urinalysis and blood investigation results with renal pathology.

CO5. Apply Knowledge in Clinical Laboratory Settings

- Demonstrate basic lab techniques such as urine analysis, peripheral smear preparation, and blood cell counting.
- Handle and process pathological specimens appropriately in dialysis and hospital labs.

CO6. Interpret Pathological Reports Relevant to Dialysis Care

- Read and interpret pathology reports for biopsy, hematology, and urinalysis.
- Assist the nephrologist or clinician in correlating pathology findings with patient symptoms.

CO7. Promote Interdisciplinary Understanding

- Collaborate with pathology labs and nephrology departments to optimize patient care.
- Understand the role of pathology in early detection and prevention of complications in dialysis patients.



Module 1:

8 hours

Introduction to Pathology

- Definition and scope of pathology
- Classification: General & Systemic Pathology
- Terminologies used in pathology
- Types of specimens: Blood, urine, tissues, etc.

Module 2:

12 hours

General Pathology

A. Cell Injury and Adaptation

- Reversible and irreversible cell injury
- Necrosis and apoptosis
- Cellular adaptation: Hypertrophy, hyperplasia, atrophy, metaplasia

B. Inflammation and Repair

- Acute and chronic inflammation
- Cellular components and mediators
- Process of wound healing
- Granulation tissue and fibrosis

C. Hemodynamic Disorders

- Edema, hyperaemia, congestion
- Haemorrhage, thrombosis, embolism
- Shock (hypovolemic, cardiogenic, septic)

D. Disorders of Immunity

- Basic concepts of immune system
- Hypersensitivity reactions (Types I–IV)
- Autoimmune diseases (basics)
- Transplant rejection



Module 3:

10 hours

Haematology (Relevant to Dialysis)

- Normal haematopoiesis
- Anaemia: Classification, causes, morphology
- Leukemia and lymphoma – brief overview
- Coagulation disorders
- Blood indices and peripheral smear

Module 4:

10 hours

Systemic Pathology (Relevant to Renal Dialysis)

A. Kidney Pathology

- Glomerulonephritis: Acute & Chronic
- Nephrotic and nephritic syndrome
- Diabetic nephropathy
- Acute kidney injury (AKI)
- Chronic kidney disease (CKD)
- Polycystic kidney disease
- Renal cell carcinoma

B. Urinary Tract

- Urinary tract infections (UTI)
- Obstructive uropathy
- Bladder carcinoma
- Renal stones (nephrolithiasis)



Semester		Third							
Course Code	Course Type	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits
			L*	T*	P	Internal	External		
BDT-303-24	Core Theory	Applied Microbiology	3	1	0	40	60	100	4

Course Outcomes: - At the end of the Course, the student will be able to:

CO1. Understand Basic Microbial Concepts

Explain the classification, structure, and growth of bacteria, viruses, fungi, and parasites relevant to human health and dialysis care.

CO2. Apply Principles of Sterilization and Infection Control

Demonstrate knowledge of sterilization, disinfection, aseptic techniques, and infection control protocols essential in dialysis units.

CO3. Identify Common Microbial Pathogens in Dialysis Settings

Recognize the role of microorganisms like *Pseudomonas*, *Staphylococcus*, *Candida*, and *Hepatitis viruses* in causing dialysis-related infections.

CO4. Understand the Basics of Immunology

Describe the immune system's role in infection, immunity, and hypersensitivity, with emphasis on infections in immunocompromised dialysis patients.

CO5. Perform Basic Microbiological Techniques

Conduct fundamental lab procedures such as staining, specimen collection, culture, and sensitivity testing used in infection diagnosis.

CO6. Promote Safe and Hygienic Practices in Dialysis Units

Implement universal precautions and water quality monitoring to minimize infection risk in haemodialysis and peritoneal dialysis patients.



Module 1: **6 hours**

Introduction to Microbiology

- History and scope of microbiology
- Classification of microorganisms: bacteria, viruses, fungi, protozoa
- Structure and morphology of bacteria
- Growth and reproduction of microbes

Module 2: **6 hours**

Sterilization and Disinfection

- Principles and methods of sterilization: autoclaving, dry heat, filtration
- Disinfection methods used in dialysis units (chemical and physical)
- Aseptic techniques
- Biomedical waste management and infection control practices

Module 3: **8 hours**

Bacteriology

- Classification of medically important bacteria
- Gram-positive and gram-negative organisms
- Bacterial pathogenesis and toxins
- Common bacterial infections in dialysis patients MRSA, VRE, Pseudomonas, E. coli
- Nosocomial infections

Module 4: **8 hours**

Virology

- General properties of viruses
- Hepatitis viruses (B and C) – diagnosis, transmission, prevention
- HIV – structure, replication, transmission, prevention
- Vaccines and universal precautions for blood-borne viruses

Module 5: **8 hours**

Microbial Infections in Dialysis Setting

- Infection control in haemodialysis centres
- Central line and catheter-related infections



- Biofilm formation and prevention
- Water-borne pathogens in dialysis machines (e.g., Pseudomonas, Mycobacteria)
- Monitoring and testing of dialysis water quality

Module 6:

6 hours

Diagnostic Microbiology

- Collection, transport, and processing of clinical specimens (blood, urine, pus, swabs)
- Staining techniques: Gram stain, Ziehl-Neelsen stain
- Culture media and identification of common pathogens
- Antimicrobial sensitivity testing (Kirby-Bauer method)



Semester		Third							
Course Code	Course Type	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits
			L*	T*	P	Internal	External		
BDT-304-24	Core Theory	Basic Concepts of Renal Diseases	3	1	0	40	60	100	4

Course Outcomes: - At the end of the Course, the student will be able to:

CO1. Understand Basic Concepts of Renal Disease

Explain the classification Structure and function of kidneys and nephrons

CO2. Apply Principles of Concepts of Renal Disease

Demonstrate knowledge of acute kidney status in dialysis units.

Module 1:

10 hours

Anatomy & Physiology of the Kidneys

- Structure and function of kidneys and nephrons
- Glomerular filtration and urine formation

Introduction to Renal Pathology:

- Signs, symptoms, and classification of renal diseases Diagnostic tests: urinalysis, serum creatinine, GFR

Module 2:

10 hours

Acute Kidney Injury (AKI)

- Definition and causes (prerenal, renal, postrenal)
- Clinical features and diagnosis
- Management of AKI
- Prevention and recovery phases

Module 3:

8 hours



Chronic Kidney Disease (CKD)

- Definition and staging of CKD
- Causes: diabetes, hypertension, glomerulonephritis
- Clinical manifestations and complications
- Diagnosis and monitoring
- Progression and prevention strategies

Module 4:

8 hours

Glomerular and Tubular Disorders

- Nephrotic and nephritic syndromes , polycystic kidney disease, interstitial nephritis

Urinary Tract Infections and Obstructions

- Cystitis, pyelonephritis, kidney stones, obstructive uropathy

Module 5:

6 hours

Renal Replacement Therapy Overview

- Indications for dialysis
- Basics of hemodialysis and peritoneal dialysis
- Kidney transplantation: a brief overview

Special Considerations:

- Pediatric and geriatric renal conditions



Semester		Third							
Course Code	Course Type	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits
			L*	T*	P	Internal	External		
BDT-305-24	Core Practical	General Pharmacology	0	0	4	60	40	100	2

List of Experiments:

1. Prescription Reading and Interpretation

- Understanding parts of a prescription
- Identifying drugs, dosages, frequency, and route
- Recognizing common abbreviations used in prescriptions

2. Drug Classification and Identification

- Spotting and identifying common drugs used in dialysis units:
- Understanding trade names vs. generic names

3. Routes and Techniques of Drug Administration (Demonstration Only)

- Oral drug administration
- Intravenous (IV), intramuscular (IM), and subcutaneous (SC) techniques (via models or charts)
- Use of infusion pumps and syringes in dialysis setup
- Injection techniques (no actual administration on humans)

4. Dosage Calculations

- Calculating dosages based on weight (mg/kg)
- Dialysis-based drug dose adjustments
- Conversion of units (mL to mg, etc.)

6. Safe Handling of Drugs

- Storage conditions for sensitive drugs (e.g., erythropoietin, insulin)
- Precautions while handling cytotoxic or nephrotoxic drugs



- Expiry date checking and labeling

Recommended Books

- Essentials of Medical Pharmacology – K.D. Tripathi
- Textbook of Pharmacology – Satoskar & Bhandarkar
- Pharmacology for Nurses and Allied Health – Padmaja Udaykumar
- Manual of Pharmacology for Allied Health Sciences – Dr. S.L. Bhatia or local university manuals



Semester		Third							
Course Code	Course Type	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits
			L*	T*	P	Internal	External		
BDT-306-24	Core Practical	Applied Pathology	0	0	4	60	40	100	2

List of Experiments:

1. Examination of blood smear
2. Reticulocyte count, ESR, PCV, haemoglobin estimation
3. Urine analysis: physical, chemical, microscopic
4. Study of biopsy slides: kidney, bladder, bone marrow
5. Handling and transport of pathology specimens
6. Understanding pathology lab reports

Recommended Books

1. Textbook of Pathology – **Harsh Mohan**
2. Essentials of Pathology – **Harsh Mohan (Short Version)**
3. Robbins Basic Pathology – **Kumar, Abbas, Aster**
4. Practical Pathology for Allied Health Sciences – **Dr. Ramadas Nayak / Other Local Authors**
5. Pathology Made Easy – **M. Chandrasekar**



Semester		Third							
Course Code	Course Type	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits
			L*	T*	P	Internal	External		
BDT-307-24	Core Practical	Applied Microbiology	0	0	4	60	40	100	2

List of Experiments:

- Laboratory Safety and Aseptic Techniques
 - Rules of microbiology lab safety
 - Hand hygiene and PPE (gloves, gown, mask)
 - Aseptic transfer techniques
 - Biomedical waste segregation and disposal
- Staining Techniques
 - Gram Staining – **identification of gram-positive and gram-negative bacteria**
 - Acid-Fast Staining (Ziehl-Neelsen) – **identification of Mycobacterium tuberculosis**
 - Simple Staining – using basic dyes to visualize bacteria
- Culture Techniques
 - Preparation of culture media: Nutrient agar, Blood agar, MacConkey agar
 - Inoculation techniques: streaking and spreading
 - Identification of contaminants in dialysis environments (e.g., swab cultures)
- Specimen Collection and Transport
 - Techniques for collecting samples: urine, blood, pus, swabs
 - Proper labelling, handling, and transportation of samples
 - Use of sterile containers and transport media
- Infection Control in Dialysis Unit (Demonstration/Observation)
 - Surface swabbing for microbial analysis
 - Dialysis water sampling for microbial quality (RO water and dialysate)
 - Disinfectant efficacy testing (if applicable)

Recommended Books

- Ananthanarayan and Paniker's Textbook of Microbiology by R. Ananthanarayan & C.K. Jayaram Paniker
- Essentials of Medical Microbiology by Apurba S. Sastry
- Textbook of Microbiology for Nurses and Allied Health Sciences by C.P. Baveja
- Textbook of Microbiology by Surinder Kumar



5. Practical Manual of Microbiology for Allied Health Sciences (University Manuals or local publisher)
6. Medical Microbiology by Prescott, Harley, Klein (International Reference)



Semester		Third							
Course Code	Course Type	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits
			L*	T*	P	Internal	External		
BDT-308-24	Core Practical	Basic Concepts of Renal Diseases	0	0	4	60	40	100	2

List of Experiments

1. Urine Analysis

- Physical examination: color, appearance, specific gravity, volume
- Chemical tests:
 - Protein (heat and acetic acid test, sulfosalicylic acid test)
 - Glucose (Benedict's test)
 - Ketones (Rothera's test)
 - Blood (benzidine or dipstick)
- Microscopic examination of urinary sediments:
 - RBCs, WBCs, casts, crystals, epithelial cells, bacteria

2. Renal Function Tests (Demonstration/Interpretation)

- Serum urea and creatinine
- GFR estimation (e.g., Cockcroft-Gault formula – calculation based)
- Uric acid, electrolytes (Na⁺, K⁺, Cl⁻), calcium, phosphate
- BUN: Creatinine ratio interpretation

3. Case Study Discussions (Chart Work / Observation)

- Interpretation of lab reports of AKI and CKD patients
- Differentiation of nephrotic vs. nephritic syndrome



- Recognizing common signs and symptoms in renal disease

4. Urine Collection Techniques

- Midstream clean-catch technique
- 24-hour urine collection for protein estimation (theoretical/demonstration)

5. Observation in Nephrology/Dialysis Unit (if included)

- Observation of patient preparation for dialysis
- Chart review: urine output, edema, blood pressure, creatinine levels
- Discussion with healthcare professionals on management of CKD
- Instruments and Equipment Familiarization (Demonstration)
 - Urometer, dipsticks, centrifuge for urine microscopy
 - Laboratory report formats and normal ranges

Suggested Books:

1. Manual of Nephrology

Author: George D. Brenner

2. Clinical Nephrology for Allied Health Sciences

Author: University-specific or local authors (e.g., RGUHS manual)

3. Essentials of Nephrology

Author: S.K. Agarwal

4. Textbook of Renal Diseases and Dialysis

Author: Mohan Ram

5. Textbook of Medical Physiology (Kidney Chapters)

Author: Guyton and Hall / A.K. Jain

6. Davidson's Principles and Practice of Medicine (Renal System Chapters) Standard reference for clinical features, diagnosis, and management of renal diseases



Semester		Third							
Course Code	Course Type	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits
			L*	T*	P	Internal	External		
BDT-309-24	Ability Enhancement Compulsory Course (AECC)	Computer Applications	2	0	0	40	60	100	1

Course Outcomes:

- CO1: Illustrate Introduction, characteristics of computer, block diagram of computer, generations of computer, computer languages.
- CO2: Categorize Storage Devices: Sequential and direct access devices, magnetic tape, magnetic disk, optical disk, mass storage devices.
- CO3: Get detailed information about Introduction of Operating System: introduction, operating system concepts, types of operating system.
- CO4: Internet and its Applications: definition, brief history, basic services (E Mail, File Transfer).
- CO5: Prioritize Application of Computers in clinical/ healthcare system.

Module 1:

11 hours

Introduction to computer: Introduction, characteristics of computer, block diagram of computer, generations of computer, computer languages.

Input output devices: Input devices (keyboard, point and draw devices, data scanning devices, digitizer, electronic card reader, voice recognition devices, vision input devices), output devices (monitors, pointers, plotters, screen image projector, voice response systems).

Processor and memory: The Central Processing Unit (CPU), main memory.

Module 2:

10 hours

Storage Devices: Sequential and direct access devices, magnetic tape, magnetic disk, optical disk, mass storage devices.

Introduction of windows: History, features, desktop, taskbar, icons on the desktop, operation with folder, creating shortcuts, operation with windows (opening, closing, moving, resizing, minimizing and maximizing, etc.).



Module 3:**11 hours**

Introduction to MS Word: introduction, components of a word window, creating, opening and inserting files, editing a document file, page setting and formatting the text, saving the document, spell checking, printing the document file, creating and editing of table, mail merge.

Introduction to Excel: introduction, about worksheet, entering information, saving workbooks and formatting, printing the worksheet, creating graphs.

Introduction to powerpoint: introduction, creating and manipulating present ation, views, formatting and enhancing text, slide with graphs.

Module 4:**12 hours**

Introduction of Operating System: introduction, operating system concepts, types of operating system.

Computer networks: introduction, types of network (LAN, MAN, WAN, Internet, Intranet), network topological (star, ring, bus, mesh, tree, hybrid), components of network.

Internet and its Applications: definition, brief history, basic services (E Mail, File Transfer Protocol, telnet, the World Wide Web (WWW)), WWW browsers, use of the internet.

Application of Computers in clinical settings.

Recommended Books:

1. Banzhaf, W., Nordin, P., Keller, R. E., & Francone, F. D. (1998) Genetic programming: an introduction: on the automatic evolution of computer programs and its applications. Morgan Kaufmann Publishers Inc.
2. Schneider, G. M., & Gersting, J. (2018) Invitation to computer science Cengage Learning.
3. Goel, A. (2010). Computer fundamentals. Pearson Education India.
4. Dandamudi, S. P. (2003). Fundamentals of computer organization and design (Vol. 7). New York: Springer.



SEMESTER-IV



Semester		Fourth							
Course Code	Course Type	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits
			L*	T*	P	Internal	External		
BDT-401-24	Core Theory	Haemodialysis - I	3	1	0	40	60	100	4

Course Outcomes:

- CO1: Understand principles and history of haemodialysis.
- CO2: Identify components and types of dialyzers.
- CO3: Comprehend vascular access types and management.
- CO4: Explain dialysis prescriptions and patient assessment.
- CO5: Discuss dialysis adequacy and complications.

Module 1:

6 hours

Introduction and Principles

- History and evolution
- Physiology of dialysis

Module 2:

8 hours

Dialyzers and Tubing

- Types of dialyzers
- Priming and reprocessing

Module 3:

8 hours

Vascular Access

- AV fistula, grafts, catheters
- Access care and complications

Module 4:

8 hours

Dialysis Prescription

- Clearance, ultrafiltration



- Frequency and duration

Module 5:

8 hours

Monitoring and Adequacy

- Vital parameters
- KT/V, URR

Module 6:

6 hours

Complications and Management (6 hrs)

- Hypotension, cramps
- Air embolism, clotting

Recommended Books:

- Handbook of Dialysis – Daugirdas
- Core Curriculum for Nephrology Nurses – ANNA
- Manual of Clinical Dialysis – Singri & Shah



Semester		Fourth							
Course Code	Course Type	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits
			L*	T*	P	Internal	External		
BDT-402-24	Core Theory	Peritoneal Dialysis	3	1	0	40	60	100	4

Course Outcomes:

- CO1: Understand peritoneal dialysis physiology.
- CO2: Explain types: CAPD, APD.
- CO3: Understand catheter placement and care.
- CO4: Manage PD solutions, exchanges, and monitoring.
- CO5: Identify complications and infection control.

Module 1:

6 hours

Introduction to PD

- Indications and principles
- Peritoneal membrane function

Module 2:

8 hours

Modalities and Techniques (8 hrs)

- CAPD and APD techniques
- Cyclor use and programming

Module 3:

6 hours

Catheter Insertion and Care

- Types and placement
- Exit-site care

Module 4:

8 hours

Dialysate and Exchanges



- Solutions and concentrations
- Manual and automated exchange

Module 5:

6 hours

Monitoring and Adequacy (6 hrs)

- UF, Kt/V for PD
- Lab and fluid balance

Module 6:

6 hours

Complications and Prevention

- Peritonitis, exit-site infections
- Hernia, ultrafiltration failure

Recommended Books:

- Peritoneal Dialysis Handbook – ISPD
- Clinical PD Guide – Khanna & Krediet



Semester		Fourth							
Course Code	Course Type	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits
			L*	T*	P	Internal	External		
BDT-403-24	Core Theory	Medical Disorders and Intensive Care	3	1	0	40	60	100	4

Course Outcomes:

- CO1: Recognize key systemic disorders.
- CO2: Understand ICU protocols and monitoring.
- CO3: Manage dialysis in critically ill patients.
- CO4: Coordinate with ICU team and handle emergencies.

