MALLA REDDY VISHWAVIDYAPEETH

SCHOOL OF ALLIED AND PUBLIC HEALTH SCIENCES AND TECHNOLOGY

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Program

Bachelor of Science (B.Sc.)

Cardio Perfusion Technology

2025

MALLA REDDY VISHWAVIDYAPEETH

SCHOOL OF ALLIED AND PUBLIC HEALTH SCIENCES AND TECHNOLOGY

BACHELOR OF CARDIO PERFUSION TECHNOLOGY

COURSE STRUCTURE

I year I semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	Max. Marks		
							INT	EXT	TOTAL
1	BCT3310101	Human Anatomy - I	4	-	-	4	30	70	100
2	BCT3310102	Human Physiology - I	4	-	-	4	30	70	100
3	BCT3310103	Medical Bio-chemistry	4	-	-	4	30	70	100
4	BCT3310104	Sociology	2	-	-	2	30	70	100
5	BCT3310105	English and Communication Skills	2	-	-	2	30	70	100
6	BCT3310106	Basics of Computers	1	-	2	2	30	70	100
7	BCT3310101P	Human Anatomy - I Practical	-	-	4	2	30	70	100
8	BCT3310102P	Human Physiology - I Practical	-	-	4	2	30	70	100
9	BCT3310107VA	Environmental Awareness	2	-	-	2	100	-	100
TOTAL			**19**	**-**	**10**	**24**	**340**	**560**	**900**

I year II semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	Max. Marks		
							INT	EXT	TOTAL
1	BCT3310201	Human Anatomy – II	4	-	-	4	30	70	100
2	BCT3310202	Human Physiology - II	4	-	-	4	30	70	100
3	BCT3310203	Pathology	2	-	-	2	30	70	100
4	BCT3310204	Microbiology	3	-	-	3	30	70	100
5	BCT3310201P	Human Anatomy – II Practical	-	-	4	2	30	70	100
6	BCT3310202P	Human Physiology – II Practical	-	-	2	1	30	70	100
7	BCT3310205	Introduction to Perfusion equipment	3	-	-	3	30	70	100
8	BCT3310206	Medical Physics	2	-	-	2	30	70	100
9	BCT3310207VA	Stress Management	1	-	-	1	100	-	100
TOTAL			**19**	**-**	**6**	**22**	**340**	**560**	**900**

II year III semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	Max. Marks		
							INT	EXT	TOTAL
1	BCT3310301	Pharmacology	3	-	-	3	30	70	100
2	BCT3310302	Medical Law, Ethics and Medical Records	3	-	-	3	30	70	100
3	BCT3310303	Health Care Administration	2	-	-	2	30	70	100
4	BCT3310304	Perfusion Circuit Management	3	-	4	5	30	70	100
5	BCT3310305	Clinical Application of Perfusion Techniques	3	-	-	3	30	70	100
6	BCT3310306VA	Soft Skills Development	1	-	-	1	100	-	100
7	BCT3310307	Clinical Postings - I	-	-	14	7	100	-	100
TOTAL			**15**	**-**	**18**	**24**	**350**	**350**	**700**

II year IV semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	Max. Marks		
							INT	EXT	TOTAL
1	BCT3310401	CABG and Patient Management	3	-	-	3	30	70	100
2	BCT3310402	Advanced Perfusion Technology	3	-	4	5	30	70	100
3	BCT3310403	Critical Care & Emergency Management	3	-	-	3	30	70	100
4	BCT3310404VA	Health and Well-being	1	-	-	1	100	-	100
5	BCT3310405	Clinical Postings - II	-	-	16	8	100	-	100
TOTAL			**10**	**-**	**20**	**20**	**290**	**210**	**500**

III year – V semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	Max. Marks		
							INT	EXT	TOTAL
1	BCT3310501	Pediatric & Adult Perfusion Management	3	-	-	3	30	70	100
2	BCT3310502	Hemodynamic Monitoring	3	-	-	3	30	70	100
3	BCT3310503	Perfusion in Specialized Surgeries	3	-	4	5	30	70	100
4	BCT3310504	Quality Assurance in Perfusion Technology	3	-	-	3	30	70	100
5	BCT3310505VA	Interpersonal Communication	1	-	-	1	100	-	100
6	BCT3310506	Clinical Postings - III	-	-	16	8	100	-	100
TOTAL			13	-	20	23	320	280	600

III year – VI semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	Max. Marks		
							INT	EXT	TOTAL
1	BCT3310601	Emerging Trends in Perfusion Technology	3	-	-	3	30	70	100
2	BCT3310602	Transplantation and ECMO Techniques	3	-	4	5	30	70	100
3	BCT3310603	Research Methodology and Biostatistics	3	-	-	3	30	70	100
4	BCT3310604VA	Art of Being a Better Person	1	-	-	1	100	-	100
5	BCT3310605	Clinical Postings - IV	-	-	16	8	100	-	100
TOTAL			10	-	20	20	290	210	500

IV year – VII semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	Max. Marks		
							INT	EXT	TOTAL
1	BCT3310701	Internship-I	-	-	40	20	30	70	100
2	BCT3310702	Project - I	-	-	2	1	100	-	100
3	BCT3310703VA	Healthy Eating for Healthy Living	1	-	-	1	100	-	100
TOTAL			**1**		**42**	**22**	**230**	**70**	**300**

IV year – VIII semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	Max. Marks		
							INT	EXT	TOTAL
1	BCT3310801	Internship-II	-	-	20	10	30	70	100
2	BCT3310802	Project - II	-	-	20	10	30	70	100
3	BCT3310803VA	Professionalism in the Workplace	1	-	-	1	100	-	100
TOTAL			**1**	-	**40**	**21**	**160**	**140**	**300**

1.1 Under Graduate Programme

Sl. No.	Course	Duration	Eligibility for admission
1	B.Sc. Cardio Perfusion Technology	4 Years (3 Years + 1 Year Internship)	10+2 or equivalent

1.2. Medium of Instruction:

English shall be the medium of instruction for all subjects of study and for examinations.

1.3. Duration of the Course

Duration details are mentioned under clause no. 1.1 of this booklet.

1.4 Examination Regulations

1.4.1 Attendance: 75% of attendance (physical presence) is mandatory.

Medical leave or other types of sanctioned leaves will not be counted as physical presence. Attendance will be counted from the date of commencement of the session to the last day of the closing of attendance before the final examination.

1.4.2 Internal Assessments:

a) Regular periodic assessment shall be conducted throughout the course. In each semester there will be **two one hour internal assessments (10 marks each)** and a continuous assessment (10 marks). Thus a total of 30 marks for the internal exam. (i.e. weightage for internal assessment shall be 30% of the total marks in each subject).

b) **Exam pattern for internal assessment** in each semester will be

(a) Short questions 3 nos. out of which the student should write two questions each carrying 5 marks (i.e. 2 x 510 marks). Two such internal examinations will be conducted.

(b) Continuous assessment of the student will be done. Students overall attendance, performance in class, behaviour of the student, extra-curricular activities etc will be assessed. Continuous assessment carries 10 marks.

(d) Thus a total of 30 marks for the internal examination. (10+10+10=30 marks). A candidate should secure a minimum of 40% marks in the internal assessment in each subject to be eligible to appear for the University examination

(e) For value added courses, only internal examination will be conducted. The assessment comprised of five assignments/presentations/case presentations each carrying 10 (i.e. 5 x 10 = 50 marks). Final examination will be for 50 marks with 5 questions each carrying 10 marks (5 x 10 = 50 marks). The minimum pass is 40% marks.

1.4.3 University Examinations (External):

a) University Examination shall be conducted at the end of every semester.

b) A candidate who satisfies the requirement of attendance and internal assessment marks, as stipulated by the University shall be eligible to appear for the University Examination.

c) Examination will be of 3 hours duration (for theory). The question pattern for those subjects without practical examination (70 marks) will be (a) Three essay questions out of which the student should answer 2 questions each carrying 10 marks (i.e. 2 x 10 = 20 marks) (b) Eight short note questions out of which the student should attempt

six questions, each carrying 5 marks (6 x 5 = 30 marks). (c) Ten very short questions each carrying 2 marks (i.e. 10 x 2 = 20 marks). Thus a total of 70 marks.

d) The question pattern for practical examination (a) Spotters/major practical/minor practical/Viva/practical record.

The minimum pass for internal assessment is 40% and for the University Examination is 50%. i.e. a student should score a total of 50% (adding the internal and external examination) to pass in each subject.

SEMESTER-I

HUMAN ANATOMY – I L/T/P/C

4/-/-/4

UNIT-I

GENERALANATOMY AND HISTOLOGY

General Anatomy:

1. Fascia
2. Muscles
3. Bones
4. Joints
5. Vessels
6. Nerve

General Histology:

1. Epithelial
2. Connective tissue
3. Muscle
4. Bone and cartilage
5. Nerve and vessels
6. Embryology

UNIT-II

UPPEREXTREMITY:

1. Osteology: Clavicle, Scapula, Humerus, Radius, Ulna, Carpals, Metacarpals, Phalanges.
2. Muscles: Origin, insertion, nerve supply and actions.

UNIT-III

UPPEREXTREMITY:

1. Joints: Shoulder girdle, shoulder joint, elbow joints, radio ulnar joint, wrist joint and joints of the hand.
2. Breast, pectoral region, axilla, cubital fossa, Arches of hand
3. Brachial plexus, nerves of upper extremity
4. Blood vessels and lymphatic drainage

UNIT-IV

CARDIOVASCULAR&RESPIRATORYANATOMY

1. Thoracic wall

2. Mediastinum

3. Heart: Anatomy of heart, blood Supply, nerve supply, conducting System and major blood vessels

4. Lungs: Anatomy of lungs, bronchial tree, pleura, Broncho pulmonary segments, blood Supply and nerve supply

5. Diaphragm: Origin, insertion, nerve supply and action, openings in the diaphragm.

6. Intercostal muscles and Accessory muscles of Respiration: Origin, insertion, nerve supply and action

7. Ribs and sternum

UNIT-V

SYSTEMIC ANATOMY

1. Digestive system:

- List the parts of the digestive system
- Anatomy of stomach, liver, gallbladder, spleen, pancreas, intestines.

2. Urinary system:

- Anatomy of kidney, urinary bladder

3. Endocrine system:

- Position and hormones secreted by each organ

4. Genital system:

- Male organs and female organs

RECOMMEMDEDTEXTBOOKS

1. Human Anatomy-Snell

2. Anatomy-Chaurasia, Volume-I,II &III

3. Neuro anatomy-Inderbir Singh

4. Human Anatomy-Kadasne, Volume-I,II&III

5. Neuro anatomy—Vishrsam Singh

6. Human Anatomy-Datta

HUMAN PHYSIOLOGY – I

L/T/P/C

4/-/-/4

UNIT-I

GENERALPHYSIOLOGY

Cell:

1. Structure of cell membrane
    a) Fluid mosaic model
    b) Lipidbi-layer
    c) Functions of cell membrane
2. Transport across cell membrane

A. Basic mechanism of transport
    a) Channel proteins
    b) Carrier proteins

B. Methods of transport
    a) Passive transport
    b) Active transport

3. Body fluids
    a) Intracellular fluid
    b) Extracellular fluid
    c) Body electrolytes
    d) Regulation of body fluid volume
4. Homeostasis
    a) Regulation of body function
    b) Homeostatic regulatory mechanism

BLOOD:

1. Composition of blood &it's volume
2. Plasma
3. Hemopoiesis
    a) Composition
    b) Plasma protein
4. Erythrocytes
    a) Normal count

b) Structure of RBC (shape &size)

c) Functions of RBC

d) Hemoglobin (Normal Value, Fate, Function)

e) Anemia& polycythemia

f) ESR&PCV

5. Leukocytes

a) Classification

b) Functions of leukocytes

6. Platelets

a) Normal count

b) Functions of thrombocytes

c) Blood Coagulation

d) Bleeding time &clotting time

7. Blood group

a) ABO system

b) Landsteiner's law

c) ABO incompatibility

d) Rh system

e) Rh incompatibility& erythroblastosis fetalis

8. Blood transfusion

a) Collection & storage of blood

b) Precautions

c) Cross matching

d) Hazards of blood transfusion

NERVE:

