MALLA REDDY VISHWAVIDYAPEETH

SCHOOL OF ALLIED AND PUBLIC HEALTH SCIENCES AND TECHNOLOGY

Suraram X Roads, Jeedimetla,
Hyderabad-500055
Web: https://mrvv.edu.in/

Program

Bachelor of Science (B.Sc.)

Neuroscience Technology

2025

MALLA REDDY VISHWAVIDYAPEETH

SCHOOL OF ALLIED AND PUBLIC HEALTH SCIENCES AND TECHNOLOGY

Bachelors of Neuroscience Technology

COURSE STRUCTURE

I year - I semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	Max. Marks		
							INT	EXT	TOTAL
1	NST3910101	Human Anatomy - I	4	-	-	4	30	70	100
2	NST3910102	Human Physiology - I	4	-	-	4	30	70	100
3	NST3910103	Medical Bio-chemistry- I	4	-	-	4	30	70	100
4	NST3910104	English and Communication Skills	2	-	-	2	30	70	100
5	NST3910105	Basic Computers	1	-	2	2	30	70	100
6	NST3910101P	Human Anatomy - I Practical	-	-	4	2	30	70	100
7	NST3910102P	Human Physiology - I Practical	-	-	4	2	30	70	100
8	NST3910106	Sociology	2	-	-	2	30	70	100
9	NST3910107VA	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	NST3910201	Human Anatomy - II	4	-	-	4	30	70	100
2	NST3910202	Human Physiology - II	4	-	-	4	30	70	100
3	NST3910203	Pathology	2	-	-	2	30	70	100
4	NST3910204	Microbiology	3		-	3	30	70	100
5	NST3910205	Introduction to Neuroscience Technology	3			3	30	70	100
6	NST3910201P	Human Anatomy – II Practical	-	-	4	2	30	70	100
7	NST3910202P	Human Physiology – II Practical	-	-	2	1	30	70	100
8	NST3910206VA	Stress Management	1	-	-	1	100	-	100
TOTAL			17	-	6	20	310	490	800

II year - III semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	Max. Marks		
							INT	EXT	TOTAL
1	NST3910301	Neuroanatomy	2			2	30	70	100
2	NST3910302	Neurophysiology	2			2	30	70	100
3	NST3910303	Basics of neuro diagnostics	3		2	4	30	70	100
4	NST3910304	Pharmacology	3	-	-	3	30	70	100
5	NST3910305	Healthcare administration	2			2	30	70	100
6	NST3910306	Medical Law, Ethics and medical records	3			3	30	70	100
7	NST3910307P	Clinical aspects of neuroscience Technology – Practical			8	4	30	70	100
8	NST3910308VA	Soft Skills Development	1			1	100	-	100
TOTAL			16		10	21	310	490	800

II-year - IV semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	Max. Marks		
							INT	EXT	TOTAL
1	NST3910401	Clinical neuro electrophysiology	3		2	4	30	70	100
2	NST3910402	Neurological conditions and disorders	3			3	30	70	100
3	NST3910403	Basics of nerve conductions and evoked potentials	3		2	4	30	70	100
4	NST3910404 (TP)	Basic Biomedical instrumentation and neuro imaging – (T+P)	2		6	5	30	70	100
5	NST3910405	Clinical postings -I			6	3	100	-	100
6	NST3910406VA	Health and well being	1			1	100	-	100
TOTAL			12	-	16	20	320	280	600

III year - V semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	Max. Marks		
							INT	EXT	TOTAL
1	NST3910501	Advanced Neuro diagnostics	3		4	5	30	70	100
2	NST3910502	Neuromonitoring in Critical Care	3			3	30	70	100
3	NST3910503	Quality Assurance in Neuroscience	3			3	30	70	100
4	NST3910504	An Introduction to Electromyography	3			3	30	70	100
5	NST3910505	Clinical Postings II– Neuro critical care			10	5	100		100
6	NST3910506VA	Interpersonal Communication	1			1	100		100
TOTAL			13		14	20	320	280	600