Module 1:

6 hours

Overview of ICU (6 hrs)

- ICU environment
- Monitoring tools

Module 2:

8 hours

Common Medical Disorders

- Diabetes, hypertension, cardiac diseases
- Fluid and electrolyte imbalances

Module 3:

6 hours

Infections and Antibiotic Use

- Sepsis, COVID-19
- Drug resistance and stewardship

Module 4:

8 hours

Dialysis in ICU



- CRRT and SLED
- Patient preparation and monitoring

Module 5:

6 hours

Emergency Protocols

- CPR, defibrillation
- Anaphylaxis, shock

Module 6:

6 hours

Communication and Ethics

- Handover and documentation
- End-of-life care

Recommended Books:

- Oxford Textbook of Critical Care
- Handbook of ICU Care – Irwin & Rippe



Semester		Fourth							
Course Code	Course Type	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits
			L*	T*	P	Internal	External		
BDT-404-24	Core Theory	Basics of Renal Dialysis Technology	3	1	0	40	60	100	4

Course Outcomes:

- CO1: Understand basic renal physiology and pathology.
- CO2: Describe water treatment and dialysate preparation.
- CO3: Understand infection control protocols in dialysis.
- CO4: Learn dialysis machine operation basics.
- CO5: Understand patient assessment and basic care protocols.

Module 1:

6 hours

Renal Anatomy and Physiology

- Nephron structure and function
- Renal function tests

Module 2:

8 hours

Introduction to Dialysis Machines

- Parts and functions
- Pre and post-dialysis checks

Module 3:

8 hours

Water Treatment System

- RO systems, pre-treatment
- Monitoring water quality

Module 4:

6 hours



Dialysate Preparation

- Acid and bicarbonate mixing
- Safety protocols

Module 5:

6 hours

Infection Control

- Hand hygiene, disinfection
- Bio-medical waste segregation

Module 5:

8 hours

Patient Interaction and Assessment

- Patient ID verification
- Consent and documentation

Recommended Books:

- Handbook of Dialysis Technology – Nissenson
- Manual on Water Treatment – ISN
- Infection Control Manual – CDC Guidelines



Semester		Fourth							
Course Code	Course Type	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits
			L*	T*	P	Internal	External		
BDT-405-24	Core Practical	Haemodialysis	0	0	4	60	40	100	2

Practical Activities:

- Dialyzer inspection and reprocessing
- Cannulation of AV fistula using dummy arm
- Machine priming and connection to circuit
- Setting blood flow and dialysate parameters
- Monitoring patient vitals during dialysis
- Handling alarms and corrective actions
- Documentation in dialysis chart
- Closure and disinfection post dialysis

Manuals:

- Practical Guide to Hemodialysis – Kher & Mattoo
- ANNA Procedure Manual.



Semester		Fourth							
Course Code	Course Type	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits
			L*	T*	P	Internal	External		
BDT-406-24	Core Practical	Peritoneal Dialysis	0	0	4	60	40	100	2

Practical Activities:

- Identification of PD equipment
- Demonstration of manual exchange procedure
- Connecting and disconnecting PD sets
- Preparation of PD solutions
- Recording ultrafiltrate and fluid balance
- Hand hygiene and infection control in PD
- Exit-site dressing and catheter care
- Complication simulation and management

Manuals:

- ISPD Practice Recommendations
- Practical PD Training Manual



Semester		Fourth							
Course Code	Course Type	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits
			L*	T*	P	Internal	External		
BDT-407-24	Core Practical	Medical Disorders and Intensive Care	0	0	4	60	40	100	2

Practical Activities:

- Basic life support (BLS) and CPR training
- Use of ICU monitoring tools: ECG, SPO2, BP
- Setting up dialysis in ICU setup
- CRRT circuit overview and demo
- Patient transfer and documentation
- Emergency trolley setup
- Fluid balance charting
- Role play on team communication in ICU

Manuals:

- ICU Skills Manual – Elsevier
- CRRT Procedure Guide – Fresenius



Semester		Fourth							
Course Code	Course Type	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits
			L*	T*	P	Internal	External		
BDT-408-24	Core Practical	Basics of Renal Dialysis Technology	0	0	4	60	40	100	2

Practical Activities:

- Identification of dialysis machine components
- RO system operation and maintenance
- Preparation of dialysate
- Performing basic machine checks
- Recording patient vitals
- Hand hygiene and PPE use
- Patient admission and documentation
- Biomedical waste handling and disposal

Manuals:

- Dialysis Technician Training Manual
- WHO Hand Hygiene Guidelines
- ISN Water Quality Manual



Semester		Fourth							
Course Code	Course Type	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits
			L*	T*	P	Internal	External		
BDT-409-24	Core Theory	Biomedical Waste Management	2	0	0	40	60	100	1

Course Outcomes:

- CO1: Identify types and categories of biomedical waste.
- CO2: Understand segregation, transport, and disposal.
- CO3: Apply color coding rules for waste handling.
- CO4: Understand hazards and safety regulations.

Module 1:

4 hours

Introduction to BMW

- Definitions and classification
- Sources and legislation

Module 2:

4 hours

Segregation and Collection

- Color coding
- Containers and labelling

Module 3:

4 hours

Storage, Transport and Disposal

- Incineration, autoclaving
- Deep burial and landfills

Module 4:

4 hours

Safety and Training

- PPE, spill management
- Role of healthcare workers



Recommended Books:

- BMW Rules and Guidelines – MoEFCC India
- Biomedical Waste Management Text – Sharma & Kaushal
- CPCB Manuals on BMW



Semester - V

Course Code	Course Type	Course Title	Load Allocations			Marks Distribution		Total Marks	Credits
			L*	T*	P	Internal	External		
BDT-501-24	Core Theory	Haemodialysis - II	3	1	0	40	60	100	4
BDT-502-24	Core Theory	Applied Dialysis Technology - I	3	1	0	40	60	100	4
BDT-503-24	Core Theory	Advance Dialysis Technology -I	3	1	0	40	60	100	4
BDT-504-24	Core Theory	Recent Advances in Dialysis Technology	3	1	0	40	60	100	4
BDT-505-24	Core Practical/ Laboratory	Haemodialysis - II - Practical	0	0	4	60	40	100	2
BDT-506-24	Core Practical/ Laboratory	Applied Dialysis Technology – I - Practical	0	0	4	60	40	100	2
BDT-507-24	Core Practical/ Laboratory	Advance Dialysis Technology -I - Practical	0	0	4	60	40	100	2
BDT-508-24	Core Practical/ Laboratory	Recent Advances in Dialysis Technology - Practical	0	0	4	60	40	100	2
BDT-509-24	Ability Enhancement Compulsory Course-(AECC)	First Aid	2	0	0	40	60	100	1
		TOTAL	14	04	16	440	460	900	25

Semester		Fifth					
Course Code	Course Type	Course Title	Load Allocation	Marks Distribution		Total Marks	Credits
BDT-501-24	Core Theory	Haemodialysis - II	L T P	Internal	External	100	4
			3 1 0	40	60		

Course Outcomes (COs)

Upon successful completion of this course, the student will be able to:

CO1: Explain the principles of advanced haemodialysis techniques, dialysis kinetics, and factors affecting dialysis adequacy.

CO2: Demonstrate knowledge of haemodialysis machine components, dialysate delivery systems, water treatment systems, and their quality assurance procedures.

CO3: Identify and manage common and life-threatening complications occurring before, during, and after haemodialysis using evidence-based practices.

CO4: Apply infection prevention, patient safety measures, anticoagulation protocols, and quality assurance standards in haemodialysis units.

CO5: Interpret laboratory investigations and clinical parameters to evaluate dialysis effectiveness and modify treatment plans accordingly.

CO6: Describe special haemodialysis procedures and dialysis management in pediatric, geriatric, critically ill, and special patient populations.

Module I: Advanced Haemodialysis Principles and Dialysis Adequacy (**Hours: 10**)

1.1 Dialysis kinetics

- Diffusion, convection and ultrafiltration
- Solute transport mechanisms
- Factors affecting solute clearance

1.2 Advanced dialysis adequacy

- Single-pool and equilibrated Kt/V
- Urea Reduction Ratio (URR)
- Online clearance monitoring

1.3 Dialysis prescription optimization

- Blood flow rate (QB)
- Dialysate flow rate (QD)
- Treatment time optimization
- Ultrafiltration profiling
- Sodium profiling

1.4 Clinical interpretation of dialysis adequacy reports

Module II: Haemodialysis Machines, Water Treatment and Dialysate Systems (**Hours: 10**)

2.1 Advanced haemodialysis machine components

- Blood pump
- Heparin pump
- Air detector
- Venous pressure monitor
- Conductivity monitor
- Temperature control system

2.2 Dialysate delivery system

- Preparation of dialysate
- Acid and bicarbonate concentrates
- Conductivity monitoring
- Temperature monitoring

2.3 Water treatment system

- Pretreatment components
- Reverse osmosis (RO) system
- Deionization

- Ultraviolet disinfection
- Endotoxin control

2.4 Water quality standards

- Chemical contaminants
- Microbiological standards
- AAMI and ISO guidelines
- Routine maintenance and quality control

Module III: Anticoagulation, Complications and Emergency Management (**Hours: 10**)

3.1 Anticoagulation during haemodialysis

- Heparin protocols
- Low molecular weight heparin
- Regional citrate anticoagulation
- Heparin-free dialysis

3.2 Acute dialysis complications

- Dialysis disequilibrium syndrome
- Hemolysis
- Pyrogen reactions
- Allergic reactions
- Air embolism
- Blood leaks

3.3 Emergency management

- Cardiac arrest during dialysis
- Hypotensive emergencies
- Hyperkalemia
- Dialyzer reactions
- Machine alarms and troubleshooting

Module IV: Infection Control, Patient Safety and Quality Assurance (**Hours: 8**)

4.1 Infection prevention in dialysis units

- Standard precautions
- Hand hygiene
- Personal protective equipment
- Biomedical waste management

4.2 Prevention of dialysis-related infections

- Vascular access infections
- Bloodstream infections
- Blood-borne pathogens
- Isolation precautions

4.3 Patient safety

- Patient identification
- Medication safety
- Documentation standards
- Incident reporting

4.4 Quality assurance

- Clinical audit
- Performance indicators
- Equipment maintenance schedules
- National and international quality standards

Module V: Special Haemodialysis Procedures and Special Patient Populations (**Hours: 10**)

5.1 Special haemodialysis therapies

- Sustained Low Efficiency Dialysis (SLED)
- Hemodiafiltration (HDF)
- Isolated ultrafiltration
- Sequential dialysis

5.2 Dialysis in special populations

- Pediatric haemodialysis
- Geriatric patients
- Pregnancy and dialysis
- Patients with diabetes mellitus
- Hepatitis B, Hepatitis C and HIV-positive patients

5.3 Nutritional considerations

- Protein requirements
- Fluid management
- Electrolyte management
- Dietary counselling

5.4 Patient education and rehabilitation

- Lifestyle modification
- Medication adherence
- Home care after dialysis
- Psychosocial support

Recommended Books

1. Handbook of Dialysis, 6th Edition, Wolters Kluwer.
2. Replacement of Renal Function by Dialysis, Springer.
3. Core Curriculum for Nephrology Nursing.
4. Clinical Dialysis.
5. Oxford Handbook of Dialysis, Oxford University Press.
6. Comprehensive Clinical Nephrology, Elsevier.