1. Structure of a neuron

2. Classification of neurons

3. Electrical activity of neuron

a) Resting membrane potential

b) Action potential

4. Propagation of nerve impulse

5. Properties of nerve fibers

6. Neuroglia-Types& functions

7. Nerve Injury

    a) Types of nerve Injury

    b) Effect of nerve Injury

    c) Regeneration of damaged nerve fiber

UNIT-II

MUSCLE PHYSIOLOGY

1. Classification

2. Properties of skeletal muscle

3. Structure of skeletal muscle

    a) Sarcomere

    b) Sarcotubular system

    c) Neuro muscular junction& disease affecting it

4. Excitation-Contraction coupling

5. Mechanism of muscle contraction

6. Functions of skeletal muscle

7. Types of muscle contractions

8. Red& white muscles

9. Rigor mortis, muscular dystrophy, altered muscle tone, muscle cramp, atrophy, EMG

UNIT-III

CARDIOVASCULARSYSTEM

1. Structure of heart & blood vessels

2. Properties of cardiac muscle

3. Origin &spread of cardiac pulse

4. Cardiac cycle &heart sounds

5. Cardiac out put

    a) Related terms

    b) Regulation of cardiac output

    c) Circulatory shock

6. Pulse &Heart rate and it's regulation

7. Blood pressure

    a) Definitions

b) Factors controlling & Influencing BP

c) Regulation of BP

8. Regional circulation

a) Coronary circulation

b) Cerebral circulation

9. Normal ECG.

UNIT-IV

RESPIRATORYSYSTEM

1. Introduction, structure & function of RS

a) Upper respiratory tract

b) Lower respiratory tract

c) Respiratory membrane

2. Mechanism of breathing

a) Mechanics of breathing

b) Respiratory pressure change

c) Compliance

d) Surfactant

3. Respiratory volumes & capacities

4. Pulmonary ventilation& Dead space

5. Transport of respiratory gases

6. Nervous &chemical regulation of respiration

7. Pulmonary function test-direct& indirect method

8. Physiological changes with altitude &acclimatization

UNIT-V

EXERCISEPHYSIOLOGY

1. Basal Metabolic Rate & Respiratory Quotient

2. Energy metabolism

3. Fatigue

4. Oxygen debt

5. Acute cardiovascular changes during exercise; difference between mild, moderate &severe exercise

6. Concept of endurance

7. Acute respiratory changes during exercise

8. Concept of training/conditioning; effects of long-term exercise/training on the CVS&RS

9. Body temperature regulation during exercise

10. Hormonal &metabolic effects during exercise

11. Exercise for muscle strength, power, endurance and their effects on it. Physical fitness & its components

RECOMMENDED TEXT BOOKS

1. Text book on Medical Physiology-Guyton

2. Textbook of Physiology-AK Jain (for MBBS students)

3. Human Physiology-C.C. Chatterjee

4. Essentials of Medical Physiology -Sembulingam, K.

5. Comprehensive Textbook of Medical Physiology: Vol-1 & 2 - Pal, Gopal Krushna

6. Physiology: Prep Manual for Undergraduates- Joshi, VijayaD.

7. Practical Physiology -Joshi, VijayaD.

MEDICAL BIOCHEMISTRY

L/T/P/C

4/-/-/4

UNIT-I

CARBOHYDRATE CHEMISTRY

- Definition, general classification with examples
- Composition and functions of Monosaccharides, Disaccharides ani Polysaccharides
- Anomers, Epimers, Enantiomers, Mutarotation
- Glycosaminoglycans (mucopolysaccharides)

LIPID CHEMISTRY

- Definition, classification with examples.
- Classification and Functions of Fatty acids, Phospholipids, Lipoprotein
- Structure and functions of Cholesterol
- Sources and functions of Ket one bodies

UNIT-II

AMINOACIDCHEMISTRY

- Definition, Classification of amino acids with examples.
- Definition, Classification of proteins with examples
- Structural organization of proteins
- Biologically important peptides

NUCLEICACIDSANDNUCLEOTIDECHEMISTRY

- Composition and Functions of Nitrogen bases, Nucleosides, Nucleotides
- Structure and Functions of DNA
- Structure, Types and Functions of RNA
- Differences between DNA and RNA

UNIT-III

ENZYMES

- Definition, Classification of enzymes with examples
- Active site, Enzyme specificity.
- Factors affecting enzyme activity
- Enzyme inhibition
- Iso enzymes and their clinical significance - LDH, creatine kinase, ALP

VITAMINS

- Definition, Classification
- Fat soluble Vitamins-Sources, RDA, Functions and Deficiency.
- Water soluble Vitamins- Sources, RDA, Functions and Deficiency

UNIT-IV

INTERMEDIARYMETABOILISM

- Glycolysis
- TCA cycle
- B-oxidation of fatty acids (Palmitic acid)
- Ketone body formation and utilization Urea cycle

UNIT-V

MINERALMETABOLIS

- Definition, Classification. Sources, RDA, Functions and Deficiency of Calcium, Phosphorous, Iron, Sodium, Potassium

CLINICALBIOCHEMISTRY

- Normal and abnormal constituents of Urine and Blood and their clinical significance:
- Normal constituents:
- Organic: Urea, Uric acid, Creatinine
- Inorganic: Ca, phosphate, chloride, electrolytes
- Abnormal constituents:
- Glucose, Ketone bodies, Protein, Blood, Bile salts, Bile pigments

RECOMMENDED BOOKS

1. Essentials of Biochemistry by U. Satyanarayana.

2. Text book of Biochemistry for Medical students. DM Vasudevan

3. Integrated textbook of Biochemistry Volume-l and II. Indumathi.

4. Textbook of Biochemistry for Medical students. MN Chatterjee and Rana Shinde.

5. Harper's Illustrated Biochemistry.

6. Essentials of Biochemistry. Pankaja Naik

L/T/P/C

2/-/-/2

SUBJECT DISCRIPTION

Sociology will introduce student to the basic sociology concepts, principles and social process, social institutions in relation to the individual, family and community and the various social factors affecting the family in rural and urban communities in India will be studied.

UNIT 1

1. Introduction:

a. Meaning- Definition, Nature and Scope of Sociology
b. Methods of Sociological Investigations, Case Study, Social Survey, Questionnaire and Interview methods.
c. Importance of its study with special reference to Health Care Professionals.

2. Social Factors in health and disease situations:

a. Role of Social factors in health
b. Role of social factor in illness
c. Decision making in taking treatment

UNIT-2

1. Socialization:

a. Definition and Meaning of Socialisation
b. Primary, Secondary and Anticipatory socialisation
c. Agencies of Socialisation

2. Social Groups:

a. Definition and Features of Social Group
b. Primary Social Group
c. Secondary Social Group
d. The role of Primary and Secondary Groups in Hospitals.

UNIT-3

1. Family:

a. The family, meaning and definition
b. Functions of family
c. Changing family patterns
d. Influence of Family on the individuals health, the effects of sickness in the family.

2. Community:

a. Rural community: meaning and features- Health problems of rural community.
b. Urban community: meaning and features – Health problems in urbanities.

UNIT-4

1. Culture and Health*:*

a. Concept of Health
b. Concept of Culture
c. Cultural factors affecting Health and diseases

2. Social Change:

a. Meaning of social change
b. Factors of social change
c. Human adaptation and social change
d. Social planning and Health

UNIT-5

1. Social Problems:

a. Population explosion
b. Juvenile delinquency
c. Alcoholism
d. Unemployment
e. Poverty
f. Problems of women

2. Social Security:

Social security and social legislation

Recommended Books:

1. Principles of sociology - - - - - C.N. Shankar Rao
2. Sociology for physiotherapy students - - - - K.P Neeraja

ENGLISH AND COMMUNICATION SKILLS

L/T/P/C

2/-/-/2

Course Objectives:

- To enhance the lexical and grammatical skills of the learners.
- To develop reading competencies for academic and professional requirements.
- To write effectively to meet professional needs.
- To hone speaking and listening skills.
- To enhance empathy and other vital interpersonal skills of the learners

UNIT 1: Sympathy (Poem) by Charles Mackay
Reading - Reading and its importance, techniques of effective reading. Writing - Paragraph Writing (Topic sentence, Supporting sentences, and Conclusion) Grammar - Parts of Speech (Parsing), Articles Vocabulary - Pain and Symptoms, and Common Illness **ELCS LAB** CALL LAB: Phonetics - Vowel Sounds (Monophthongs and Diphthongs) Listening - Introduction to listening, Purpose of Listening, and Barriers to effective listening ICS LAB: Speaking - Self-introduction and Introducing others, JAM

UNIT 2: A Birthday Letter by Jawaharlal Nehru
Reading - Skimming and Scanning Writing - Letter writing (Requests, Leave applications, Purchase letters, Letters in correspondence with medical insurance companies) Grammar - Phrase, Clause and Sentence; Prepositions Vocabulary - Body parts and diseases, Definitions / One-word substitutes **ELCS LAB** CALL LAB: Phonetics - Consonant Sounds Listening - Listening for gist and specific information ICS LAB: Speaking - Small talk, Narration of anecdotes

UNIT 3: The secret of work by Swami Vivekananda
Reading - Making inferences and predictions Writing - E-mail writing Grammar - Tenses, Reported speech Vocabulary - Food and lifestyle, Instruments and Equipment **ELCS LAB** CALL LAB: Intonation Listening - Listening and identifying facts and opinions ICS LAB: Speaking - Role Plays (OET) (Giving and taking instructions, interacting with and explaining processes, conditions and instructions to the patients and their attenders.

UNIT 4: All the world's a stage (Poem) by William Shakespeare
Reading - Reading for explicit and implicit meaning Writing - Short essays: 2-Paragraph Essay, Thesis Statement Grammar - Subject-Verb agreement, Degrees of Comparison Vocabulary - Caring and Emotions, Medical Abbreviations and Acronyms **ELCS LAB** CALL LAB: Consonant Clusters Listening - Listen- Comprehend - Speak, Health Care ICS LAB: Speaking - Formal Discussions, Physical Description/Personality

UNIT 5: Sister Nivedita: Calcutta's Angel of Mercy (Article/Essay) by Monidipa Dey
Reading - Intensive and Extensive Reading, reading comprehension passages from OET and IELTS Writing - Report writing (Analyzing tests and Reporting patient condition) Grammar – Voice, If conditionals Vocabulary - Health, Hygiene and Wellness, Medical Vocabulary/Terminology **ELCS LAB** CALL LAB: Past Tense Markers and Plural Markers Listening - Listening tasks from OET and IELTS ICS LAB: Speaking - Conversation practice, Short oral presentations specifying the condition of the patient

COURSE OUTCOMES:

- Construct grammatically correct sentences with appropriate vocabulary.
- Analyze, interpret and synthesize a diverse range of profession-specific concepts through better comprehension of the text.
- Draft various types of written communication pieces useful to their professional lives.
- Understand and apply norms of scientific communication, soft skills and positive interpersonal communication.
- Listen effectively and speak fluently in formal and informal situations, especially in their workplace.

TEXTBOOK:

English for nurses by Vijaya Laxmi Naidu. Nirali Prakashan. 2008.

RECOMMENDED BOOKS:

- Practical English Usage by Michael Swan. OUP. 1995.
- On Writing Well by William Zinsser, Harper Resource Book. 2001.
- Cambridge English for nursing by Virginia Allum and Patricia Mc Garr. CUP. 2010.
- English for nursing by Ross Wright and Bethany Cagnol. Pearson. 2001.
- English for nursing-2 by Maris Spada Symonds and Ross Wright. Pearson. 2001.
- Everyday English for International nurses by Joy Parkinson and Chris Brooker. Elsevier. 2004.
- Oxford English for career Nurses by Tony Grice. Oxford University Press. 2007.

BASICS OF COMPUTERS

L/T/P/C

1/-/2/2

COURSE OBJECTIVES:

To understand all components of computer, different working environments and operations of computer.

To learn creating different types of word documents, MS Excel manipulations, Power point documents.

To understand basic requirements of computer network hardware, software and its network architecture.

UNIT – I

Introduction to computers--Definition of Computer-Characteristics of computer- Components of Computer Hardware – Input & Output devices- Memories– RAM and ROM– MB, GB their conversions – Software: Application Software and Systems software- Data and Information –Different computer languages- Number systems- Binary and decimal conversions.

UNIT – II

MS WORD: Typing text in MS Word– Manipulating text¬– formatting text–using different font sizes, bold, italic– bullets and numbering –Pictures, Aligning the text and justify– choosing paper size– adjusting margins– header and footer, inserting page no's in a doc– printing a file with options– using spell check and grammar– find and replace– mail merge – insert tables in a document.

UNIT – III

MS EXCEL: Creating MS Excel-Cell editing, using formulas and functions, manipulating data with excel– using sort function to sort numbers and alphabets– drawing graphs and charts using data in excel.

MS POWERPOINT: Slide transition and animation-slides with sounds– inserting clip arts– Pictures, tables and graphs.

UNIT – IV

Introduction to Computer Networks: Introduction, Computer Network Devices(Hubs, Switches, Routers, Gateway, Bridge, Modems, Wireless Access Points, Firewalls & NIC), Types of computer Networks (LAN, MAN & WAN), Network Topologies (Star, Ring, Mesh, Tree, Hybrid Topologies), Internet Based Applications, Advantages & Disadvantages of Computer Networks, E-Mail, Components of E-Mail, Attaching Files in E-mail, Different Search Engines.

UNIT – V

Introduction to Artificial Intelligence & ML: History of AI, Sub Areas of AI, Applications of AI in Healthcare, Benefits of AI in Health Care, Challenges of AI in Healthcare, Introduction to MachineLearning, Applications of Machine Learning, Machine Learning Algorithms, Real world Machine Learning Use Cases.

COURSE OUTCOMES:

At the end of the course the student will be able

To understand peripherals of the computer how it works and understand various languages ofthe computer.

To create any kind of presentations for presenting their knowledge anywhere in the form ofdocument or ppt.

To create excel sheets to save data and process the data efficiently.

To understand basic requirements of computer network hardware, software and itsnetwork architecture.