III year – VI semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	Max. Marks		
							INT	EXT	TOTAL
1	NST3910601	Applied Neuroscience	3			3	30	70	100
2	NST3910602	Neurotherapeutics	3			3	30	70	100
3	NST3910603	Advanced neuroimaging	3			3	30	70	100
4	NST3910604	Advanced neuroscience techniques	2			2	30	70	100
5	NST3910605	Clinical postings			10	5	100		100
6	NST3910606	Research methodology and Biostatistics	3			3	30	70	100
7	NST3910607VA	Art of being a good person	1			1	100		100
TOTAL			14		12	20	350	350	700

IV year – VII semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	Max. Marks		
							INT	EXT	TOTAL
1	NST3910701	Project work I	-	-	2	1	100		100
2	NST3910702	Internship-I	-	-	40	20	30	70	100
3	NST3910703VA	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	NST3910801	Internship-II	-		-	20	10	30	70	100
2	NST3910802	Project work II	-		-	20	10	30	70	100
3	NST3910803VA	Professionalism in the Workplace	1		-	-	1	100	-	100
TOTAL			1			40	21	160	140	300

1 Under Graduate Programme

Sl. No.	Course	Duration	Eligibility for admission
1	B.Sc Neuroscience Technology	4 years	Intermediate Bi PC, 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) Essay question 1 no. (5 marks)
(b) Short questions 1 no. (2 marks)
(c) Very short question 3 nos. (each carries 1 mark i.e., 1 x 3 = 3 marks)
Thus, a total of 10 marks for one internal assessment
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 minimum pass is 40% marks.
(f) For project both internal and external examination will be conducted.

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
GENERAL ANATOMY AND HISTOLOGY
1.Introduction to anatomy, anatomical terms, planes, axis.
2.General Anatomy:

- Fascia
- Muscles
- Bones
- Joints
- Vessels
- Nerve

3. General Histology:

- Epithelial
- Connective tissue
- Muscle
- Bone and cartilage
- Nerve and vessels
- Embryology

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

UNIT-III
BASIC ANATOMY OF 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 & RESPIRATORY ANATOMY
1. Thoracic wall
2. Anatomy of circulatory system
3. Heart: Anatomy of heart, blood Supply, nerve supply, conducting System and major blood vessels
4. Lungs: Basic Anatomy of lungs, bronchial tree, pleura, Broncho pulmonary segments, blood Supply and nerve supply
5. Diaphragm: Origin, insertion, nerve supply and action.
6. Intercostal muscles and Accessory muscles of Respiration: Origin, insertion, nerve supply and action
7. Basic anatomy of Ribs and sternum

UNIT-V

SYSTEMIC ANATOMY

1. Digestive system:
   - List the parts of the digestive system
   - Basic Anatomy of stomach, liver, gallbladder, spleen, pancreas, intestines.
2. Urinary system:
   - Basic Anatomy of kidney, urinary bladder
3. Endocrine system:
   - Position and hormones secreted by each organ
4. Genital system:
   - Basic anatomy of Male organs and female organs

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. Neuro anatomy—Vishrsam Singh
6. Human Anatomy-Datta

Human Physiology – I

L/T/P/C
4/-/-/4

UNIT-I
GENERAL PHYSIOLOGY

1. 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

2. 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. 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) Sarco tubular system
    c) Neuro muscular junction& disease affecting it
4. Mechanism of muscle contraction
5. Functions of skeletal muscle
6. Types of muscle contractions
7. Red& white muscles
8. Rigor mortis, muscular dystrophy, altered muscle tone, muscle cramp, atrophy, EMG

UNIT-III

Cardiovascular System

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

Respiratory system

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. Nervous &chemical regulation of respiration
6. Pulmonary function test-direct& indirect method

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, Disaccharide's 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

Aminoacid chemistry

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

Nucleicacids and nucleotide chemistry

- 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

Intermediary Metaboilism

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

UNIT-V

Mineral Metabolism

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

Clinical biochemistry

- 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

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 medicalinsurance 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 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.