Semester		Fifth				
Course Code	Course Type	Course Title	Load Allocation	Marks Distribution	Total Marks	Credits
BDT-502-24	Core Theory	Applied Dialysis Technology - I	L T P	Internal External	100	4
			3 1 0	40 60		

Course Outcomes (COs)

Upon successful completion of this course, the student will be able to:

CO1: Explain the principles, components, and operational aspects of dialysis equipment and supporting technologies used in haemodialysis units.

CO2: Describe the functioning, maintenance, calibration, and quality assurance of dialysis machines and water treatment systems.

CO3: Demonstrate knowledge of dialysis consumables, dialysate preparation, biomedical instrumentation, and infection control practices used in dialysis technology.

CO4: Apply principles of equipment safety, troubleshooting, preventive maintenance, and biomedical waste management in dialysis units.

CO5: Interpret machine alarms, technical parameters, and water quality reports to ensure safe and effective dialysis treatment.

CO6: Understand recent advances and emerging technologies in dialysis systems, patient monitoring, and digital healthcare applications in nephrology.

Course Content

Module I: Fundamentals of Applied Dialysis Technology

(Hours: 8)

1.1 Introduction to Applied Dialysis Technology

- Evolution of dialysis technology
- Scope and applications
- Role of dialysis technologist

1.2 Principles of dialysis equipment

- Fluid dynamics
- Pressure monitoring
- Blood flow principles
- Dialysate flow principles

1.3 Biomedical instrumentation in dialysis

- Pressure transducers
- Flow sensors
- Conductivity sensors
- Temperature sensors
- Air detection systems

1.4 Safety standards in dialysis technology

Module II: Haemodialysis Machine Technology (**Hours: 10**)

2.1 Components of haemodialysis machine

- Blood pump
- Heparin pump
- Ultrafiltration controller
- Air detector
- Venous pressure monitor
- Arterial pressure monitor

2.2 Dialysate delivery system

- Mixing system
- Conductivity monitoring
- Temperature regulation
- Bicarbonate proportioning

2.3 Machine calibration

- Functional testing
- Performance verification
- Preventive maintenance

2.4 Machine alarms and troubleshooting

- Pressure alarms
- Air alarms
- Blood leak alarms
- Conductivity alarms
- Temperature alarms

Module III: Water Treatment and Dialysate Technology (**Hours: 10**)

3.1 Water treatment system

- Source water evaluation
- Pretreatment components
- Water softener
- Activated carbon filters
- Sediment filters
- Reverse osmosis (RO) system

3.2 Distribution systems

- Water storage tanks
- Distribution loop
- Disinfection methods

3.3 Dialysate technology

- Acid concentrate
- Bicarbonate concentrate
- Dialysate preparation
- Online monitoring

3.4 Water quality monitoring

- Chemical contaminants
- Microbiological monitoring
- Endotoxin testing
- AAMI and ISO standards

Module IV: Dialysis Consumables, Sterilization and Infection Control (**Hours: 10**)

4.1 Dialysis consumables

- Dialyzers
- Blood tubing sets
- Fistula needles
- Catheters
- Syringes and accessories

4.2 Sterilization methods

- Steam sterilization
- Ethylene oxide sterilization
- Gamma radiation
- Chemical disinfection

4.3 Infection prevention

- Hand hygiene
- Personal protective equipment (PPE)
- Biomedical waste management
- Disinfection of dialysis equipment

4.4 Quality assurance of consumables

- Storage
- Expiry management
- Traceability
- Inventory control

Module V: Preventive Maintenance, Quality Assurance and Emerging Technologies (**Hours: 10**)

5.1 Preventive maintenance

- Daily maintenance
- Weekly maintenance
- Monthly maintenance
- Annual servicing

5.2 Quality assurance

- Equipment validation
- Calibration records
- Documentation
- Equipment audit

5.3 Digital technology in dialysis

- Electronic medical records (EMR)
- Machine data management
- Remote monitoring
- Tele-nephrology

5.4 Emerging technologies

- Online Hemodiafiltration (HDF)
- Wearable dialysis devices
- Portable dialysis machines
- Artificial kidney research
- Future trends in dialysis technology

Recommended Books

1. Handbook of Dialysis, 6th Edition, Wolters Kluwer.
2. Clinical Dialysis.
3. Replacement of Renal Function by Dialysis, Springer.
4. Core Curriculum for Nephrology Nursing.
5. Comprehensive Clinical Nephrology, Elsevier.
6. Dialysis Therapy, Elsevier.

Semester		Fifth				
Course Code	Course Type	Course Title	Load Allocation	Marks Distribution	Total Marks	Credits
BDT-503-24	Core Theory	Advance Dialysis Technology -I	L T P	Internal External	100	4
			3 1 0	40 60		

Course Outcomes (COs)

Upon successful completion of this course, the student will be able to:

CO1: Explain the principles, indications, and clinical applications of advanced renal replacement therapies (RRT).

CO2: Differentiate various continuous and hybrid dialysis modalities used in critically ill patients.

CO3: Interpret clinical, laboratory, and hemodynamic parameters for selecting appropriate dialysis modalities in complex clinical situations.

CO4: Describe advanced extracorporeal blood purification techniques used in nephrology and critical care.

CO5: Apply evidence-based principles in dialysis quality improvement, clinical research, and patient-centered care.

CO6: Discuss recent innovations, artificial kidney technologies, and future developments in dialysis therapy.

Course Content

Module I: Advanced Renal Replacement Therapies

Hours: 10

1.1 Overview of advanced renal replacement therapy (RRT)

- Classification of RRT modalities
- Selection of appropriate dialysis modality
- Timing of initiation and discontinuation of RRT

1.2 Hybrid dialysis therapies

- Sustained Low Efficiency Dialysis (SLED)
- Sustained Low Efficiency Daily Dialysis (SLEDD)
- Extended Daily Dialysis (EDD)

1.3 Hemodiafiltration (HDF)

- Principles
- Modes of HDF
- Clinical indications
- Advantages and limitations

1.4 Isolated Ultrafiltration

- Principles
- Clinical applications
- Patient selection

Module II: Continuous Renal Replacement Therapy (CRRT)

Hours: 10

2.1 Introduction to CRRT

- Principles and indications
- Advantages over intermittent haemodialysis

2.2 Types of CRRT

- Continuous Venovenous Hemofiltration (CVVH)
- Continuous Venovenous Hemodialysis (CVVHD)
- Continuous Venovenous Hemodiafiltration (CVVHDF)

- Slow Continuous Ultrafiltration (SCUF)

2.3 CRRT prescription

- Dose calculation
- Replacement fluids
- Fluid balance
- Anticoagulation strategies

2.4 Monitoring patients on CRRT

- Hemodynamic monitoring
- Electrolyte monitoring
- Acid-base assessment
- Nutritional considerations

Module III: Extracorporeal Blood Purification Therapies

Hours: 10

3.1 Therapeutic Plasma Exchange (TPE)

- Principles
- Clinical indications
- Replacement fluids
- Complications

3.2 Hemoperfusion

- Mechanism
- Adsorbent cartridges
- Poisoning and toxin removal
- Clinical applications

3.3 Immunoabsorption

- Principles
- Indications
- Advantages and limitations

3.4 Combined extracorporeal therapies

- Sequential therapies
- Multi-organ support systems
- Liver support systems (overview)

Module IV: Dialysis in Complex Clinical Conditions

Hours: 8

4.1 Acute Kidney Injury (AKI)

- KDIGO classification
- Dialysis indications
- Modality selection

4.2 Dialysis in intensive care unit (ICU)

- Septic shock
- Multi-organ dysfunction syndrome (MODS)
- Cardiorenal syndrome

4.3 Dialysis in special situations

- Drug overdose
- Tumor lysis syndrome
- Rhabdomyolysis
- Severe electrolyte disturbances

4.4 Ethical issues in dialysis

- Withdrawal of dialysis
- End-of-life care
- Shared decision-making

Module V: Research, Innovation and Future Directions in Dialysis

Hours: 10

5.1 Evidence-Based Dialysis Practice

- Clinical guidelines
- Interpretation of research evidence
- Outcome measures

5.2 Clinical research in dialysis

- Basics of clinical trials
- Dialysis registries
- Quality indicators
- Clinical audit

5.3 Artificial intelligence and digital health

- AI in dialysis prescription
- Predictive analytics
- Remote patient monitoring
- Wearable health technologies

5.4 Future innovations

- Wearable artificial kidney
- Implantable bioartificial kidney
- Nanotechnology in dialysis
- Precision medicine in nephrology

Recommended Books

1. Handbook of Dialysis, 6th Edition, Wolters Kluwer.
2. Replacement of Renal Function by Dialysis, Springer.
3. Critical Care Nephrology, Elsevier.
4. Comprehensive Clinical Nephrology, Elsevier.
5. Clinical Dialysis.
6. Evidence-Based Nephrology, Wiley-Blackwell.