RECOMMENDED BOOKS:

- Computer Fundamentals by Goel, Anita Pearson
- Computer Fundamentals : Concepts, Systems & Applications- 8th Edition by Priti Sinha, PradeepK., Sinha
- MS-Office 2010 Training Guide by Prof. Satish Jain, M. Geetha
- Computer Networks, Andrews S Tanenbaum, 5th Edition, Pearson Education
- Artificial Intelligence : A modern Approach, Stuart J. Russell and Peter Norvig, Third Edition, PearsonEducation
- Hands-on Machine Learning with Scikit-Learn, Keras, and TensorFlow, Aurelien Geron-Oreilly, 2ndEdition.

HUMAN ANATOMY - I Practical

L/T/P/C

-/-/4/2

Human anatomy practicals for physiotherapy students are essential for understanding the structure of the human body, its systems, and their functional relationships. These practicals focus on giving students hands-on experience in identifying anatomical structures, learning dissection techniques, and understanding the musculoskeletal, nervous, and cardiovascular systems, all of which are vital for effective physiotherapy practice.

GROSS SPECIMENS/SPOTTERS

- Upper Extremity
- Identify the spotter- (Cross section of shoulder Joint, Elbow Joint, Wrist complex,Hand)
- Identify the bone- UPPER EXTREMITY BONES (Scapula, Clavicle, Humerus, Radius and Ulna, Carpals, Metacarpals and Phalanges) Including side determination
- Surface Anatomy of the Upper Extremity – UPPER EXTREMITY BONES AND MUSCLES
- Myology- (cadaveric spotter) Spotters of the upper extremity muscles including the origin, insertion, blood and nerve supply
- Spotters of Blood vessels (Profunda Brachii, Brachial, Radial, Ulnar)
- Spotter of Nerves (Axillary, Musculocutaneous, Radial, Median, Ulnar)
- Structure and Parts of the Breast- Spotter Cardio-vascular and Respiratory Anatomy
- Gross Specimen of Heart, Lung
- Spotters of Bronchial tree, Bronchopulmonary segments
- Myology- (Diaphragm, Intercoastal muscles and Accessory Muscles)
- Systemic Anatomy
- Gross Specimen/Spotter (Stomach, Liver, Gall Bladder, Spleen, Pancreas, Intestines,Kidney, Uterus)
- Cross section of Kidney
- Spotters of Glands- (Pituitary Gland, Thyroid gland, Adrenal gland, Parathyroid, Pineal Gland)

HUMAN PHYSIOLOGY - I Practical

L/T/P/C

-/-/4/2

These practicals typically align with the theoretical aspects of physiology and help students apply concepts to real-world clinical scenarios. Key Areas Covered in Human Physiology for this semester includes the following.

- Determination of blood group
- Estimation of haemoglobin concentration
- Peripheral pulse determination
- Auscultation of Heart sounds
- Determination of blood pressure
- Auscultation of breathe sounds
- Assessment of respiratory rate
- Anthropometric assessment (BMI & WHR)

ENVIRONMENTAL AWARENESS

L/T/P/C

2/-/-/2

Course Description:

This course introduces students to the fundamental concepts of environmental awareness, examining the relationship between humans and the environment. It emphasizes the impact of human activities on the planet and promotes sustainable practices. Students will explore key environmental issues, such as climate change, biodiversity, pollution, and resource conservation, and develop practical knowledge for contributing to environmental protection.

Course Objectives:

By the end of the course, students will be able to:

Understand the basic concepts of environmental science and sustainability.

Identify the major environmental challenges facing the world today.

Analyze the impact of human activities on ecosystems, biodiversity, and natural resources.

Explore global environmental policies and local solutions to environmental problems.

Implement sustainable practices in everyday life.

Unit 1

Introduction to Environmental Awareness

What is environmental awareness?

The importance of environmental education.

Key environmental concepts: ecosystems, biodiversity, sustainability. Historical perspective on environmental awareness.

Unit 2

Earth's Ecosystems and Biodiversity

What are ecosystems?

Types of ecosystems: forests, oceans, wetlands, etc. Importance of biodiversity.

Threats to biodiversity: habitat loss, invasive species, climate change.

Unit 3

Pollution and Its Impact

Types of pollution: air, water, soil, noise, and light pollution. Causes and effects of pollution on health and ecosystems. Case studies of major pollution events.

Unit 4

Climate Change and Global Warming

The science of climate change.

Greenhouse effect and human contributions.

Impacts of climate change: rising temperatures, sea levels, extreme weather. Mitigation and adaptation strategies.

Unit 5

Resource Conservation

Renewable vs. non-renewable resources.

The importance of conserving water, energy, and other resources.

Techniques for conservation: recycling, energy efficiency, and water-saving practices.

Unit 6

Sustainable Agriculture and Food Systems

Environmental impact of conventional farming practices.

Sustainable agriculture: organic farming, permaculture, and agroecology. The role of diet in environmental sustainability.

Unit 7

Waste Management

Types of waste: municipal, industrial, hazardous, electronic. The 3 Rs: Reduce, Reuse, Recycle.

Landfills, incineration, and composting. Zero waste lifestyle.

Unit 8

Water Conservation and Management

The global water crisis: causes and consequences. Water management practices and policies.

The importance of clean water for all living organisms.

Unit 9

Environmental Policy and Legislation

Global environmental treaties: Paris Agreement, Kyoto Protocol. National environmental policies and regulations.

Role of NGOs, governments, and individuals in policy development.

Unit 10

Green Technologies and Innovations

Introduction to renewable energy sources (solar, wind, hydro, etc.).
Electric vehicles and sustainable transportation.

Innovations in waste-to-energy and sustainable agriculture.

The Role of Individuals in Environmental Protection

How individual actions impact the environment.

Eco-friendly lifestyles: reducing waste, sustainable consumption, green travel. Community action and grassroots movements.

Reference Textbook

Environmental Science: A Global Concern" by William P. Cunningham & Mary Ann Cunningham

SEMESTER-II

HUMAN ANATOMY – II

L/T/P/C

4/-/-/4

UNIT-I

LOWER EXTREMITY:

1. Osteology including features, side determination, muscular attachment, clinical and applied anatomy of the following lower extremity bones Innominate bone, femur, tibia, fibula, patella, tarsals, metatarsals and phalanges.

2. Myology: Origin, insertion, nerve supply, action, function, clinical and applied anatomy

- Anterior compartment of thigh, Medial compartment and Posterior compartment
- Gluteal Region
- Anterior aspect of leg, medial and lateral aspect, Posterior aspect of leg
- Dorsum of foot

UNIT-II

LOWER EXTREMITY:

1. Arthrology: Joint structure, articulating components, relations, joint actions, Clinical and Applied Anatomy including Radiography

2. Hip Joint, Knee joint, Ankle joint, joints of the foot.

3. Femoral triangle, femoral canal and inguinal canal, Adductor canal, popliteal fossa, arches of foot 4. Lumbar plexus, Sacral plexus, Nerves of the Lower Extremity including cutaneous Nerves

5. Blood vessels and lymphatic drainage

UNIT-III

VERTEBRAL COLUMN AND PELVIC GIRDLE:

1. Atypical and typical vertebra

2. Structure and features of Cervical, thoracic, lumbar, sacral and coccygeal vertebrae

3. Origin, insertion, nerve supply and actions of pre and para vertebral muscles

4. Muscles of Trunk and Abdomen

5. Core muscle Anatomy

6. Joints of vertebral column, structure and composition of intervertebral disc including the Radiography Evaluation

7. Joint structure, articulating components, relations, joint actions, Clinical and Applied Anatomy including Radiography of Sacro- Iliac joint

8. Structure of Innominate bone Pelvic girdle and muscles of the pelvic floor including Applied Anatomy

UNIT-IV

HEAD AND NECK:

1. Bones of the skull and face

2. Muscles of the face and neck

3. Triangles of the neck

4. Gross anatomy of eyeball, nose, ears and tongue

UNIT-V

NEURO ANATOMY:

1. General organization of Nervous System

2. Central Nervous System-Gross structure of Brain and Spinal Cord

3. Diencephalon- Gross structure of Thalamus, Hypothalamus and Basal Ganglia

4. Meninges and Coverings of spinal cord

5. Cerebro-Spinal Fluid and ventricles of brain

6. Spinal Cord- Segmental features, Laminae, Nuclei, Tracks of spinal cord

7. Spinal nerves, nerve root ganglia

8. Blood supply to brain and spinal cord with clinical and applied anatomy

9. Peripheral Nervous system

10. Cranial nerves- Course and applied Anatomy Neuromuscular junction

RECOMMEMDED TEXT BOOKS

1. Human Anatomy – Snell

2. Anatomy- Chaurasia, Volume- I,II & III

3. Neuro anatomy -- Inderbir Singh

4. Human Anatomy – Kadasne, Volume- I, II & III

5. Neuroanatomy -- Vishrsam Singh

6. Human Anatomy – Datta

HUMAN PHYSIOLOGY -II

L/T/P/C

4/-/-/4

UNIT-I

NERVOUS SYSTEM-I

1. Introduction to nervous system - CNS, PNS and ANS

2. Neurotransmitters - Definition, fate of neurotransmitter, types

3. Synapse - Definition, type, structure, transmission of impulse across a synapse, properties.

4. Receptors and Sensation - Types of sensations, Classification of receptors, properties

5. Sensory System - Organization of the sensory system, sensory Homunculus

6. Ascending Tracts - Definitions, Neuronal composition of ascending tracts, dorsal column, anterolateral tract

7. Pathophysiology of pain - Definitions, hyperalgesia and allodynia, deep pain, referred pain and its theories, management of chronic pain, endogenous opioid analgesic system

8. Motor Cortex - Cerebrum, cortical areas of brain, motor homunculus, cerebral dominance, connections, mapping the functional areas of brain

9. Descending Tracts - Pyramidal system, extrapyramidal system

UNIT-II

NERVOUS SYSTEM-II

1. Spinal cord - Introduction, effects of complete transection of the spinal cord, effects of hemisection of the spinal cord (Brown-Sequard Syndrome)

2. Reflexes - Reflex action, reflex arc, classification, properties, types - conditioned reflex, stretch reflex, inverse stretch reflex, withdrawal reflex, crossed extensor reflex, superficial reflexes (Plantar & Abdominal)

3. Connections, Functions and applied aspect of thalamus, hypothalamus, cerebellum, basal ganglia 4. Regulation of tone, Posture and it’s reflexes, Equilibrium and vestibular apparatus

5. Limbic system, Reticular Activating System, Sleep and it’s types, sleep disorders, Electroencephalogram (EEG)

6. Higher Functions - Learning, Memory, Speech

7. Autonomic Nervous System - Sympathetic division, Parasympathetic division, control of autonomic functions

8. Cerebrospinal fluid - Formation and circulation, composition and properties, functions, applied aspect - Hydrocephalus, lumbar puncture

UNIT-III

SPECIAL SENSES:

1. Vision - Anatomy of eye, visual pathway, pupillary reflexes, dark adaptation, light adaptation, photosensitivity

2. Hearing - Anatomy of ear, auditory pathway, tests for hearing - Watch test, Rinne's test, Weber's test, deafness, Audiometry

3. Taste and Smell: Taste sensations, taste pathway, olfactory pathway

ENDOCRINOLOGY:

1. Hormones - Definition, types, hormonal chemistry, regulation, hormone receptor, mechanism of action

2. Secretion, regulation, function and applied aspect of Hypothalamus, Pituitary Gland, Thyroid Gland, Parathyroid Gland, Pancreas, Adrenal Gland.

UNIT-IV

REPRODUCTIVE SYSTEM:

1. Sex determination and differentiation & it's abnormalities, puberty, importance of sex hormones

2. Female reproductive system - Internal & external genital organs, Oogenesis, Structure of egg, Follicle development, ovulation, menstrual cycle, menopause

3. Male reproductive system - Testes, accessory sex organs, Spermatogenesis, structure of sperm

4. Physiology of pregnancy - Fertilization, Implantation, Placenta (formation, function, hormones), maternal changes during pregnancy, pregnancy tests, infertility

5. Childbirth Physiology - Parturition, Lactation

UNIT-V

GASTROINTESTINAL SYSTEM:

1. Physiological stages of digestion

2. Liver function

EXCRETORY SYSTEM:

1. Kidneys-structure & function
2. Urine formation (to exclude concentration and dilution)
3. Juxtaglomerular apparatus
4. Fluid and electrolyte balance – Na, K, H2O
5. Neural control of Micturition and diuresis
6. Applied physiology: Types of bladders

RECOMMENDED TEXT BOOKS

1. Text book on Medical Physiology – Guyton
2. Textbook of Physiology – A K Jain

PATHOLOGY L/T/P/C

2/-/-/2

UNIT I

Cellular adaptation, Cell injury & cell death. - 17 Hours

- Introduction to pathology.
- Overview: Cellular response to stress and noxious stimuli. Cellular adaptations of growth and differentiation.
- Overview of cell injury and cell death.
- Causes of cell injury. Mechanisms of cell injury.
- Reversible and irreversible cell injury.
- Examples of cell injury and necrosis.

UNIT II

Inflammation. - 8 Hours

- General features of inflammation Historical highlights
- Acute inflammation
- Chemical mediators of inflammation Outcomes of acute inflammation Morphologic patterns of acute inflammation Summary of acute inflammation
- Chronic inflammation

UNIT III

Immunity disorders. - 6 Hours

- General features of the immune system Disorders of the immune system

UNIT IV

Infectious diseases. - 6 Hours

- General principles of microbial pathogenesis viral infections.
- Bacterial infections-Rheumatic heart disease.
- Fungal infections.
- Parasitic infections.