Recommended Books:

1. English for nurses by Vijaya Laxmi Naidu. Nirali Prakashan. 2008.
2. Practical English Usage by Michael Swan. OUP. 1995.
3. On Writing Well by William Zinsser, Harper Resource Book. 2001.
4. Cambridge English for nursing by Virginia Allum and Patricia Mc Garr. CUP. 2010.
5. English for nursing by Ross Wright and Bethany Cagnol. Pearson. 2001.
6. English for nursing-2 by Maris Spada Symonds and Ross Wright. Pearson. 2001.
7. Everyday English for International nurses by Joy Parkinson and Chris Brooker. Elsevier. 2004.
8. Oxford English for career Nurses by Tony Grice. Oxford University Press. 2007.

Basic Computers

L/T/P/C
1/-/2/2

Course Objectives:

- To understand all components of computer, different working environments and operations ofcomputer.
- To learn creating different types of word documents, MS Excel manipulations, Power pointdocuments.
- To understand basic requirements of computer network hardware, software and itsnetwork 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, tablesand 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 Machine Learning, 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 of the computer.
To create any kind of presentations for presenting their knowledge anywhere in the form of document or ppt.
To create excel sheets to save data and process the data efficiently.
To understand basic requirements of computer network hardware, software and its network architecture.

Recommended Books:

1. Computer Fundamentals by Goel, Anita Pearson
2. Computer Fundamentals: Concepts, Systems & Applications- 8th Edition by Priti Sinha, PradeepK., Sinha
3. MS-Office 2010 Training Guide by Prof. Satish Jain, M. Geetha
4. Computer Networks, Andrews S Tanenbaum, 5th Edition, Pearson Education
5. Artificial Intelligence: A modern Approach, Stuart J. Russell and Peter Norvig, Third Edition, PearsonEducation
6. 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
- Spotters of Blood vessels (Profunda Brachii, Brachial, Radial, Ulnar)
- Spotter of Nerves (Axillary, Musculocutaneous, Radial, Median, Ulnar)
- Gross Specimen of Heart, Lung
- Spotters of Bronchial tree, Bronchopulmonary segments

Systemic Anatomy

- Gross Specimen/Spotter (Stomach, Liver, Gall Bladder, Spleen, Pancreas, Intestines,Kidney, Uterus)
- Cross section of Kidney

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, bleeding time and clotting time
- Estimation of haemoglobin concentration
- Peripheral pulse determination
- Auscultation of Heart sounds
- Determination of blood pressure
- Auscultation of breath sounds
- Assessment of respiratory rate

Sociology

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.

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

1. Introduction to Environmental Awareness
2. What is environmental awareness?
3. The importance of environmental education.
4. Key environmental concepts: ecosystems, biodiversity, sustainability. Historical perspective on environmental awareness.

Unit 2

1. Earth's Ecosystems and Biodiversity
2. What are ecosystems?
3. Types of ecosystems: forests, oceans, wetlands, etc. Importance of biodiversity.
4. Threats to biodiversity: habitat loss, invasive species, climate change.

Unit 3

1. Pollution and Its Impact

2. 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

1. Climate Change and Global Warming
2. The science of climate change.
3. Greenhouse effect and human contributions.
4. Impacts of climate change: rising temperatures, sea levels, extreme weather. Mitigation and adaptation strategies.

Unit 5

1. Resource Conservation
2. Renewable vs. non-renewable resources.
3. The importance of conserving water, energy, and other resources.
4. Techniques for conservation: recycling, energy efficiency, and water-saving practices.

Unit 6

1. Sustainable Agriculture and Food Systems
2. Environmental impact of conventional farming practices.
3. Sustainable agriculture: organic farming, permaculture, and agroecology. The role of diet in environmental sustainability.

Unit 7

1. Waste Management
2. Types of waste: municipal, industrial, hazardous, electronic. The 3 Rs: Reduce, Reuse, Recycle.
3. Landfills, incineration, and composting. Zero waste lifestyle.