Semester		Fifth				
Course Code	Course Type	Course Title	Load Allocation	Marks Distribution	Total Marks	Credits
BDT-504-24	Core Theory	Recent Advances in Dialysis Technology	L T P	Internal External	100	4
			3 1 0	40 60		

Course Outcomes (COs)

Upon successful completion of this course, the student will be able to:

CO1: Describe recent technological innovations and emerging trends in dialysis therapy and nephrology.

CO2: Explain the role of digital health, artificial intelligence, and smart technologies in improving dialysis outcomes.

CO3: Discuss advances in dialysis membranes, wearable devices, implantable artificial kidneys, and regenerative medicine.

CO4: Evaluate the application of precision medicine, biomarkers, and personalized dialysis strategies in patient care.

CO5: Understand the concepts of sustainability, green dialysis, and quality improvement initiatives in modern dialysis practice.

CO6: Critically appraise current research, international guidelines, and future developments in dialysis technology.

Course Content

Module I: Innovations in Dialysis Biomaterials and Membrane Technology

Hours: 10

1.1 Evolution of dialysis membrane technology

- High-flux membranes
- Medium cut-off (MCO) membranes
- High cut-off (HCO) membranes
- Protein-leaking membranes

1.2 Nanotechnology in dialysis

- Nanomaterials in membrane design
- Nano-filtration concepts
- Surface modification technologies

1.3 Biocompatible materials

- Bioactive membrane coatings
- Anti-thrombogenic surfaces
- Anti-inflammatory biomaterials

1.4 Future membrane development

- Smart membranes
- Self-cleaning membranes
- Biodegradable materials

Module II: Artificial Intelligence and Digital Healthcare in Dialysis

Hours: 10

2.1 Artificial Intelligence (AI) in nephrology

- Machine learning applications
- Predictive analytics
- Clinical decision support systems

2.2 Digital health technologies

- Tele-nephrology
- Tele-dialysis

- Remote patient monitoring
- Mobile health (mHealth) applications

2.3 Big data in dialysis

- Electronic dialysis records
- Clinical databases
- Predictive outcome models

2.4 Cybersecurity and data privacy

- Health information security
- Data protection
- Ethical considerations in digital healthcare

Module III: Regenerative Medicine and Next-Generation Renal Replacement

Hours: 10

3.1 Bioartificial kidney

- Design principles
- Current research
- Clinical challenges

3.2 Wearable and portable dialysis devices

- Wearable artificial kidney (WAK)
- Portable haemodialysis systems
- Portable peritoneal dialysis devices

3.3 Stem cell therapy in nephrology

- Stem cell biology
- Renal tissue regeneration
- Clinical applications

3.4 Tissue engineering and organ biofabrication

- 3D bioprinting
- Kidney organoids
- Xenotransplantation (overview)

Module IV: Precision Medicine and Emerging Diagnostic Technologies

Hours: 8

4.1 Precision nephrology

- Personalized dialysis prescription
- Pharmacogenomics
- Individualized patient management

4.2 Novel biomarkers

- Biomarkers of kidney injury
- Biomarkers of dialysis adequacy
- Biomarkers for cardiovascular risk

4.3 Point-of-care diagnostics

- Bedside laboratory technologies
- Continuous biochemical monitoring
- Wearable biosensors

4.4 Integration of diagnostics with dialysis care

Module V: Sustainable Dialysis and Future Perspectives

Hours: 10

5.1 Green dialysis

- Water conservation strategies
- Energy-efficient dialysis systems
- Waste reduction and recycling
- Environmentally sustainable dialysis practices

5.2 International innovations in dialysis

- Home-based dialysis technologies
- Community dialysis models
- Global advances in nephrology care

5.3 Current international guidelines

- KDIGO recommendations (overview)
- International Society of Nephrology initiatives
- Quality improvement programmes

5.4 Future directions

- Artificial intelligence-assisted autonomous dialysis
- Robotics in dialysis care
- Precision renal replacement therapy
- Future challenges and opportunities

Recommended Books

1. Handbook of Dialysis, 6th Edition, Wolters Kluwer.
2. Replacement of Renal Function by Dialysis, Springer.
3. Critical Care Nephrology, Elsevier.
4. Comprehensive Clinical Nephrology, Elsevier.
5. Artificial Organs.
6. Brenner and Rector's The Kidney, Elsevier.

Semester		Fifth				
Course Code	Course Type	Course Title	Load Allocation	Marks Distribution	Total Marks	Credits
BDT-505-24	Core Theory	Haemodialysis - II - Practical	L T P	Internal External	100	2
			0 0 4	60 40		

List of Practical Experiments

1. **Pre-dialysis Patient Assessment**
2. **Preparation and Operation of Haemodialysis Machine**
3. **Initiation and Monitoring of Haemodialysis**
4. **Monitoring Dialysis Adequacy**
5. **Assessment and Care of Vascular Access**
6. **Management of Intra-dialytic Complications**
7. **Anticoagulation Monitoring**
8. **Dialysis Documentation and Patient Counselling**
9. **Infection Prevention and Biomedical Waste Management**
10. **Case-based Clinical Evaluation**

Suggested Books

1. Handbook of Dialysis, 6th Edition, Wolters Kluwer.
2. Clinical Dialysis.
3. Replacement of Renal Function by Dialysis, Springer.
4. Core Curriculum for Nephrology Nursing.
5. Comprehensive Clinical Nephrology, Elsevier.
6. Oxford Handbook of Dialysis, Oxford University Press.

Semester		Fifth				
Course Code	Course Type	Course Title	Load Allocation	Marks Distribution	Total Marks	Credits
BDT-506-24	Core Theory	Applied Dialysis Technology – I - Practical	L T P	Internal External	100	2
			0 0 4	60 40		

List of Practical Experiments

1. Identification and Demonstration of Haemodialysis Machine Components
2. Machine Preparation, Functional Checks and Calibration
3. Preparation of Dialysate and Quality Assessment
4. Study and Demonstration of Water Treatment System
5. Water Quality Testing
6. Machine Alarm Identification and Troubleshooting
7. Preventive Maintenance of Dialysis Equipment
8. Sterilization and Handling of Dialysis Consumables
9. Infection Control and Biomedical Waste Management
10. Quality Assurance and Documentation in Dialysis Technology

Suggested Books

1. Handbook of Dialysis, 6th Edition, Wolters Kluwer.
2. Clinical Dialysis.
3. Replacement of Renal Function by Dialysis, Springer.
4. Comprehensive Clinical Nephrology, Elsevier.
5. Medical Instrumentation: Application and Design, Wiley.
6. Biomedical Instrumentation and Measurements, Pearson.

Semester		Fifth				
Course Code	Course Type	Course Title	Load Allocation	Marks Distribution	Total Marks	Credits
BDT-507-24	Core Theory	Advance Dialysis Technology -I - Practical	L T P	Internal External	100	2
			0 0 4	60 40		

List of Practical Experiments

1. Preparation and Demonstration of Continuous Renal Replacement Therapy (CRRT) System
2. Preparation of CRRT Prescription
3. Hemodiafiltration (HDF) Procedure
4. Therapeutic Plasma Exchange (TPE) Demonstration
5. Hemoperfusion Procedure (Demonstration)
6. Assessment of Critically Ill Patients Requiring Advanced Dialysis
7. Calculation and Interpretation of Clinical Parameters
8. Management of Complications During Advanced Renal Replacement Therapy
9. Case-Based Clinical Discussion
10. Journal Review and Evidence-Based Practice Presentation

Suggested Books

1. Handbook of Dialysis, 6th Edition, Wolters Kluwer.
2. Replacement of Renal Function by Dialysis, Springer.
3. Critical Care Nephrology, Elsevier.
4. Clinical Dialysis.
5. Comprehensive Clinical Nephrology, Elsevier.
6. Evidence-Based Nephrology, Wiley-Blackwell.

Semester		Fifth				
Course Code	Course Type	Course Title	Load Allocation	Marks Distribution	Total Marks	Credits
BDT-508-24	Core Theory	Recent Advances in Dialysis Technology - Practical	L T P	Internal External	100	2
			0 0 4	60 40		

List of Practical Experiments

1. **Demonstration of High-Flux and Advanced Dialyzer Membranes**
2. **Assessment of Online Hemodiafiltration (HDF) System**
3. **Digital Dialysis Data Interpretation**
4. **Remote Patient Monitoring and Tele-Nephrology (Demonstration)**
5. **Wearable and Portable Dialysis Technologies**
6. **Quality Improvement Audit in Dialysis Unit**
7. **Green Dialysis and Sustainability Assessment**
8. **Critical Appraisal of Recent Research Publications**
9. **Case-Based Application of Precision Dialysis**
10. **Seminar on Emerging Innovations in Dialysis Technology**

Suggested Books

1. Handbook of Dialysis, 6th Edition, Wolters Kluwer.
2. Replacement of Renal Function by Dialysis, Springer.
3. Critical Care Nephrology, Elsevier.
4. Comprehensive Clinical Nephrology, Elsevier.
5. Brenner and Rector's The Kidney, Elsevier.
6. Artificial Organs.

Semester		Fifth					
Course Code	Course Type	Course Title	Load Allocation	Marks Distribution	Total Marks	Credits	
BDT-509-24	Core Theory	First Aid	L T P	Internal External	100	1	
			2 0 0	40 60			

Course Outcomes (COs)

Upon successful completion of this course, the student will be able to:

CO1: Explain the principles, objectives, and legal aspects of first aid and emergency care.