UNIT V

Neoplasia. - 5 Hours

- Definitions Nomenclature.
- Biology of tumor growth benign and malignant neoplasms Epidemiology.
- Carcinogenic agents and their cellular interactions Clinical features of tumors.

UNIT VI

Environmental and nutritional disorders. - 8 Hours

- Environmental and disease.
- Common environmental and occupational exposures Nutrition and disease.
- Coronary artery disease.

Reference:

Pathology, Harsh Mohan e. Basic Pathology by Robbins

3/-/-/3

UNIT I

Morphology - 6 Hours

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

UNIT II

Growth and nutrition. - 4 Hours

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

UNIT III

Culture media. - 4 Hours

- Use of culture media in diagnostic bacteriology, antimicrobial sensitivity test.

UNIT IV

Sterilization and Disinfection. - 2 Hours

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

UNIT V

Immunology. - 6 Hours

- Immunity, vaccines, types of vaccine and immunization schedule, principles, and interpretation of common serological tests namely Widal, VDRL, ASLO, CRP, RF & ELISA.
- Rapid tests for HIV and HBsAg (excluding technical details).

UNIT VI

Systematic Bacteriology. - 10 Hours

- Morphology, cultivation, diseases caused, laboratory diagnosis including specimen collection of the following bacteria (excluding classification, antigenic structure, and pathogenicity),
- Staphylococci, Streptococci, Pneumococci, Gonococci, Meningococci, C. diphtheriae, Mycobacteria, Clostridia, Bacillus, Shigella, Salmonella, E. coli, Klebsiella, Proteus,
- Vibrio cholerae, Pseudomonas & Spirochetes.

UNIT VII

Parasitology. - 6 Hours

- Morphology, life cycle, laboratory diagnosis of following parasites: E.histolytica, Plasmodium, tape worms, Intestinal nematodes.

UNIT VIII

Mycology. - 6 Hours

- Morphology, diseases caused and lab diagnosis of following fungi. Candida,
  Cryptococcus, Dermatophytes, opportunistic fungi

UNIT IX

Virology. - 6 Hours

- General properties of viruses, diseases caused lab diagnosis and prevention of following viruses, Herpes, Hepatitis, HIV, Rabies and Poliomyelitis.

Reference:

a. Microbiology, Ananthanarayan and Paniker's,
b. CP. Baveja. Textbook of Microbiology for nurses.
c. A textbook of Microbiology-Chakraborty.

HUMAN ANATOMY PRACTICAL – II

L/T/P/C

-/-/4/2

GROSS SPECIMENS/SPOTTERS

SPINE, PELVIS AND LOWER EXTREMITY

Identify the spotter- Osteology- Identify the bone, LOWER EXTREMITY BONES (Innominate bone, femur, tibia, fibula, patella, tarsals, metatarsals and phalanges.) Including side determination, Spinal Segments, Vertebrae (Cervical, Thoracic, Lumbar, Sacral and Coccyx), Pelvis and Innominate Bones

Surface Anatomy of the Spine and Lower Extremity –Atlas, Axis, C-7 vertebrae, Spinous and Transverse process of vertebra, Locate the Innominate bone, ASIS and PSIS, Coccyx, Sacrum, Greater Trochanter, Condyles of femur, Patella, Tibial Tubercles and condyles, Shin Bone, Tarsal bones, Malleoli

Myology- (cadaveric spotter) Spotters of the lower extremity muscles including the origin, insertion, blood and nerve supply

Arthrology- (Cross section of Hip Joint, Knee Joint, Ankle Joint, Joints of Foot, Pelvic Joints, Joints of Spine, Intervertebral Joints, Facet Joints, Sacro-Iliac Joints)

Abdominal muscles, Pre and para vertebral muscles, pelvic floor muscles

Popliteal Fossa, Inguinal Canal, Arches of foot

Spotters of Blood vessels

NEURO-ANATOMY IDENTIFY THE SPOTTER

Cross Section of the Skull, Sinuses of skull,

Muscles of the skull and face

Triangles of the neck

SYSTEMIC ANATOMY

Gross Specimen/Spotter (Brain and Spinal Cord)

Cross section of brain and spinal cord

Identify the spinal nerves

Cranial Nerves

HUMAN PHYSIOLOGY PRACTICAL – II L/T/P/C

-/-/2/1

Examination of superficial sensations

Examination of deep sensations

Examination of cortical sensations

Examination of reflexes

Cranial nerve examination

Examination of Balance and coordination

INTRODUCTION TO PERFUSION EQUIPMENT

L/T/P/C

3/-/-/3

UNIT – I- CONCEPT OF OPERATION THEATRES:

Layout and designs, walls, ceilings, floor, ceiling, lightning, ventilation, airflow, temperature and humidity, operating table

UNIT II – HISTORY AND BASICS OF EXTRACORPOREAL CIRCULATION

- History and evolution of cardiopulmonary bypass (Gibbon, DeWall, etc.)
- Indications and contraindications of CPB
- Concept and purpose of extracorporeal circulation
- Overview of open-heart surgery and role of the perfusionist
- Blood flow dynamics and effects of hypothermia

UNIT III – COMPONENTS OF THE HEART-LUNG MACHINE

- Detailed parts of the heart-lung machine
- Roller and centrifugal pumps: principles, mechanisms, advantages/disadvantages
- Tubing: types, materials, sizes, and flow dynamics
- Priming fluids and their role
- Cannulation techniques and devices (arterial, venous)
- Components of CPB, Cardioplegia.

UNIT IV – OXYGENATORS AND HEAT EXCHANGE SYSTEMS

- Types of oxygenators: bubble, membrane, and hollow-fiber
- Working principles and gas exchange process
- Heat exchangers: principles of heat transfer and control
- Heater–cooler units: function and integration into circuit
- Filters and bubble traps: arterial line filter, cardiotomy reservoir filter

UNIT V – MONITORING AND SAFETY DEVICES

- Monitoring systems: pressure sensors, temperature probes, flow meters
- Alarms and safety interlocks in perfusion machines
- Venous reservoir level indicators
- Anticoagulation monitoring: ACT, blood gas analyzers

- Cardioplegia delivery system: components and types

UNIT VI - BIOCOMPATIBILITY, STERILIZATION, AND MAINTENANCE

- Materials used in perfusion circuits: biocompatibility and surface coatings
- Sterilization and disinfection procedures for perfusion equipment, special equipments: sharp/semi sharp, microsurgical equipments, air powered equipments, lensed equipments, laparoscopic equipments, cautery machines, tourniquets and other common equipments
- Single-use vs reusable components, Washing, cleaning, packing.
- Preventive maintenance, calibration, and troubleshooting
- Recent advancements in perfusion technology (ECMO, mini-CPB)

Reference:

1. Manual of Clinical Perfusion (2nd Edition Updates) Bryan V, Lich CCP.
2. Cardiopulmonary bypass Reeds & Clarke.

MEDICAL PHYSICS

L/T/P/C

2/-/-/2

UNITI: FUNDAMENTALS OF PHYSICS IN MEDICINE

- Basic Units and Measurements – SI units, derived units, dimensions, conversions
- Mechanics and Motion – types of motion, Newton's laws, vectors, scalars, linear/angular momentum
- Fluid Mechanics – pressure, Pascal's law, Bernoulli's principle, applications in blood flow and respiratory systems
- Bio-Mechanics Basics – center of gravity, torque, levers (applications in human body)

UNIT II: HEAT, TEMPERATURE, AND THERMODYNAMICS

- Temperature Scales – Celsius, Kelvin, Fahrenheit
- Heat Transfer Mechanisms – conduction, convection, radiation
- Thermal Expansion and Clinical Devices
- First and Second Law of Thermodynamics – energy conservation and entropy in physiological systems
- Applications in Sterilization and Cryogenics

UNIT III: SOUND AND ULTRASONICS IN MEDICINE

- Nature of Sound – frequency, wavelength, velocity, amplitude
- Acoustics of the Human Ear
- Medical Applications – stethoscope principles
- Ultrasound imaging – A-mode, B-mode, M-mode
- Doppler effect and fetal monitoring

UNIT IV: LIGHT, OPTICS AND LASERS IN MEDICINE

- Nature of Light and Refraction
- Lenses and Optics in Vision – human eye structure, myopia, hyperopia, correction
- Medical Optical Instruments – microscope, endoscope, ophthalmoscope
- Laser in Medicine – laser types, properties, applications in dermatology, ophthalmology, surgery

UNIT V: ELECTRICITY, MAGNETISM AND ELECTROMAGNETIC WAVES

- Basic Electrical Concepts – voltage, current, resistance, Ohm's law
- AC and DC Current – frequency, impedance, circuits
- Capacitors and Inductors – applications in defibrillators, pacemakers
- Electromagnetic Radiation – spectrum, visible light, X-rays, UV, IR
- Magnetic Fields – MRI principle and application

UNIT VI: RADIATION PHYSICS AND PROTECTION

- Radioactivity – alpha, beta, gamma radiation

- Nuclear Physics Basics – atomic structure, isotopes, half-life
- X-rays and Imaging – X-ray production, attenuation, interaction with tissues, CT scan principle
- Radiation Dosimetry – units: Gray, Sievert, Becquerel
- Radiation Hazards & Protection – ALARA principle, shielding, time-distance-shielding concept, safety standards and regulatory bodies (ICRP, AERB)

UNIT VII: BIOMEDICAL INSTRUMENTATION BASICS

- Transducers and Sensors – temperature, pressure, ECG, EEG, EMG sensors
- Basic Monitoring Equipment – ECG, pulse oximeter, defibrillator, ventilators
- Electrical Safety in Hospitals – grounding, leakage currents, isolation techniques

UNIT VIII: PRINCIPLES AND APPLICATIONS OF MODERN IMAGING MODALITIES

- Computed Tomography (CT) – principle, image formation, applications
- Magnetic Resonance Imaging (MRI) – principle, contrast mechanisms, applications
- Positron Emission Tomography (PET) – principle, radioisotopes used
- Digital Radiography – CR vs DR, image acquisition and processing

Recommended Textbooks & References

- "Medical Physics" by A. K. Bhattacharya
- "Basic Radiological Physics" by Dr. K Thayalan
- "Physics for Radiographers" by John L. Ball & Tony Price
- "Introduction to Biomedical Engineering" by John Enderle
- ICRP and AERB Radiation Safety Guidelines

STRESS MANAGEMENT

L/T/P/C

1/-/-/1

Course Objectives:

By the end of the course, students will:

Understand what stress is and how it affects the body and mind.

Learn how to recognize personal stressors and individual responses to stress.

Explore various coping strategies to manage stress effectively.

Understand how lifestyle changes can reduce overall stress.

Learn how to manage stress in academic and professional settings.

Equip students with tools to build long-term resilience against stress.

Unit 1

Introduction to Stress and Its Effects Definition of stress: Eustress vs. Distress Types of stress: Acute vs. Chronic

The biology of stress (fight-or-flight response, hormones)

Short-term and long-term effects on physical and mental health The role of perception and coping mechanisms

Unit 2

Identifying Stressors and Personal Stress Responses

Internal vs. external stressors (work, relationships, environment) Identifying stress patterns (thoughts, behaviours, physical reactions) Emotional regulation and its role in stress management

The Stress Process: How stress develops and escalates

Unit 3

Coping Strategies and Stress Relief Techniques

Problem-focused vs. emotion-focused coping

Cognitive Behavioral Therapy (CBT) techniques for stress

Relaxation techniques (deep breathing, progressive muscle relaxation) Time management and organization as stress-relief tools

Developing a personal coping plan

Unit 4

Lifestyle Changes for Managing Stress The role of physical activity and exercise Sleep hygiene and its connection to stress Nutrition and its impact on mental health Social support and healthy relationships Mindfulness and meditation practices

Unit 5

Stress Management at Work and School

Managing work and school stress: Time management, prioritization Dealing with high-pressure environments and deadlines

Building resilience and avoiding burnout

The importance of taking breaks and practicing self-care

Unit 6

Building Long-Term Stress Resilience

Resilience theory and how to bounce back from adversity Developing a growth mindset to handle challenges Building emotional intelligence to cope with stress Integrating stress management into daily life

Reference Textbook

Stress Management: From Basic Science to Best Practice" by C. L. Cooper and Philip L. Merritt

SEMESTER-III

PHARMACOLOGY L/T/P/C

3/-/-/3

UNIT-I

General Pharmacology

a) Absorption, distribution, metabolism and elimination of drugs,

b) routes of drug administration.

c) Adverse reactions to drugs.

d) Factors modifying drug response

UNIT-II

Autonomic nervous system & Peripheral nervous system

a) Sympathetic nervous system - sympathomimetics, sympatholytics

b) Parasympathetic - Cholinergics, Anticholinergics Drugs

c) Skeletal muscle relaxants

d) Local anaesthetics

UNIT-III

Central nervous system

a) Drug therapy of various CNS disorders like epilepsy, depression.

