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 forValue Education

- Understanding the need, basic guidelines, content and process for ValueEducation
- 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 19ulfilment of aspirations of every human being with theircorrect priority
- Understanding Happiness and Prosperity correctly- A critical appraisal ofthe current scenario
- Method to 19ulfil the above human aspirations: understanding and living inharmony 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 thematerial '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 andenjoyer)
- 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 PracticeSessions.

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* andprogram for its 19ulfilment 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 HumanGoals
- Visualizing a universal harmonious order in society- Undivided Society (*AkhandSamaj),* Universal Order (*SarvabhaumVyawastha)*- from family toworld 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 asCo-existence

- Understanding the harmony in the Nature
- Interconnectedness and mutual 20ulfilment among the four orders of nature-recyclability and self-regulation in nature
- Understanding Existence as Co-existence (*Sah-astitva*) of mutuallyinteracting units in all-pervasive space
- Holistic perception of harmony at all levels of existence

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

Module 5: **06 hours**

Implications of the above Holistic Understanding of Harmony onProfessional

- 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 augmentinguniversal human order,
  Ability to identify the scope and characteristics of people-friendly and eco-

friendly production systems,
Ability to identify and develop appropriate technologiesand 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 toGrowth 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 HumanValues), 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.,I0th Edi, 2017.
2. Mackie and McCartney Practical Medical Microbiology, Relx India Pvt ltd, 14th Edi, 2018.
3. Baveja CP, Textbook of Microbiology, APC, 6'h edi, 2021.
4. Sriram Kumar (S), Textbook of Microbiology, All win Publication, l 51 Edi, 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 andConservation. S. Chand Publishing, New Delhi.
16. Sodhi, N.S., Gibson, L. & Raven, P.H. (eds). 2013. Conservation Biology: Voices fromthe 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:

1. 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
2. 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
3. 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)
4. 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
5. 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

1. Ananthanarayan and Paniker's Textbook of Microbiology by R. Ananthanarayan & C.K. Jayaram Paniker

2. Essentials of Medical Microbiology by Apurba S. Sastry

3. Textbook of Microbiology for Nurses and Allied Health Sciences byC.P. Baveja

4. 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, magn etic 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, mag netic 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
- Cycler 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