CO2: Perform primary assessment and basic life support (BLS) for patients experiencing medical emergencies.

CO3: Provide appropriate first aid for common injuries, poisoning, burns, fractures, and environmental emergencies.

CO4: Demonstrate safe transportation, disaster preparedness, and emergency response techniques while ensuring patient safety.

Module I: Fundamentals of First Aid and Basic Life Support

Hours: 8

1.1 Introduction to First Aid

- Definition, aims, and scope
- Principles of first aid
- Responsibilities of a first aider
- Contents of a first aid kit

1.2 Emergency Assessment

- Scene safety
- Primary survey (ABCDE approach)
- Secondary survey
- Vital signs assessment

1.3 Basic Life Support (BLS)

- Chain of survival
- Adult, child, and infant CPR (overview)
- Airway management
- Recovery position
- Automated External Defibrillator (AED): introduction and indications

Module II: First Aid for Medical Emergencies

Hours: 8

2.1 Medical Emergencies

- Syncope (fainting)
- Seizures
- Shock
- Stroke
- Heart attack (myocardial infarction)

2.2 Respiratory Emergencies

- Choking
- Asthma attack
- Anaphylaxis
- Breathlessness

2.3 Diabetic Emergencies

- Hypoglycemia
- Hyperglycemia

2.4 Heat- and Cold-related Emergencies

- Heat exhaustion
- Heat stroke
- Hypothermia
- Frostbite (overview)

Module III: First Aid for Injuries and Poisoning

Hours: 8

3.1 Wound Management

- Types of wounds
- Control of bleeding
- Dressing and bandaging
- Prevention of infection

3.2 Musculoskeletal Injuries

- Sprains
- Strains
- Fractures
- Joint dislocations
- Splinting techniques (principles)

3.3 Burns and Electrical Injuries

- Thermal burns
- Chemical burns
- Electrical burns
- Eye injuries

3.4 Poisoning and Bites

- Poisoning by drugs and chemicals
- Food poisoning
- Snake bites
- Insect bites and stings
- Animal bites

Module IV: Disaster Management, Patient Transport and Medico-Legal Aspects

Hours: 8

4.1 Disaster Preparedness

- Types of disasters
- Triage principles
- Mass casualty management
- Role of healthcare professionals

4.2 Safe Patient Transportation

- Principles of lifting and moving patients
- Use of stretchers
- Immobilization techniques
- Spinal precautions

4.3 Medico-Legal and Ethical Considerations

- Consent in emergencies
- Documentation
- Confidentiality
- Good Samaritan principles
- Infection prevention during first aid

Recommended Books

1. First Aid Manual, Latest Edition.
2. Oxford Handbook of Emergency Medicine, Oxford University Press.
3. Nancy Caroline's Emergency Care in the Streets, Jones & Bartlett Learning.
4. Emergency Care and Transportation of the Sick and Injured, Jones & Bartlett Learning.
5. American Heart Association Guidelines for CPR and ECC, Latest Edition.
6. Davidson's Principles and Practice of Medicine, Elsevier (for medical emergency concepts).



Semester - VI

Course Code	Course Type	Course Title	Load Allocations			Marks Distribution		Total Marks	Credits
			L*	T*	P	Internal	External		
BDT-601-24	Core Theory	Applied Dialysis Technology - II	3	1	0	40	60	100	4
BDT-602-24	Core Theory	Advance Dialysis Technology -II	3	1	0	40	60	100	4
BDT-603-24	Core Theory	Dialysis in Special Situations	3	1	0	40	60	100	4
BDT-604-24	Core Theory	Research Methodology and Biostatistics	3	1	0	40	60	100	4
BDT-605-24	Core Practical/ Laboratory	Applied Dialysis Technology – II - Practical	0	0	4	60	40	100	2
BDT-606-24	Core Practical/ Laboratory	Advance Dialysis Technology -II - Practical	0	0	4	60	40	100	2
BDT-607-24	Core Practical/ Laboratory	Dialysis in Special Situations- Practical	0	0	4	60	40	100	2
BDT-608-24	Core Practical/ Laboratory	Recent Advances in Dialysis Technology - Practical	0	0	4	60	40	100	2
BDT-609-24	Ability Enhancement Compulsory Course-(AECC)	Hospital Management and Medical Ethics	2	0	0	40	60	100	1
		TOTAL	14	04	16	440	460	900	25

Semester		Sixth					
Course Code	Course Type	Course Title	Load Allocation	Marks Distribution	Total Marks	Credits	
BDT-601-24	Core Theory	Applied Dialysis Technology - II	L T P	Internal External	100	4	
			3 1 0	40 60			

Course Outcomes (COs)

Upon successful completion of this course, the student will be able to:

CO1: Explain advanced operational principles, validation procedures, and quality management systems used in modern dialysis facilities.

CO2: Apply biomedical engineering concepts for equipment performance evaluation, calibration, and lifecycle management in dialysis units.

CO3: Interpret national and international regulatory standards governing dialysis equipment, safety, and quality assurance.

CO4: Demonstrate knowledge of dialysis informatics, digital documentation, inventory management, and healthcare technology integration.

CO5: Describe the technological requirements and operational aspects of home dialysis, portable dialysis systems, and tele-dialysis services.

CO6: Evaluate innovations in dialysis equipment management and healthcare technology to improve patient safety and operational efficiency.

Module I: Dialysis Equipment Validation and Quality Management

Hours: 10

1.1 Equipment validation

- Installation Qualification (IQ)
- Operational Qualification (OQ)
- Performance Qualification (PQ)

1.2 Quality Management Systems (QMS)

- Principles of quality management
- Standard Operating Procedures (SOPs)
- Risk management in dialysis services
- Internal quality audits

1.3 Equipment lifecycle management

- Procurement planning
- Acceptance testing
- Preventive replacement strategies
- Equipment decommissioning

1.4 Accreditation requirements

- NABH standards (overview)
- ISO quality systems in dialysis units

Module II: Biomedical Engineering Applications in Dialysis

Hours: 10

2.1 Biomedical engineering support

- Electrical safety testing
- Leakage current testing
- Equipment performance verification
- Functional safety checks

2.2 Medical gas and utility systems

- Medical gas supply in dialysis units
- Power backup systems
- UPS and generator systems
- Environmental monitoring

2.3 Biomedical equipment management

- Asset management
- Maintenance documentation
- Service contracts (AMC/CMC)
- Equipment downtime analysis

2.4 Clinical engineering support in dialysis centers

Module III: Dialysis Informatics and Digital Healthcare

Hours: 10

3.1 Dialysis information systems

- Electronic Dialysis Record (EDR)
- Clinical documentation software
- Digital scheduling systems

3.2 Healthcare informatics

- Data collection and reporting
- Clinical dashboards
- Data analytics for quality improvement

3.3 Connectivity and interoperability

- Integration with Hospital Information Systems (HIS)
- Laboratory Information Systems (LIS)
- Picture Archiving and Communication Systems (PACS) overview

3.4 Cybersecurity in healthcare

- Data confidentiality
- Electronic health record security
- Ethical and legal considerations

Module IV: Home Dialysis Technology and Remote Care

Hours: 8

4.1 Home haemodialysis

- Equipment requirements
- Patient selection

- Home setup and safety
- Patient and caregiver training

4.2 Home peritoneal dialysis technology

- Automated Peritoneal Dialysis (APD)
- Remote monitoring systems
- Home support services

4.3 Tele-dialysis

- Remote consultation
- Virtual patient monitoring
- Mobile health applications
- Challenges and future scope

Module V: Operational Management and Future Technologies

Hours: 10

5.1 Dialysis unit planning

- Layout and workflow
- Capacity planning
- Resource utilization
- Equipment allocation

5.2 Inventory and supply chain management

- Procurement of dialysis consumables
- Stock control methods
- Cold chain management (overview)
- Vendor evaluation

5.3 Emerging technologies

- Smart dialysis systems
- Internet of Medical Things (IoMT)
- Robotics in healthcare
- Automation in dialysis units

5.4 Future directions in dialysis technology

- Digital transformation
- Sustainable healthcare technologies
- Innovation and entrepreneurship in dialysis services

Recommended Books

1. Handbook of Dialysis, 6th Edition, Wolters Kluwer.
2. Clinical Dialysis.
3. Replacement of Renal Function by Dialysis, Springer.
4. Medical Instrumentation: Application and Design, Wiley.
5. Biomedical Instrumentation and Measurements, Pearson.
6. Health Informatics: Practical Guide.

Semester		Sixth					
Course Code	Course Type	Course Title	Load Allocation	Marks Distribution	Total Marks	Credits	
BDT-602-24	Core Theory	Advance Dialysis Technology -II	L T P	Internal External	100	4	
			3 1 0	40 60			

Course Outcomes (COs)

Upon successful completion of this course, the student will be able to:

CO1: Evaluate complex clinical conditions requiring individualized dialysis management using evidence-based approaches.

CO2: Integrate pharmacological principles, nutrition, and multidisciplinary care into comprehensive management of dialysis patients.

CO3: Describe the role of the dialysis technologist in kidney transplantation, pre-transplant evaluation, and post-transplant care.

CO4: Apply principles of clinical governance, patient safety, and quality improvement in advanced nephrology practice.

CO5: Analyze ethical, legal, psychosocial, and palliative care issues encountered in long-term dialysis management.

CO6: Demonstrate professional leadership, communication, and management skills required for advanced dialysis practice.