b) Non-steroidal anti-inflammatory drugs

c) General anesthetics

AUTOCOIDS

a) Histamine and anti histaminics

UNIT-IV

Cardiovascular system

a) Drug therapy of hypertension, shock, angina, cardiac arrhythmias

b) Diuretics

c) Coagulants and anticoagulants, antiplatelet drugs

d) Hypo-lipidemics

Gastrointestinal and respiratory system

a) Drug treatment of peptic ulcer

b) Drug therapy of bronchial asthma

UNIT-V

Hormones

a) Drug therapy of Diabetes

b) Corticosteroids

c) Chemotherapeutic agents - b-Lactam Antibiotics, fluoroquinolones, aminoglycoside, tetracyclines, chloramphericol

PRACTICALS

a) Study of laboratory animals and their handling (a. Frogs, b. Mice, c. Rats, d. Guinea pigs, e. Rabbits).

b) Study of laboratory appliances used in experimental pharmacology.

c) Study of use of anesthetics in laboratory animals.

d) Effects of skeletal muscle relaxants using rota-rod apparatus.

e) Effect of drugs on locomotor activity using actophotometer.

f) Anticonvulsant effect of drugs by MES and PTZ method.

g) Study of local anesthetics by different method

RECOMMENDED BOOKS:

1. Padmaja Uday kumar - Pharmacology for Dental & Allied Health Sciences - 4th edition, 2017.

2. Joginder Singh Pathania, Rupendra Kumar Bharti, Vikas Sood-Textbook of Pharmacology for Paramedical Students 2019

3. KD Tripathi- Essentials of Pharmacology - 8th edition, 2018.

4. HL Sharma & KK Sharma - Principles of Pharmacology - 3rd edition, 2017.

MEDICAL LAW/ ETHICS AND MEDICAL RECORDS L/T/P/C

3/-/-/3

MEDICAL LAW

UNIT-I

- Medical ethics - Definition - Goal Scope
- Introduction to Code of conduct

UNIT-II

- Basic principles of medical ethics Confidentiality Malpractice and negligence - Rational and irrational drug therapy

UNIT-III

- Autonomy and informed consent - Right of patients
- Care of the terminally ill- Euthanasia

UNIT-IV

- Organ transplantation
- Medico legal aspects of medical records-Medico legal case and type-Records and document related to MLC-ownership of medical records-Confidentiality Privilege communication Release of medical information - Unauthorized disclosure retention of medical records - other various aspects.
- Professional Indemnity insurance policy

UNIT-V

- Development of standardized protocol to avoid near miss or sentinel events Obtaining an informed consent

RECOMMENDED BOOKS:

1. Law relating to medical negligence and compensation- Dr. K.P.D.A. Prabakar & Dr. J.Paulraj Joseph-2023

2. A textbook of medical jurisprudence and toxicology-Justice K Kannan -25 edition-1" edition-2016

3. Law the doctor must know-Hitesh J Bhatt & Geetebdra Sharma-2017

4. Law on medical negligence and legal remedies-Dr. Annu Bahl Mehra & Harshit Kiran-2022

RECORD KEEPING

UNIT-I

- Commonly Used Prefixes, Suffixes and root words in Medical Terminology, Common Latin Terms used in Prescription Writing, Study of Standard Abbreviations.

UNIT-II

- Medical Records Management. Meaning, functions, principles of record keeping, Importance of medical records to patients, doctors, and hospitals, classification of records like coding system, indexing system, types of forms basic and special, legal aspects of medical records.

UNIT-III

- International Classification of Diseases (ICD), Electronic Medical Record (EMR), Records Management: Registers, forms, retention and preservation of MR, Role of MRD personnel.

UNIT-IV

- Medical Registers: Meaning, types, advantages of Medical Registers, registers used in various departments, Statutory registers and reports to be maintained-specimens

UNIT-V

- Medical Audit: its process, role and importance in hospitals.

RECOMMENDED BOOKS:

Davies, Juanita. Essentials of Medical Terminology. 3rd edition. New York. Delmar. 2008

Mogli. J.D. Medical Records: Organization & Management 2nd edition New Delhi Jaypee Brothers.

The body by Bilbirson Agreed for Occupance

ETHICS

UNIT-I

- Introduction to Public Health Ethics.
- Theories of Justice and Distribution of Public Health Resources.
- Principle for Public Health Ethics.

UNIT-II

- Priority-Setting and Resource Allocation at the Macro Level.
- Priority-Setting and Resource Allocation at the Micro Level.

UNIT-III

- Medical Ethics, Legal Aspects and Medical Terminology.

1) Role Definition and Interaction, Ethical, Moral, and Legal Responsibilities

2) Medical terminology

3) Medical waste Management

UNIT-IV

- Contemporary Ethical and Legal Issues in Health Care: Legal regulation of a standalone diagnostic center, medico-legal cases and medical negligence, ethical aspects of health care.
- Balancing Individual and Community Interests.
- Ethics and Health Promotion.

UNIT-V

- Role of Human Rights in Public Health
- Ethics of Beath Promotion and Disease Prevention

RECOMMENDED BOOKS:

1. Ethics and Public Health Archana Rani Sahoo & Patitapahan Das-2017

2. Public Health, Ethics and Equity-Sudhir Anand, Fabienne Peter and Amartya Sen-2006

3. Nursing and healthcare ethics-Robinson & Doody-6 edition-2022

4. Ethics- William K. Frankena 2 edition-2015

HEALTH CARE ADMINISTRATION

L/T/P/C

2/-/-/2

Introduction to Health Care Systems

Overview of Health Care Organizations (Hospitals, Systems, Clinics); Governance and Leadership in Health Care Organizations; Decision-Making and Communication Flows;

Health Care Policies and Regulations

Financial Management and Budgeting

Health Insurance and Reimbursement

Health Information Systems

Human Resources in Health Care: Health care workforce: Challenges and Trends; Workforce planning and job analysis; Recruitment and selection in health care; Employee retention and turnover; orientation, training, and professional development; Performance appraisal systems; Workplace safety, Wellness, and burnout prevention; HR analytics and Strategic planning

Quality Improvement and Patient Safety: Health care errors and adverse events; Root cause analysis (RCA) and Failure mode and effects analysis (FMEA); Quality measurement and performance indicators; Lean and six sigma in health care; Accreditation and regulatory requirements; Reporting systems and learning from errors

Legal and Ethical Issues

Strategic Planning and Marketing

Emerging Trends in Health Care

Recommended Text Books/Reading

1. Hospital Administration and Human Resource Management by Sharma, D.C

2. Principles of Hospital Administration and Planning by B.M. Sakharkar

3. Essentials of Hospital Management & Administration by S.L. Goel and R.K. Sharma

4. Health Care Management: Organization Design and Behaviour by Shortell & Kaluzny

5. Organizational Behaviour in Health Care by Nancy Borkowski

6. Introduction to Healthcare Quality Management by Patrice Spath

7. Patient Safety and Healthcare Improvement at a Glance by Sukhmeet Panesar et al.

PERFUSION CIRCUIT MANAGEMENT

L/T/P/C

3/-/4/5

UNIT I: CIRCUIT DESIGN & SELECTION

- Design considerations for perfusion circuits (adult, pediatric, neonatal)
- Circuit components: tubing characteristics, oxygenator, filters, reservoirs
- Criteria for selecting disposables vs. reusable components
- Safety features: occlusion settings, air-handling mechanisms

UNIT II: PRIMING & HYPOTHERMIA MANAGEMENT

- Pre-bypass checklist and priming protocol
- Priming fluids: crystalloids, colloids, plasma expanders & rheological impacts
- Hypothermia methods: rationale, temperature monitoring sites, rewarming techniques
- Effects of temperature on blood viscosity and perfusion dynamics.

UNIT III: BLOOD GAS & ANTICOAGULATION MONITORING

- Blood-gas interpretation: pH, PCO_2/PO_2, electrolytes, hemoglobin, saturation, BE
- Anticoagulation protocols during bypass: heparin, protamine, ACT & aPTT monitoring, platelet dysfunction management
- Protocols for coagulopathies and heparin-less bypass

UNIT IV: MICROEMBOLI, FILTRATION & HEMOCONSERVATION

- Embolic hazards: gaseous and particulate microemboli sources and physiology
- Filters: arterial, cardiotomy, leukocyte-depleting, micro-pore & depth filters
- Blood conservation techniques: ultrafiltration (conventional/modified), cell salvage, ultrafiltration devices

UNIT V: PUMP TYPES, CONDUCT OF CPB & TROUBLESHOOTING

- Pump mechanisms and selection: roller, centrifugal, diagonal; pulsatile vs. non-pulsatile perfusion.
- Conduct of CPB: cannulation protocols, starting, maintaining, and terminating bypass
- Managing complications: mechanical/electrical failures, perfusion accidents, safety protocols
- Termination protocols: ventilation initiation, inotropic support, de-airing before separation from bypass

PRACTICAL

- Understanding Basic Perfusion Techniques and Perfusion Circuit Management
- Understanding oxygenators, filters, reservoirs, and tubing sets
- Sterilization and safety protocols in perfusion
- Documentation and recording of perfusion procedures
- Ethical and professional practices in the perfusion setting
- Perfusion equipment troubleshooting and maintenance basics

References

- Cardiopulmonary Bypass: Principles and Practice – Glenn P. Gravlee
- Basics of Perfusion and cardiopulmonary Bypass

CLINICAL APPLICATION OF PERFUSION TECHNIQUES

L/T/P/C
3/-/-/3

UNIT 1: PRE-OPERATIVE ASSESSMENT AND PERFUSION PLANNING

- Review of cardiac surgical procedures requiring cardiopulmonary bypass (CPB)
- Pre-operative evaluation of patients: history, diagnostics, and lab tests
- Understanding pre-op imaging: ECG, echocardiogram, angiogram, CT
- Planning perfusion strategy based on comorbidities and procedure
- Communication with surgical and anaesthesia teams

UNIT 2: CLINICAL SETUP AND OPERATION OF HEART-LUNG MACHINE

- Assembling and priming circuits in the OR environment
- Operating roller and centrifugal pump systems during live cases
- Monitoring real-time perfusion parameters:
  1. Arterial/venous pressures
  2. Flow rates, oxygenation, temperature
  3. Hematocrit, electrolytes, ACT
- De-airing techniques and leak management during surgery

UNIT 3: PERFUSION IN VARIOUS SURGICAL PROCEDURES

- Adult cardiac surgeries: CABG, valve repair/replacement
- Congenital heart surgeries: ASD, VSD, TOF correction
- Aortic surgeries: dissection, aneurysm repair
- Clinical protocols for cardioplegia: antegrade, retrograde, warm/cold
- Special perfusion considerations in re-operations and high-risk cases

UNIT 4: ADVANCED SUPPORTIVE TECHNIQUES AND EMERGENCY MANAGEMENT

- Modified ultrafiltration (MUF) and conventional ultrafiltration (CUF)
- Initiation and monitoring of ECMO (VV and VA)
- Intra-aortic balloon pump (IABP): setup and perfusionist role
- Managing complications during CPB: hypotension, air embolism, equipment failure
- Post-CPB weaning techniques and patient stabilization

UNIT 5: DOCUMENTATION, ETHICS, AND PROFESSIONAL PRACTICE

- Perfusion record-keeping and operative notes
- Checklists and reporting of perfusion-related data
- Blood conservation strategies and transfusion protocols
- Legal and ethical issues in clinical perfusion
- Professionalism and communication in the OR setting
- Role of perfusionist in multidisciplinary team

Reference:

- Gravlee, Glenn P. – Cardiopulmonary Bypass: Principles and Practice
- Robert M. Bojar – Manual of Perioperative Care in Adult Cardiac Surgery

SOFT SKILLS DEVELOPMENT **L/T/P/C**

1/-/-/1

Course Objectives:

By the end of the course, students will:

Improve their communication and interpersonal skills.

Develop emotional intelligence (EQ) and conflict resolution strategies.

Enhance their ability to work in teams and exhibit leadership qualities.

Gain confidence in public speaking and professional writing.

Master time management and personal organization strategies.

Week 1

Introduction to Soft Skills

Definition of soft skills vs. hard skills

The importance of soft skills in the workplace

Key soft skills: communication, teamwork, adaptability, problem-solving, leadership, etc.

Activities: Icebreakers, group discussions on soft skills in the workplace

Assignment: Self-assessment on current soft skills

Week 2 Communication Skills

The communication process: sender, message, receiver, feedback Active listening techniques

Body language and non-verbal cues Effective speaking: tone, clarity, and pacing Email and phone communication etiquette

Activities: Role-playing scenarios (e.g., client interaction, conflict resolution)

Assignment: Practice active listening and send an email incorporating effective communication principles.

Week 3

Emotional Intelligence (EQ)

What is emotional intelligence? (Self-awareness, self-regulation, motivation, empathy, and social skills) Recognizing and managing your emotions

Understanding others' emotions and building empathy Developing emotional resilience

Activities: Emotional intelligence quizzes, group discussion on handling emotions in stressful situations

Assignment: Journaling emotional responses and reflection on EQ practices.

Week 4

Teamwork and Collaboration Roles and dynamics within teams Effective communication in teams Conflict resolution in teams

Building trust and fostering a collaborative environment

Activities: Team exercises, problem-solving tasks, and brainstorming sessions

Assignment: Work on a team project or task, and present it in class.

Week 5

Conflict Resolution

Sources of conflict (miscommunication, differing priorities, etc.)

Conflict resolution strategies (e.g., negotiation, mediation, compromise) The role of active listening in resolving conflicts

Managing personal emotions during conflict

Activities: Case studies, role-playing conflict resolution scenarios

Assignment: Reflect on a personal or professional conflict and propose a resolution strategy.

Week 6

Time Management and Personal Organization

The importance of time management in personal and professional success Prioritization techniques (e.g., Eisenhower Matrix, ABCDE method)

Tools for time management (digital calendars, to-do lists, Pomodoro technique) Setting SMART goals

Managing procrastination and avoiding distractions

Activities: Time-blocking exercises, goal-setting workshop

Assignment: Create a personal time management plan and track daily productivity for a week.

Week 7

Leadership and Influence

Types of leadership (e.g., transformational, transactional, servant leadership) Leading by example: qualities of effective leaders

Building and maintaining team morale The art of persuasion and influence

Activities: Leadership style assessment, group discussions on leadership challenges

Assignment: Write a reflection on a leader you admire and why.

Week 8

Public Speaking and Presentation Skills

Overcoming fear of public speaking

Structuring a presentation (opening, body, conclusion) Effective use of visual aids (PowerPoint, etc.)

Engaging the audience through storytelling, eye contact, and body language

Activities: Group presentations, peer feedback sessions, impromptu speaking exercises

Assignment: Prepare and deliver a short presentation (5-7 minutes) on a topic of choice.

Reference Textbook

The 7 Habits of Highly Effective People" by Stephen R. Covey

CLINICAL POSTINGS I

L/T/P/C

-/-/14/7

- Understanding the Perfusion Circuit Management
- Observing the Basic Perfusion Techniques
- Understanding the Clinical Application of Perfusion Techniques

Students are posted in the following departments,

- OT, ICU's, Wards, Emergency department

Assessment Components:

- Logbook Evaluation
- Viva Voce / Case Discussion
- Practical Skills Check
- Clinical Observation Report

SEMESTER- IV

CABG AND PATIENT MANAGEMENT

L/T/P/C

3/-/-/3

1.Haemodynamic aspects of total heart - Lung bypass

- Perfusion flow pressure and resistance distribution of blood flow among various vascular beds.

2.Metabolic aspects of total heart - Lung bypass Oxygen need and perfusion flow requirements. Perfusion flow and oxygen uptake

- Acid-base balance
- Electrolyte and water balance
- Oxygen toxicity

3. Effects of perfusion on organs

- Brain, heart, lungs, kidney liver and spleen area and other organs

4.Control of adequacy of perfusion

- The ideal perfusion
- Monitoring devices
- Techniques of control

5. Haematological problems, Blood Prime, Priming solutions, Control of Effects of various priming solution on RBC trauma

6. Induced cardiac arrest and myocardial protection

- Physiological principles of including cardiac arrest, morphology, function and metabolism of the arrested heart
- Cardioplegia - Cold blood, potassium and modified cold prime cardioplegia

7. Hypothermia

- Blood stream cooling nerves peripheral cooling modes of blood stream cooling heart and circulation at low temperature

8.Assisted circulation

- Circulatory support metabolic support by partial heart lung bypass. Effects of partial heart-lung bypass on organs.

9. Biomedicus pump

10. LV assist devices-LVAD, RVAD, BIVAD

11. Intra-aortic balloon pump-IABP

12. Autotransfusion, cell saver.

INVESTIGATIONS

- Haematological-their significance
- Urine
- E.C.G.
- Chest X-ray
- Echocardiography
- Angiography
- Liver function test
- Renal function test
- Others

Reference:

- Gravlee GP et al. – Cardiopulmonary Bypass: Principles and Practice
- Kaplan JA – Cardiac Anesthesia: In Cardiac and Noncardiac Surgery
- Kern MJ et al. – The Interventional Cardiology Manual

L/T/P/C

3/-/4/5

UNIT 1: ADVANCED CONCEPTS IN CARDIOPULMONARY BYPASS (CPB)

- Advanced principles of CPB (laminar vs turbulent flow, shear stress, pressure-flow relationships)
- Pulsatile vs non-pulsatile perfusion
- Biocompatible circuits and coated tubing
- Ultrafiltration techniques:
    1. Conventional ultrafiltration (CUF)
    2. Modified ultrafiltration (MUF)
- Hemodilution and hematocrit management strategies
- Advanced anticoagulation monitoring (TEG, Heparin assay)

UNIT 2: MYOCARDIAL PROTECTION & ORGAN PRESERVATION

- Advanced cardioplegia strategies:
    1. Blood vs crystalloid cardioplegia
    2. Antegrade vs retrograde delivery
    3. Del Nido and Custodiol cardioplegia
- Techniques for organ protection (renal, neurological, pulmonary)
- Temperature management (deep hypothermia, controlled rewarming)
- Ischemia-reperfusion injury management

UNIT 3: MECHANICAL CIRCULATORY SUPPORT (MCS)

- Intra-aortic balloon pump (IABP): indications, timing, management
- Ventricular assist devices (VADs): types, short vs long-term use
- ECMO (Extracorporeal Membrane Oxygenation):
    1. VV and VA ECMO principles
    2. Cannulation, oxygenator function, flows, monitoring
    3. ECMO weaning and troubleshooting
- Total artificial heart and implantable devices (overview)

UNIT 4: MINIMALLY INVASIVE AND ROBOTIC PERFUSION

- Perfusion considerations in:
    1. Minimally Invasive Cardiac Surgery (MICS)
    2. Port-access and robotic CABG
- Endoscopic vessel harvesting
- Sutureless anastomosis and hybrid procedures
- Off-pump coronary artery bypass (OPCAB): perfusionist's role
- Perioperative perfusion support in transcatheter valve implantation (TAVI)

UNIT 5: INNOVATIONS, MONITORING & SAFETY IN PERFUSION

- Continuous online monitoring: SvO_2, DO_2, VO_2, lactate
- Goal-directed perfusion and indexed flow management
- Blood conservation strategies and autotransfusion
- Simulation in perfusion training
- Safety protocols and checklists
- Regulatory standards and quality assurance in perfusion

Reference:

- Gravlee GP et al. – Cardiopulmonary Bypass: Principles and Practice
- Kermode J – Advanced Perfusion Techniques in Cardiac Surgery
- Glower DD – Mechanical Circulatory Support: Principles and Applications
- Darowski M – Advanced Monitoring and Management of Perfusion
- ELSO Red Book (by Extracorporeal Life Support Organization)
- Latest guidelines & updates from:
- American Society of ExtraCorporeal Technology (AmSECT)
- ELSO Guidelines
- Perfusion Journal
- Journal of ExtraCorporeal Technology

PRACTICALS:

- Setup and comparison of pulsatile vs non-pulsatile flow
- Observation of Intra-Aortic Balloon Pump (IABP)
- Demonstration of ECMO
- Basic setup and demonstration of Ventricular Assist Devices (VADs)
- Real-time monitoring of oxygen delivery (DO_2), oxygen consumption (VO_2), and SvO_2
- Use of checklists and safety protocols in perfusion
- Sterilization and maintenance of advanced perfusion equipment
- Perfusion documentation and CPB logbook maintenance
- Quality control and auditing in perfusion practice

Reference:

- Gravlee GP – Cardiopulmonary Bypass: Principles and Practice

UNIT 1: BASICS OF CRITICAL CARE

- Introduction to intensive care and emergency medicine
- ICU structure and environment
- Types of ICUs: Medical, Surgical, Cardiac, Neuro, Pediatric
- Basic life support (BLS) and advanced cardiac life support (ACLS)
- Infection control practices in ICU
- Roles and responsibilities of the perfusion technologist in ICU settings

UNIT 2: HEMODYNAMIC AND RESPIRATORY MONITORING

- Arterial and central venous pressure monitoring
- Pulmonary artery catheterization (Swan-Ganz)
- ECG monitoring and interpretation of arrhythmias
- Oxygenation and ventilation parameters (ABG, SpO_2, $ETCO_2$)
- Mechanical ventilation basics: modes, settings, alarms
- Weaning from mechanical ventilation

UNIT 3: EMERGENCY MANAGEMENT

- Cardiac arrest and resuscitation protocols
- Shock: classification, causes, and management (hypovolemic, cardiogenic, septic)
- Acute coronary syndromes (STEMI/NSTEMI) and emergency PCI
- Cardiac tamponade and pericardiocentesis
- Emergency airway management and intubation techniques
- Recognition and initial management of stroke

UNIT 4: POSTOPERATIVE CARDIAC ICU MANAGEMENT

- Postoperative care of CABG and valve replacement patients
- Common post-cardiac surgery complications: bleeding, arrhythmia, low cardiac output
- Chest drain management
- Temporary pacing and pacemaker troubleshooting
- IABP and ECMO monitoring in ICU

- Blood transfusion protocols and fluid management

UNIT 5: DRUGS IN CRITICAL CARE & EMERGENCY

- Inotropes and vasopressors (dopamine, dobutamine, adrenaline, noradrenaline)
- Anti-arrhythmic drugs and emergency medications
- Sedation, analgesia, and neuromuscular blockers in ICU
- Antiplatelet, anticoagulants, and thrombolytics
- Electrolyte and fluid therapy
- Crash cart preparation and emergency drug tray handling

Reference:

- David W. Chang – Clinical Application of Mechanical Ventilation
- Tulay Koru-Sengul – Essentials of Critical Care Nursing
- Yadav B – Textbook of Emergency and Critical Care Medicine
- Sharma S – Textbook of Critical Care for Paramedics and Nurses

HEALTH AND WELL-BEING

L/T/P/C

1/-/-/1

Course Description:

This course explores the holistic approach to health and well-being, focusing on physical, mental, and social aspects. Students will learn about health promotion strategies, the importance of physical activity, nutrition, mental health awareness, and stress management.

The course also addresses the impact of lifestyle choices and societal factors on overall health.

Course Objectives:

By the end of the course, students will be able to:

Understand the physical, mental, and social determinants of health.

Apply strategies for improving and maintaining physical health.

Recognize the importance of mental well-being and stress management techniques.

Understand the relationship between nutrition and overall health.

Develop practical skills for managing time, stress, and emotions.

Cultivate a balanced approach to achieving long-term health and well-being.

Unit 1

Introduction to Health and Well-being

Overview of health and well-being concepts

Dimensions of health: Physical, mental, social, and emotional The impact of lifestyle choices on health

Unit 2

Physical Health and Fitness

Importance of physical activity for overall health

Types of exercise: Aerobic, strength, flexibility, and balance Creating a personal fitness plan

Unit 3

Nutrition and Healthy Eating

Basics of nutrition: Macronutrients and micronutrients Healthy eating habits and food groups

Impact of nutrition on physical and mental health

Unit 4

Mental Health and Emotional Well-being

Understanding mental health: Definitions, stigma, and myths Key aspects of emotional well-being

Building emotional resilience

Unit 5

Stress Management Techniques Understanding stress and its effects on health Mindfulness and relaxation techniques

Time management for stress reduction

Unit 6

Sleep and Recovery

Importance of sleep for physical and mental health Sleep hygiene and healthy sleep habits

Impact of sleep deprivation on overall well-being

Unit 7

Social Health and Relationships

The role of social connections in well-being

Healthy relationships: Communication, boundaries, and support Community involvement and social well-being

Unit 8

Substance Use and Addiction

The impact of alcohol, tobacco, and drugs on health Understanding addiction and treatment options Preventive measures and harm reduction strategies

Unit 9

Chronic Diseases and Prevention

Common chronic diseases (e.g., diabetes, heart disease) Risk factors and lifestyle modifications for prevention Screening, early detection, and health monitoring

Unit 10

Building Healthy Habits

The psychology of habit formation

Strategies for adopting and maintaining healthy habits Overcoming barriers to healthy behaviour changes

Reference Textbook

Health and Wellness" by S. L. Kaskutas & K. A. A. Nielson

CLINICAL POSTINGS II L/T/P/C

-/-/16/8

Observing,

- Coronary Artery Bypass Grafting (CABG) & Patient Management
- Advanced Perfusion Techniques
- Critical Care and Emergency Management

Students are posted in the following departments,

- OT, ICU's, Wards, Emergency department

Assessment Components:

- Logbook Evaluation
- Viva Voce / Case Discussion
- Practical Skills Check
- Clinical Observation Report

SEMESTER- V

PEDIATRIC AND ADULT PERFUSION MANAGEMENT L/T/P/C

3/-/-/3

Unit 1: Basics of Pediatric and Adult Perfusion

- Overview of pediatric vs adult cardiovascular anatomy and physiology
- Developmental differences in circulation
- Indications for cardiopulmonary bypass in pediatric and adult patients
- Perfusion-related challenges in different age groups

Unit 2: Pediatric Perfusion Techniques

- Perfusion strategies in congenital heart diseases (ASD, VSD, TOF, TGA, TAPVR)
- Miniaturized circuits: design and management
- Pediatric flow rate and perfusion parameter calculations
- Myocardial protection in pediatric patients (Del Nido, DHCA, pH-stat vs alpha-stat)
- Modified ultrafiltration (MUF) in pediatric cases

Unit 3: Adult Perfusion Techniques

- Perfusion during CABG, valve replacement, and aortic surgeries
- Anticoagulation and hemodilution strategies in adults
- Cardioplegia: blood vs crystalloid, warm vs cold
- Temperature and metabolic control during CPB
- Ultrafiltration and fluid balance in adults