Module I: Advanced Clinical Management of Dialysis Patients

Hours: 10

1.1 Comprehensive patient assessment

- Clinical history and physical examination
- Interpretation of laboratory investigations
- Nutritional assessment
- Functional status assessment

1.2 Management of chronic dialysis complications

- Chronic kidney disease–mineral and bone disorder (CKD-MBD)
- Renal anemia
- Protein-energy wasting
- Dialysis-related amyloidosis

1.3 Cardiovascular complications

- Hypertension
- Heart failure
- Arrhythmias
- Sudden cardiac death in dialysis patients

1.4 Individualized patient care planning

Module II: Pharmacology and Nutrition in Dialysis

Hours: 10

2.1 Pharmacology in kidney failure

- Principles of drug dosing in CKD
- Dialyzability of drugs
- Medication reconciliation
- Drug interactions

2.2 Common medications in dialysis

- Erythropoiesis-stimulating agents
- Iron therapy
- Phosphate binders
- Vitamin D analogues
- Calcimimetics

2.3 Advanced renal nutrition

- Medical nutrition therapy
- Micronutrient supplementation
- Nutrition in critically ill dialysis patients
- Nutrition monitoring

2.4 Patient education for medication adherence

Module III: Kidney Transplantation and Multidisciplinary Care

Hours: 10

3.1 Kidney transplantation

- Indications and contraindications
- Living and deceased donor transplantation
- Pre-transplant evaluation
- Role of the dialysis technologist

3.2 Post-transplant care

- Immediate postoperative monitoring
- Immunosuppressive therapy (overview)
- Recognition of complications
- Graft monitoring

3.3 Multidisciplinary team approach

- Role of nephrologist
- Dialysis technologist
- Renal nurse
- Dietitian
- Social worker
- Clinical psychologist

Module IV: Clinical Governance, Ethics and Palliative Care

Hours: 8

4.1 Clinical governance

- Patient safety culture
- Clinical risk management
- Quality improvement projects
- Clinical outcome indicators

4.2 Ethical and legal issues

- Informed consent
- Patient autonomy
- Confidentiality
- Professional ethics
- Legal responsibilities of dialysis professionals

4.3 Palliative nephrology

- Conservative kidney management
- End-of-life care
- Advance care planning
- Communication with patients and families

Module V: Leadership, Research Translation and Professional Development

Hours: 10

5.1 Leadership in dialysis services

- Leadership styles
- Team management
- Conflict resolution
- Effective communication

5.2 Healthcare management

- Resource optimization
- Patient satisfaction
- Clinical documentation
- Performance evaluation

5.3 Translation of research into practice

- Clinical practice guidelines
- Quality improvement initiatives
- Implementation science
- Benchmarking in dialysis services

5.4 Professional development

- Continuing Professional Development (CPD)
- Lifelong learning
- National and international nephrology organizations
- Career pathways in nephrology technology

Recommended Books

1. Comprehensive Clinical Nephrology, Elsevier.
2. Handbook of Dialysis, 6th Edition, Wolters Kluwer.
3. Clinical Dialysis.
4. Brenner and Rector's The Kidney, Elsevier.
5. Oxford Handbook of Nephrology and Hypertension, Oxford University Press.
6. KDIGO Clinical Practice Guidelines (latest updates for reference).

Semester		Sixth					
Course Code	Course Type	Course Title	Load Allocation	Marks Distribution	Total Marks	Credits	
BDT-603-24	Core Theory	Dialysis in Special Situations	L T P	Internal External	100	4	
			3 1 0	40 60			

Course Outcomes (COs)

Upon successful completion of this course, the student will be able to:

CO1: Explain the indications and modifications of dialysis therapy required in various special clinical situations.

CO2: Apply appropriate dialysis strategies for pediatric, geriatric, pregnant, obese, and critically ill patients.

CO3: Describe dialysis management in acute medical, surgical, toxicological, and metabolic emergencies.

CO4: Interpret clinical and laboratory findings to assist in selecting appropriate dialysis modalities for special patient populations.

CO5: Demonstrate knowledge of multidisciplinary care, patient safety, and individualized dialysis planning in complex clinical scenarios.

CO6: Evaluate ethical, psychosocial, and rehabilitation aspects of managing patients requiring dialysis under special circumstances.

Module I: Dialysis in Special Patient Populations

Hours: 10

1.1 Pediatric dialysis

- Indications
- Physiological considerations
- Vascular access challenges
- Growth and developmental issues

1.2 Geriatric dialysis

- Frailty assessment
- Functional limitations
- Cognitive impairment
- Individualized dialysis prescription

1.3 Dialysis during pregnancy

- Maternal physiological changes
- Dialysis prescription modifications
- Fetal monitoring
- Maternal and fetal outcomes

1.4 Dialysis in obese and malnourished patients

- Technical challenges
- Nutritional considerations
- Outcome assessment

Module II: Dialysis in Critical Illness and Organ Dysfunction

Hours: 10

2.1 Dialysis in intensive care

- Hemodynamic instability
- Septic shock
- Multiple Organ Dysfunction Syndrome (MODS)
- Fluid overload management

2.2 Dialysis in liver disease

- Hepatorenal syndrome
- Acute liver failure

- Combined liver-kidney dysfunction

2.3 Cardiorenal syndrome

- Classification
- Dialysis considerations
- Ultrafiltration strategies

2.4 Dialysis in respiratory failure

- Mechanical ventilation considerations
- Acid-base management
- Fluid optimization

Module III: Dialysis in Medical and Toxicological Emergencies

Hours: 10

3.1 Dialysis in poisoning

- Principles of extracorporeal toxin removal
- Drug overdose
- Alcohol poisoning
- Toxic alcohols
- Heavy metal poisoning (overview)

3.2 Dialysis in metabolic emergencies

- Severe hyperkalemia
- Metabolic acidosis
- Hypercalcemia
- Tumor lysis syndrome

3.3 Dialysis in endocrine emergencies

- Diabetic ketoacidosis with AKI
- Hyperosmolar hyperglycemic state
- Adrenal crisis (overview)

3.4 Emergency dialysis planning

- Indications
- Timing
- Patient stabilization

Module IV: Dialysis in Infectious Diseases and Immunological Disorders

Hours: 8

4.1 Dialysis in viral infections

- Hepatitis B
- Hepatitis C
- HIV infection
- Infection prevention strategies

4.2 Dialysis during emerging infectious diseases

- COVID-19 (principles and lessons learned)
- Isolation dialysis
- Personal protective measures

4.3 Dialysis in autoimmune diseases

- Systemic Lupus Erythematosus (SLE)
- ANCA-associated vasculitis
- Goodpasture syndrome

4.4 Dialysis support in transplant rejection

- Acute rejection (overview)
- Delayed graft function
- Temporary dialysis support

Module V: Individualized Dialysis Care and Rehabilitation

Hours: 10

5.1 Patient-centered dialysis care

- Shared decision-making
- Individualized treatment goals
- Quality of life assessment

5.2 Psychosocial aspects

- Depression and anxiety
- Family counselling
- Social support systems
- Patient adherence

5.3 Rehabilitation of dialysis patients

- Physical rehabilitation
- Occupational rehabilitation
- Return-to-work programmes
- Long-term follow-up

5.4 Clinical case discussions

- Integrated management of complex dialysis patients
- Multidisciplinary case planning
- Outcome evaluation

Recommended Books

1. Critical Care Nephrology, Elsevier.
2. Handbook of Dialysis, 6th Edition, Wolters Kluwer.
3. Comprehensive Clinical Nephrology, Elsevier.
4. Brenner and Rector's The Kidney, Elsevier.
5. Oxford Handbook of Nephrology and Hypertension, Oxford University Press.
6. Goldfrank's Toxicologic Emergencies, McGraw-Hill.

Semester		Sixth				
Course Code	Course Type	Course Title	Load Allocation	Marks Distribution	Total Marks	Credits
BDT-604-24	Core Theory	Research Methodology and Biostatistics	L T P	Internal External	100	4
			3 1 0	40 60		

Course Outcomes (COs)

Upon successful completion of this course, the student will be able to:

CO1: Explain the principles, types, and processes of scientific research and evidence-based healthcare.

CO2: Formulate research problems, develop research proposals, and select appropriate study designs and sampling methods.

CO3: Apply basic biostatistical techniques for data organization, analysis, interpretation, and presentation using appropriate statistical tools.

CO4: Critically appraise scientific literature and interpret research findings for clinical decision-making.

CO5: Demonstrate knowledge of research ethics, informed consent, plagiarism, and good scientific practices.

CO6: Prepare scientific reports, dissertations, and research presentations following standard academic guidelines.