Unit 4: Monitoring and Weaning in Pediatric and Adult Cases

- Hemodynamic and metabolic monitoring during CPB
- Venting and de-airing techniques
- Weaning from bypass: pediatric vs adult approaches
- Inotropes and rhythm control
- Blood conservation and transfusion practices

Unit 5: Postoperative Management and Emergencies

- ICU management after CPB in pediatric and adult patients
- Role of perfusionist in postoperative care
- Use of ECMO and IABP in children and adults
- Emergency troubleshooting: air embolism, pump failure, hypotension
- Case documentation and perfusion record-keeping

Reference:

- Gravlee GP – Cardiopulmonary Bypass: Principles and Practice
- Mavroudis & Backer – Pediatric Cardiac Surgery
- Moss & Adams – heart disease in Infants, Children, and Adolescents
- ELSO Red Book – Guidelines for ECMO Practice

HEMODYNAMIC MONITORING

L/T/P/C

3/-/-/3

Unit 1: Introduction to Hemodynamics

- Definition and principles of hemodynamics
- Cardiac output, stroke volume, preload, afterload, contractility
- Factors affecting systemic and pulmonary circulation
- Vascular resistance (SVR, PVR)
- Physiology of blood pressure and heart sounds

Unit 2: Non-Invasive Hemodynamic Monitoring

- Blood pressure monitoring (manual, oscillometric)
- Pulse oximetry (SpO_2): principle, limitations
- Capnography ($ETCO_2$)
- Jugular venous pressure (JVP) assessment
- Doppler echocardiography in perfusion monitoring
- Impedance cardiography

Unit 3: Invasive Hemodynamic Monitoring

- Arterial line (A-line) monitoring
- Central venous pressure (CVP) monitoring
- Pulmonary artery catheterization (Swan-Ganz): measurements and waveforms
- Cardiac output measurement (thermodilution, Fick method)
- Pressure-volume loops and preload responsiveness
- Mixed venous oxygen saturation (SvO_2)

Unit 4: Advanced Monitoring Techniques in Perfusion

- Monitoring during cardiopulmonary bypass (CPB)
    1. Arterial and venous pressures
    2. Flow rate monitoring
    3. Line pressure alarms and bubble detection
    4. Venous reservoir levels
- Near-infrared spectroscopy (NIRS) and cerebral oximetry
- Lactate monitoring and metabolic indicators

- Temperature monitoring (core vs peripheral)

Unit 5: Hemodynamic Interpretation, Troubleshooting & Documentation

- Interpretation of waveforms and pressure tracings
- Identification of abnormal hemodynamic trends
- Clinical decision-making based on monitoring data
- Complications of invasive monitoring
- Troubleshooting monitoring equipment
- Hemodynamic charting and electronic data documentation

Reference:

- Understanding Hemodynamics - Antonio M. Gotto
- Essentials of Cardiopulmonary Monitoring - Michael R. Pinsky
- Cardiopulmonary Bypass: Principles and Practice - Gravlee GP

PERFUSION IN SPECIALIZED SURGERIES

L/T/P/C

3/-/4/5

UNIT 1 – INTRODUCTION TO SPECIALIZED PERFUSION

- Overview of perfusion beyond routine cardiac surgery
- Classification of specialized surgeries requiring perfusion support
- Principles of adapting cardiopulmonary bypass (CPB) to unique surgical needs
- Safety and ethical considerations in complex perfusion scenarios

UNIT 2 – PERFUSION IN CONGENITAL HEART SURGERY

- Perfusion modifications in pediatric and neonatal cases
- Use of deep hypothermic circulatory arrest (DHCA)
- Myocardial protection in pediatric patients
- Oxygenator and circuit size selection for pediatric perfusion

UNIT 3 – PERFUSION IN AORTIC AND MAJOR VESSEL SURGERIES

- CPB techniques in aortic aneurysm and dissection repair
- Selective cerebral perfusion and antegrade/retrograde cerebral perfusion
- Hypothermia management in aortic arch surgeries
- Cannulation strategies in major vessel repairs

UNIT 4 – PERFUSION IN TRANSPLANTATION AND MECHANICAL CIRCULATORY SUPPORT

- Principles of perfusion in heart transplantation
- Principles of perfusion in lung transplantation
- Organ preservation and transport techniques
- Role of perfusionist in VAD (Ventricular Assist Device) and TAH (Total Artificial Heart) implantation
- Integration with ECMO in transplant patients

UNIT 5 – PERFUSION IN NON-CARDIAC AND COMPLEX SURGERIES

- CPB-assisted tumor resections (e.g., atrial myxoma, mediastinal tumors)
- Perfusion in major trauma surgeries with cardiac involvement
- Support for minimally invasive cardiac surgery (MICS)
- Role in robotic cardiac surgeries
- Hypothermic and normothermic regional perfusion in organ salvage

UNIT 6 – CRISIS MANAGEMENT & ADVANCES

- Managing complications during specialized perfusion
- Hemodilution, coagulopathy, and blood conservation in complex cases
- Advances in monitoring (near-infrared spectroscopy, advanced hemodynamic monitors)
- Emerging technologies in specialized perfusion (miniaturized CPB, biocompatible circuits)

RECOMMENDED REFERENCE BOOKS:

- Gravlee GP, "Cardiopulmonary Bypass: Principles and Practice" – Latest edition
- Baker, "Manual of Perfusion Technology"
- Khonsari & Sintek, "Cardiopulmonary Bypass in Adults"
- Brooker, "Perfusion for Congenital Heart Surgery: Notes on Cardiopulmonary Bypass for a Complex Patient Population"
- M. Darowski, "Advances in Extracorporeal Circulation"

PRACTICALS:

- Observation in OT
- Observing Post Surgical Procedures in Critical Care and ICU
- Observing the various Adult and Paediatric Procedures in OT Complex

Reference:

Cardiopulmonary Bypass: Principles and Practice- Gravlee GP

3/-/-/3

Unit 1: Introduction to Quality Assurance (QA)

- Definition, principles, and objectives of quality assurance
- Importance of QA in clinical perfusion services
- Quality control vs quality assurance
- Regulatory bodies (NABH, JCI, ISO) relevant to perfusion practice
- Role of perfusionist in maintaining clinical quality standards

Unit 2: Standard Operating Procedures (SOPs) and Clinical Guidelines

- Development and implementation of SOPs in perfusion
- Protocols for cardiopulmonary bypass (CPB), ECMO, and IABP
- Safety checklists and time-out procedures
- Equipment calibration and maintenance logs
- Case documentation and perfusion records (manual and digital)

Unit 3: Equipment Quality and Safety Management

- Routine inspection of heart-lung machine, oxygenators, and circuits
- Preventive maintenance and servicing schedules
- Monitoring and alarm systems: standards and troubleshooting
- Sterilization protocols for extracorporeal circuits
- Inventory control and shelf-life management of disposables

Unit 4: Performance Indicators and Error Reporting

- Clinical audits and performance evaluation in perfusion
- Incident reporting and root cause analysis (RCA)
- Infection control monitoring in perfusion circuits
- Measurement of key indicators (e.g., ACT compliance, flow accuracy)
- Role of morbidity and mortality (M&M) reviews in quality improvement

Unit 5: Accreditation, Ethics, and Continuing Education

- Overview of NABH/JCI/ISO accreditation in cardiac centers
- Ethical and legal responsibilities of a perfusionist
- Patient safety and consent in perfusion-related procedures
- Importance of continuing professional development (CPD)
- Simulation-based training and competency assessments

Reference:

Gravlee GP – Cardiopulmonary Bypass: Principles and Practice

INTERPERSONAL COMMUNICATION

L/T/P/C

1/-/-/1

COURSE DESCRIPTION:

This course explores the fundamental principles, theories, and techniques of interpersonal communication. Students will examine both verbal and non-verbal communication strategies and apply these skills to improve personal and professional interactions. Through class discussions, role-playing, and group activities, students will develop a better understanding of effective communication in various social contexts.

COURSE OBJECTIVES:

By the end of the course, students will:

Understand the theories and principles of interpersonal communication.

Develop effective verbal and non-verbal communication skills.

Analyse and enhance communication in various interpersonal relationships (e.g., friendships, family, workplace).

Improve listening, empathy, and conflict-resolution skills.

Understand cultural and gender influences on communication.

Apply communication skills in real-world scenarios.

Unit 1

- Introduction to Interpersonal Communication
- Overview of interpersonal communication theory.
- Key principles: sender, message, receiver, feedback, noise. Importance of communication in daily life.

Unit 2

- Verbal Communication
- The role of language in communication.
- Choosing words carefully: Clarity, precision, and ambiguity. Influence of culture and context on verbal communication.

Unit 3

- Non-Verbal Communication
- Body language, facial expressions, and gestures. Space, posture, and touch in communication.
- The role of non-verbal cues in conveying emotions

Unit 4

- Listening Skills
- Types of listening: Active, passive, reflective. Barriers to effective listening.
- Developing empathy through listening.

Unit 5

- Self-Disclosure and Relationship Development The importance of self-disclosure in relationships. The Johari Window model.
- How self-disclosure affects trust and intimacy.

Unit 6

- Conflict in Interpersonal Communication Types of conflict: Productive vs. destructive. Conflict management styles.
- Strategies for resolving conflict in healthy ways.

Unit 7

- Cultural and Gender Differences in Communication
- Cultural influences on communication styles. Gender communication differences.
- Strategies for effective cross-cultural communication.

Unit 8

- Communication in Close Relationships
- Communication patterns in romantic relationships, family, and friendships.
- Managing expectations and maintaining healthy communication in intimate relationships.

Unit 9

- Communication in the Workplace
- Interpersonal communication in professional settings.
- Navigating professional relationships and maintaining boundaries. Communication and leadership.

Unit 10

- Digital Communication
- The role of technology in interpersonal communication. The impact of social media on relationships.
- Pros and cons of digital communication tools.
- The Ethics of Communication
- Ethical dilemmas in communication.
- Honesty, transparency, and privacy in conversations. Balancing openness with respect for others' boundaries.

Reference Textbook:

"Interpersonal Communication: Everyday Encounters" (Author: Julia T. Wood, 9th Edition

CLINICAL POSTINGS III L/T/P/C

-/-/16/8

Observing,

- Paediatric & Adult Perfusion
- Perfusion in Specialized Surgeries

Students are posted in the following departments,

- OT, ICU's, Wards, Emergency department

Assessment Components:

- Logbook Evaluation
- Viva Voce / Case Discussion
- Practical Skills Check
- Clinical Observation Report

SEMESTER- VI

EMERGING TRENDS IN PERFUSION TECHNOLOGY L/T/P/C

3/-/-/3

Unit 1: Advances in Cardiopulmonary Bypass (CPB)

- Miniaturized CPB (MCPB) and closed-loop systems
- Pulsatile perfusion and automated flow control
- Heparin-coated and biocompatible circuits
- Goal-directed perfusion strategies
- Smart perfusion monitoring with integrated software

Unit 2: Technological Innovations in Perfusion Equipment

- 5th/6th generation heart-lung machines
- Integration of AI and machine learning in perfusion data analysis
- Advanced oxygenators and membrane technologies
- Portable perfusion and transport circuits
- Wearable sensors for intraoperative monitoring

Unit 3: Mechanical Circulatory Support Innovations

- New-generation **ECMO** systems (rotary pump, magnetically levitated pump)
- Pediatric and portable ECMO units
- Total artificial heart (TAH) advancements
- Long-term **Ventricular Assist Devices (LVAD/RVAD/BiVAD)**
- Percutaneous circulatory assist devices (Impella, TandemHeart)

Unit 4: Robotic and Minimally Invasive Perfusion

- Perfusion protocols for robotic-assisted CABG and valve surgeries
- CO_2 insufflation and de-airing in minimal access
- Hybrid cardiac surgery techniques
- 3D printing and planning in congenital heart surgery
- Image-guided cannulation and real-time mapping

Unit 5: Research, Ethics, and Future Scope

- Artificial intelligence (AI) in clinical decision support for perfusion
- Big data and cloud-based perfusion record systems
- Stem cells and regenerative therapies in cardiac support
- Ethical issues in advanced and experimental perfusion
- Role of perfusionist in clinical trials and translational research

Reference:

- Cardiopulmonary Bypass: Principles and Practice- Gravlee GP

Unit 1: Overview of Organ Transplantation

- Principles of organ transplantation (Heart, Lung, Heart-Lung)
- Indications for heart and lung transplant
- Role of ECMO in bridging to transplant
- Types of transplant candidates supported by ECMO
- Organ allocation criteria

Unit 2: ECMO as a Bridge to Transplant

- VA-ECMO vs. VV-ECMO in pre-transplant support
- Selection criteria and contraindications
- Duration, outcomes, and ethical considerations
- Management of patients on ECMO waiting for transplant
- Case studies and transplant outcomes data

Unit 3: ECMO During Transplant Surgery

- Cannulation strategies and perfusion considerations
- Intraoperative management during heart/lung transplantation
- Anticoagulation strategies and ACT management
- Coordination with transplant and perfusion teams
- Transitioning from ECMO to cardiopulmonary bypass (CPB)

Unit 4: Post-Transplant ECMO Support

- Indications for ECMO after transplantation
- Weaning strategies and ECMO-related complications
- Graft dysfunction management
- Monitoring parameters and imaging guidance
- Infection control and immunosuppressive considerations

Unit 5: Emerging Practices and Ethics

- Ex-vivo lung perfusion (EVLP) and heart perfusion platforms
- Normothermic regional perfusion (NRP) in DCD transplantation

- Transport ECMO and mobile ECMO units
- Legal and ethical issues in transplant and ECMO overlap
- Quality assurance and documentation protocols

PRACTICALS:

- Introduction of ECMO, its Principles, Types of ECMO and its Components
- Uses of ECMO
- Observing the working of ECMO
- Observation of ECMO Management
- Understanding the troubleshooting and common issues associated with ECMO

Reference:

- Extracorporeal Life Support: The ELSO Red Book (5th ed.) -Bartlett et al.
- Cardiopulmonary Bypass: Principles and Practice - Gravlee GP
- Manual of Perioperative Care in Adult Cardiac Surgery - Robert M. Bojar

RESEARCH METHODOLOGY AND BIOSTATISTICS L/T/P/C

3/-/-/3

- **Introduction to Research Methodology**

Meaning of research; Objectives of research; Motivation in research; Types of researches and research approaches; Criteria for good research; Problems encountered by researchers in India

- **Identifying Research Problems**

Research problem: Conceptualizing Research: Research questions, hypotheses, constructs, variables

Testing of hypothesis: Basic concepts concerning testing of hypothesis; Limitations of testing of hypothesis

- **Ethical issues in Research**

Introduction to research ethics (Historical background, Nuremberg, Belmont Report)

Ethical principles: Autonomy, beneficence, non-maleficence, justice

Informed Consent

Privacy & Confidentiality: Data protection, anonymity, GDPR (General Data Protection Regulation) basics Vs, Digital Personal Data Protection Act 2023 of India

Ethical Review process: Role of IRB/IEC, applications.