Module I: Fundamentals of Research Methodology

Hours: 10

1.1 Introduction to Research

- Definition and objectives
- Characteristics of scientific research
- Types of research
 - Basic research
 - Applied research
 - Clinical research
 - Quantitative and qualitative research

1.2 Research Process

- Identification of research problem
- Literature review
- Research objectives
- Research questions
- Hypothesis formulation

1.3 Research Design

- Experimental studies
- Observational studies
- Cross-sectional studies
- Case-control studies
- Cohort studies
- Randomized controlled trials

1.4 Variables and operational definitions

Module II: Sampling, Data Collection and Research Ethics

Hours: 10

2.1 Sampling Techniques

- Probability sampling
- Non-probability sampling
- Sample size estimation
- Sampling errors

2.2 Data Collection Methods

- Questionnaires

- Interviews
- Observation
- Clinical records
- Laboratory data collection

2.3 Research Instruments

- Reliability
- Validity
- Pilot study
- Data management

2.4 Research Ethics

- Ethical principles in biomedical research
- Institutional Ethics Committee (IEC)
- Informed consent
- Confidentiality
- Plagiarism
- Good Clinical Practice (GCP)

Module III: Fundamentals of Biostatistics

Hours: 10

3.1 Introduction to Biostatistics

- Scope and applications
- Types of data
- Scales of measurement

3.2 Descriptive Statistics

- Frequency distribution
- Tables and graphs
- Mean
- Median
- Mode
- Standard deviation
- Variance
- Percentiles

3.3 Probability and Distributions

- Basic probability concepts
- Normal distribution
- Binomial distribution

- Sampling distribution

3.4 Inferential Statistics

- Confidence interval
- Standard error
- Concept of hypothesis testing
- p-value
- Type I and Type II errors

Module IV: Statistical Tests and Data Analysis

Hours: 8

4.1 Parametric Tests

- Student's t-test
- Paired t-test
- One-way ANOVA

4.2 Non-Parametric Tests

- Chi-square test
- Mann-Whitney U test
- Wilcoxon signed-rank test

4.3 Correlation and Regression

- Pearson correlation
- Spearman correlation
- Linear regression
- Interpretation of results

4.4 Introduction to Statistical Software

- Microsoft Excel for data analysis
- Overview of SPSS
- Data coding
- Data entry
- Basic statistical output interpretation

Module V: Scientific Writing and Evidence-Based Practice

Hours: 10

5.1 Scientific Writing

- Structure of research proposal
- Dissertation format
- Research article structure (IMRAD)
- Referencing styles (APA, Vancouver)

5.2 Literature Review

- Database searching
- PubMed
- Google Scholar
- Reference management software (overview)

5.3 Critical Appraisal

- Reading scientific papers
- Levels of evidence
- Systematic reviews
- Meta-analysis (overview)

5.4 Research Presentation

- Poster presentation
- Oral presentation
- Scientific communication
- Publication ethics

Recommended Books

1. Research Methodology: Methods and Techniques, New Age International.
2. Medical Biostatistics, Jaypee Brothers Medical Publishers.
3. Essentials of Medical Statistics, Wiley-Blackwell.
4. Practical Statistics for Medical Research, Chapman & Hall/CRC.
5. How to Read a Paper: The Basics of Evidence-Based Medicine, Wiley-Blackwell.
6. Designing Clinical Research, Wolters Kluwer.

Semester		Sixth				
Course Code	Course Type	Course Title	Load Allocation	Marks Distribution	Total Marks	Credits
BDT-605-24	Core Theory	Applied Dialysis Technology – II - Practical	L T P	Internal External	100	2
			0 0 4	60 40		

List of Practical Experiments

1. **Equipment Validation of Haemodialysis Machine**
2. **Electrical Safety Testing of Dialysis Equipment**
3. **Preparation of Standard Operating Procedures (SOPs)**
4. **Preventive Maintenance and Equipment Audit**
5. **Dialysis Information System (DIS) Documentation**
6. **Inventory and Asset Management**
7. **Quality Management in Dialysis Unit**
8. **Planning and Layout of a Dialysis Unit**
9. **Home Dialysis Technology Demonstration**
10. **Comprehensive Technical Case Study**

Suggested Books

1. Handbook of Dialysis, 6th Edition, Wolters Kluwer.
2. Medical Instrumentation: Application and Design, Wiley.
3. Biomedical Instrumentation and Measurements, Pearson.
4. Clinical Dialysis.
5. Health Informatics: Practical Guide.
6. Hospital Administration and Management.

Semester		Sixth				
Course Code	Course Type	Course Title	Load Allocation	Marks Distribution	Total Marks	Credits
BDT-606-24	Core Theory	Advance Dialysis Technology -II - Practical	L T P	Internal External	100	2
			0 0 4	60 40		

List of Practical Experiments

1. **Comprehensive Assessment of a Dialysis Patient**
2. **Interpretation of Laboratory Investigations**
3. **Medication Review and Dose Adjustment**
4. **Renal Nutrition Assessment**
5. **Kidney Transplant Patient Evaluation (Demonstration/Case Study)**
6. **Clinical Governance and Quality Improvement Exercise**
7. **Communication and Ethical Decision-Making**
8. **Case-Based Management of Complex Dialysis Patients**
9. **Evidence-Based Clinical Practice**
10. **Comprehensive Clinical Case Presentation**

Suggested Books

1. Comprehensive Clinical Nephrology, Elsevier.
2. Handbook of Dialysis, 6th Edition, Wolters Kluwer.
3. Clinical Dialysis.
4. Brenner and Rector's The Kidney, Elsevier.
5. Oxford Handbook of Nephrology and Hypertension, Oxford University Press.
6. KDIGO Clinical Practice Guidelines (latest edition/reference).

Semester		Sixth				
Course Code	Course Type	Course Title	Load Allocation	Marks Distribution	Total Marks	Credits
BDT-607-24	Core Theory	Dialysis in Special Situations- Practical	L T P	Internal External	100	2
			0 0 4	60 40		

List of Practical Experiments

1. **Assessment of Dialysis Patients in Special Populations**
2. **Case-Based Dialysis Planning in Critical Care**
3. **Interpretation of Clinical and Laboratory Parameters**
4. **Management of Dialysis in Medical Emergencies (Simulation)**
5. **Case Demonstration: Dialysis in Liver and Cardiac Disorders**
6. **Dialysis Management in Infectious Diseases**
7. **Management of Poisoning and Toxicological Emergencies (Case-Based)**
8. **Psychosocial Assessment and Patient Counselling**
9. **Multidisciplinary Case Discussion**
10. **Comprehensive Clinical Case Presentation**

Suggested Books

1. Critical Care Nephrology, Elsevier.
2. Handbook of Dialysis, 6th Edition, Wolters Kluwer.
3. Comprehensive Clinical Nephrology, Elsevier.
4. Brenner and Rector's The Kidney, Elsevier.
5. Oxford Handbook of Nephrology and Hypertension, Oxford University Press.
6. Goldfrank's Toxicologic Emergencies, McGraw-Hill.

Semester		Sixth				
Course Code	Course Type	Course Title	Load Allocation	Marks Distribution	Total Marks	Credits
BDT-608-24	Core Theory	Recent Advances in Dialysis Technology - Practical	L T P	Internal External	100	2
			0 0 4	60 40		

List of Practical Experiments

1. **Comparative Evaluation of Advanced Dialyzer Membranes**
2. **Demonstration of Smart Dialysis Systems**
3. **Artificial Intelligence in Dialysis Care (Case-Based Exercise)**
4. **Remote Monitoring and Tele-Dialysis**
5. **Evaluation of Wearable and Portable Dialysis Technologies**
6. **Quality Improvement Project in Dialysis Unit**
7. **Green Dialysis Audit**
8. **Critical Appraisal of Recent Scientific Literature**
9. **Review of International Clinical Guidelines**
10. **Seminar and Technology Presentation**

Suggested Books

1. Handbook of Dialysis, 6th Edition, Wolters Kluwer.
2. Replacement of Renal Function by Dialysis, Springer.
3. Critical Care Nephrology, Elsevier.
4. Comprehensive Clinical Nephrology, Elsevier.
5. Artificial Organs.
6. Brenner and Rector's The Kidney, Elsevier.

Semester		Sixth				
Course Code	Course Type	Course Title	Load Allocation	Marks Distribution	Total Marks	Credits
BDT-609-24	Core Theory	Hospital Management and Medical Ethics	L T P	Internal External	100	1
			2 0 0	40 60		

Course Outcomes (COs)

Upon successful completion of this course, the student will be able to:

CO1: Describe the organizational structure, functions, and management principles of hospitals and healthcare institutions.

CO2: Explain the roles and responsibilities of healthcare professionals within multidisciplinary healthcare teams.

CO3: Apply principles of medical ethics, professional conduct, and legal responsibilities in clinical practice.

CO4: Demonstrate knowledge of healthcare quality, patient safety, communication, and hospital accreditation standards.

Module I: Fundamentals of Hospital Management

Hours: 8

1.1 Introduction to Hospital Management

- Definition and objectives
- Types of hospitals
- Functions of hospitals
- Organizational structure of a hospital

1.2 Hospital Administration

- Principles of management
- Planning, organizing, staffing, directing, and controlling
- Hospital departments and their functions
- Role of hospital administrators

1.3 Healthcare Team

- Multidisciplinary healthcare team
- Role of allied health professionals
- Interprofessional collaboration
- Leadership and teamwork

Module II: Healthcare Quality and Patient Safety

Hours: 8

2.1 Quality Management in Healthcare

- Concepts of quality healthcare
- Quality assurance and quality improvement
- Clinical governance (overview)
- Patient satisfaction

2.2 Patient Safety

- Patient identification
- Safe medication practices
- Prevention of medical errors
- Risk management
- Incident reporting

2.3 Hospital Accreditation

- NABH accreditation (overview)
- NABL accreditation (overview)
- Quality indicators in healthcare
- Continuous quality improvement

Module III: Medical Ethics and Professionalism

Hours: 8

3.1 Principles of Medical Ethics

- Autonomy
- Beneficence
- Non-maleficence
- Justice

3.2 Professional Ethics

- Code of professional conduct
- Professional accountability
- Confidentiality and privacy
- Ethical dilemmas in healthcare

3.3 Patient Rights

- Rights and responsibilities of patients
- Informed consent
- Refusal of treatment
- End-of-life ethical issues (overview)

Module IV: Medico-Legal Issues and Healthcare Communication

Hours: 8

4.1 Medico-Legal Aspects

- Medical negligence
- Legal responsibilities of healthcare professionals
- Documentation and medical records
- Consumer Protection Act (overview)
- Biomedical Waste Management Rules (overview)

4.2 Communication in Healthcare

- Professional communication skills
- Patient counselling
- Communication with relatives
- Conflict management
- Breaking difficult news (principles)

4.3 Stress and Professional Well-being

- Workplace stress
- Burnout prevention
- Time management
- Professional development and lifelong learning

Recommended Books

1. Hospital Administration.
2. Principles of Hospital Administration and Planning, Jaypee Brothers Medical Publishers.
3. Medical Ethics.
4. Medical Law and Ethics, Pearson.
5. Essentials of Hospital Administration and Management.
6. Textbook of Bioethics.