Conflict of Interest: Financial, personal, institutional conflicts

Animal research ethics: 3Rs, ethics of animal experimentation

Components of ethical research plan: Plagiarism and Academic Misconduct (Fabrication, falsification, retractions); Authorship and Publication Ethics

- **Research Design**

Meaning of research design and its need.

Quantitative vs. Qualitative Design,

Experimental Designs: Randomized control trials, pre-post tests

Quasi-Experimental Designs: Non-randomized designs, time series

Non-Experimental Designs: Correlational, cross-sectional, case studies

- **Basic concepts of Biostatistics**

Introduction: Definition and characteristics of statistics

Importance of study of statistics; Branches of statistics; Statistics and health sciences;

Descriptive and inferential statistics

Variables and their types

Tabulation of data:

Basic principles of graphical representations

Types of diagrams- histograms, frequency polygons, smooth frequency polygon,

cumulative frequency curve, non- probability curve

Measures of central tendency: Need for measure of central tendency; Definition and calculation of mean- ungrouped and grouped; Definition and calculation of Median; Definition and calculation of mode; Comparison of mean, median, and mode

Probability and standard deviation: Meaning of probability or standard deviation; The binomial distribution; The normal distribution; Divergence from normality- skewness and kurtosis

- **Types of Data:** Qualitative data ; Quantitative data
- **Research tools and data collection methods**

Measurement and scaling techniques: Measurement in research; Scales in research sources of error in measurements; Technique of developing measurement tools; Meaning of scaling and its classification; Important scaling techniques

Methods of data collection: Collection of primary data; Collection of data through questionnaires and schedules; Differences between questionnaires and schedules

- **Sampling Methods**

Sampling fundamentals: Need for sampling, and some fundamental definitions; Important sampling distributions

Sampling design: Criteria for selecting procedure; Implications for sampling design; Steps in sampling design; Different types of sampling designs

- **Developing a research proposal**

  Introduction to Research Proposal; Selecting a Research Problem; Review of

  Literature; Formulating Research Objectives and Hypotheses; Research Questions;

  Theoretical or Conceptual Framework; Research Design and Methodology; Sampling

  Techniques and Sample Size; Data Collection Methods; Data Analysis Plan; Ethical

  Considerations; Limitations and Delimitations; References and Bibliography;

  Appendices (e.g., consent forms, tools, questionnaires)

RECOMMENDED BOOKS:

- Methods in biostatistics by Mahajan
- Research methodology by C R Kothari
- Textbook of biostatistics by Sundar Rao
- Textbook of biostatistics and research methodology by U. Satyanarayana
- Creswell, J.W., & Creswell, J.D. (2023). Research Design: Qualitative, Quantitative, and Mixed Methods Approaches
- Shamoo, A.E., & Resnik, D.B. (2015). Responsible Conduct of Research.
- Creswell, J.W. (2023). Research Design: Qualitative, Quantitative, and Mixed Methods Approaches

ART OF BEING A BETTER PERSON **L/T/P/C**

1/-/-/1

Course Description:

This course explores what it means to live ethically, compassionately, and meaningfully as a human being. Students will engage in discussions about moral philosophy, empathy, self-awareness, and how to cultivate kindness, responsibility, and social engagement in everyday life.

Course Objectives:

By the end of the course, students will:

Understand foundational ethical principles that guide human behavior.

Cultivate emotional intelligence and empathy.

Learn practical strategies for self-improvement and kindness.

Understand their role in society and how to make a positive impact.

Reflect on personal actions, relationships, and contributions to the community.

Unit 1

Introduction to Being a Good Human

Defining "goodness" and ethical living

Overview of moral philosophies: Utilitarianism, Deontology, Virtue Ethics The role of self-awareness in personal growth

Activity: Reflective journaling on what "being good" means to you.

Unit 2

The Power of Empathy

Understanding empathy vs. sympathy

The science behind empathy and its benefits for social connections Techniques for cultivating empathy in everyday life

Activity: Empathy-building exercises and discussions.

Unit 3

Emotional Intelligence (EQ)

What is Emotional Intelligence? (Self-awareness, self-regulation, motivation, empathy, and social skills) The role of EQ in personal and professional relationships

Strategies to improve emotional intelligence

Activity: Self-assessment of emotional intelligence and EQ development exercises.

Unit 4

Compassion and Kindness

The science of kindness: How kindness benefits us and others

Practicing kindness in small, everyday actions

Overcoming barriers to kindness (e.g., stress, biases, indifference)

Activity: "Random Acts of Kindness" challenge.

Unit 5

Personal Integrity and Honesty

The importance of integrity in personal and professional life Consequences of dishonesty and lack of integrity

How to align actions with values

Activity: Case study discussion on ethical dilemmas and decision-making.

Unit 6

Building Positive Relationships

Communication skills for healthy relationships Setting boundaries and respecting others' boundaries Conflict resolution and forgiveness

Activity: Role-playing scenarios to practice healthy communication.

Unit 7

Responsibility and Accountability

The concept of personal responsibility in life Accountability in both personal and community contexts How to take ownership of mistakes and learn from them Activity: Reflect on past mistakes and plan for growth.

Unit 8

Contributing to the Community and Society

The role of individuals in building strong communities Volunteering, activism, and social responsibility

The impact of small, positive actions on a larger scale

Activity: Brainstorming session on potential ways to contribute to the local community.

Unit 9

Practicing Gratitude and Contentment

The psychological and emotional benefits of gratitude Practicing contentment in a consumer-driven world Techniques for cultivating a mindset of abundance Activity: Gratitude journal and daily reflection.

Unit 10

Living with Purpose and Meaning

Discovering personal values and purpose

The intersection of passion, skills, and service Creating a life plan that aligns with core values Activity: Create a personal mission statement.

Week 11

Overcoming Negative Traits: Greed, Anger, and Envy The psychology behind negative emotions and traits How greed, anger, and envy affect our well-being

Strategies for managing and transforming negative emotions

Activity: Mindfulness meditation and reflection exercises.

Bringing It All Together: A Life of Goodness Review of key learnings from the course Creating a vision for continuous personal growth

How to maintain a positive and ethical life in a challenging world

Activity: Final reflection paper or presentation on how students will apply the course's principles to their life.

Reference Textbook

How to Win Friends and Influence People" by Dale Carnegie

The Seven Habits of Highly Effective People" by Stephen R. Covey

CLINICAL POSTINGS IV **L/T/P/C**

-/-/16/8

- Observing the various procedures in OT complex
- Observing the Pre-Operative, Intra-Operative and Post-Operative procedures
- Understanding and Observing the Transplantation and ECMO Techniques

Students are posted in the following departments,

- OT, ICU's, Wards, Emergency department

Assessment Components:

- Logbook Evaluation
- Viva Voce / Case Discussion
- Practical Skills Check
- Clinical Observation Report

SEMESTER VII

HEALTHY EATING FOR HEALTHY LIVING **L/T/P/C**

1/-/-/1

UNIT I – Introduction to Food and Nutrition

- Definitions: Food, Nutrition, Health, Nutrients

- Functions of food
- Classification of nutrients (macro & micronutrients)
- Food groups and food pyramid
- Concept of a balanced diet

UNIT II – Macronutrients and Micronutrients

- **Macronutrients**:
    1. Carbohydrates: functions, sources, energy value
    2. Proteins: types, functions, sources
    3. Fats: types, functions, dietary sources
- **Micronutrients**:
    1. Vitamins: A, B-complex, C, D, E, K – sources, deficiency disorders
    2. Minerals: Calcium, Iron, Iodine, Zinc – functions and sources

UNIT III – Nutritional Requirements and Assessment

1. Nutritional needs across the lifespan:
    a. Infants, children, adolescents
    b. Pregnant & lactating women
    c. Elderly population
2. Recommended Dietary Allowances (RDA – Indian context)
3. Methods of nutritional assessment:
    a. Anthropometry (BMI, MUAC)
    b. Dietary surveys (24-hour recall, food frequency questionnaire)

UNIT IV – Meal Planning and Diet in Health & Disease

- Principles of meal planning
- Balanced diet planning for different age groups and lifestyles
- Diet modification in common conditions:
    1. Obesity
    2. Diabetes mellitus
    3. Hypertension

4. Anemia

- Nutrition during stress and infections

UNIT V – Food Hygiene and Safety

- Food safety concepts
- Personal hygiene and hand hygiene
- Safe food handling and storage
- Common foodborne illnesses
- Reading and interpreting food labels (FSSAI guidelines)
- Food adulteration and detection techniques

UNIT VI – Lifestyle and Functional Foods

- Role of nutrition in lifestyle diseases
- Dietary patterns and behavioral changes
- Functional foods and nutraceuticals (e.g. probiotics, antioxidants)
- Importance of hydration, sleep, and physical activity
- Role of traditional Indian diets and medicinal ingredients (turmeric, ginger, etc.)

Reference books:

1. Nutrition and You" by Joan Salge Blake

2. Understanding Nutrition" by Eleanor Noss Whitney and Sharon Rady Rolfes

INTERNSHIP I L/T/P/C

-/-/40/20

Students are posted in the following units of CTVS department by monitoring and assisting the various procedures in,

- OT Complex

- ICU's
- Wards
- Emergency Department
- Medical Records Department

PROJECT I

L/T/P/C

-/-/2/1

- Should undertake extensive literature search from reputed journals in their specialization.
- Formulate a research question.

- Design a research study and get it approved from all scientific committees
- Student need to get a review article done based on the literature search

SEMESTER VIII

PROFESSIONALISM IN THE WORK PLACE **L/T/P/C**

1/-/-/1

UNIT I: Fundamentals of Professionalism in Healthcare

- Definitions and importance of professionalism
- Patient-centred care and the healthcare professional's role

- Key professional values: integrity, accountability, reliability, respect, confidentiality
- Personal grooming and workplace appearance

UNIT II: Ethical Foundations & Professional Ethics

- Introduction to professional ethics in healthcare
- Ethical principles: beneficence, non-maleficence, autonomy, justice
- Confidentiality, honesty, transparency, and accountability
- Handling ethical dilemmas in real-world scenarios

UNIT III: Communication Skills & Emotional Intelligence

- Internal and external communication: clarity, tone, and empathy
- Emotional intelligence: self-awareness, emotion regulation, empathy
- Active listening, non-verbal cues, therapeutic patient communication
- Professionalism in sensitive situations: difficult patients, grieving families

UNIT IV: Interpersonal Relationships & Teamwork

- Building effective relationships with colleagues and other professionals
- Understanding diverse patient and team backgrounds: cultural competence and sensitivity
- Conflict resolution strategies and assertiveness skills
- Trust-building, empathy, and resolution of workplace challenges

UNIT V: Professional Behavior & Workplace Conduct

- Time management, punctuality, organization, and responsibility
- Accountability, self-management, and personal growth
- Maintaining professional boundaries and upholding patient rights
- Modeling behavior for workplace culture and leadership

UNIT VI: Career Development & Professional Presentation

- Presentation skills: resumes, interviews, professional presence

- Ethical and respectful use of social media/professional platforms
- Continuing education, lifelong learning, and reflective practice
- Navigating career paths and workplace feedback systems

Reference books:

1. Professionalism: Skills for Workplace Success" by Deborah C. Dillon

2. The Professional Workplace: The Skills You Need to Succeed" by Ronald W. Holmes

INTERNSHIP II **L/T/P/C**

-/-/20/10

Students are posted in the following units of CTVS department by monitoring and assisting the various procedures in,

- OT Complex
- ICU's
- Wards
- Emergency Department
- Medical Records Department

PROJECT II

L/T/P/C

-/-/20/10

- As continuation of project I, students should do an independent research project
- They should submit the Dissertation/Thesis and defend it