Unit 8

1. Water Conservation and Management
2. The global water crisis: causes and consequences. Water management practices and policies.
3. The importance of clean water for all living organisms.

Unit 9

1. Environmental Policy and Legislation
2. Global environmental treaties: Paris Agreement, Kyoto Protocol. National environmental policies and regulations.
3. Role of NGOs, governments, and individuals in policy development.

Unit 10

1. Green Technologies and Innovations
2. Introduction to renewable energy sources (solar, wind, hydro, etc.). Electric vehicles and sustainable transportation.
4. Innovations in waste-to-energy and sustainable agriculture.

5. The Role of Individuals in Environmental Protection
6. How individual actions impact the environment.
7. 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
Basic Anatomy Of Lower Extremity:

1. Osteology including features, side determination, 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
    a. Gluteal Region

UNIT-II
Basic Anatomy of 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
Basic Anatomy of Vertebral Column And Pelvic Girdle:

1. Types of vertebrae
2. Basic Structure and features of Cervical, thoracic, lumbar, sacral and coccygeal vertebrae
3. Muscles of Trunk and Abdomen
4. Core muscle Anatomy
5. Joints of vertebral column, structure and composition of intervertebral disc including the Radiography Evaluation

6. Basic Joint structure, articulating components, relations, joint actions, Clinical and Applied Anatomy including Radiography of Sacro- Iliac joint
7. Basic Structure of Innominate bone Pelvic girdle and muscles of the pelvic floor including Applied Anatomy

UNIT-IV

Basic Anatomy of Head and Neck:

1. Bones of the skull and face
2. Muscles of the face and neck

UNIT-V

Basic 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. Cerebro-Spinal Fluid
5. Spinal Cord- Segmental features, Laminae, Nuclei
6. Spinal nerves
7. Basic blood supply to brain and spinal cord with clinical and applied anatomy
8. Peripheral Nervous system
9. Cranial nerves- Applied Anatomy

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. Pathophysiology of pain - Definitions, hyperalgesia and allodynia, deep pain, referred pain and its theories, management of chronic pain, endogenous opioid analgesic system
7. functions of various parts of brain in brief.

UNIT-II

Nervous System-II

1. Spinal cord - Introduction, effects of complete transection of the spinal cord, effects of hemi section of the spinal cord (Brown-Sequard Syndrome)
2. Reflexes - Reflex action, reflex arc, classification, properties, types – superficial and deep reflexes
3. Regulation of tone, Posture and it's reflexes, Equilibrium and vestibular apparatus
4. Higher Functions - Learning, Memory, Speech
5. Autonomic Nervous System - Sympathetic division, Parasympathetic division, control of autonomic functions
6. Cerebrospinal fluid - Formation and circulation, composition, 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, functions
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

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. Renal circulation
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

1. **Cellular adaptation, Cell injury & cell death.**
   - 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.

2. Inflammation:

- 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

3. Immunity disorders.

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

4. Infectious diseases. -

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

5. Neoplasia. -

- Definitions Nomenclature.
- Biology of tumor growth benign and malignant neoplasms Epidemiology.

- Carcinogenic agents and their cellular interactions Clinical features of tumors.

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

Recommended Text Book:
Pathology, Harsh Mohan e. Basic Pathology by Robbin

Microbiology

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

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

b) Growth and nutrition.
- Nutrition, growth and multiplications of bacteria, use of culture media in diagnostic bacteriology.

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

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

e) Immunology.
- 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).

f) Systematic Bacteriology.
- 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*.

g) Parasitology.
- Morphology, life cycle, laboratory diagnosis of following parasites: E.histolytica, Plasmodium, tape worms, Intestinal nematodes.
- h) Mycology.
- Morphology, diseases caused and lab diagnosis of following fungi. Candida,
- Cryptococcus, Dermatophytes, opportunistic fungi

i) Virology.

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

Recommended Books

1. Microbiology, Ananthanarayan and Paniker's,
2. CP. Baveja. Textbook of Microbiology for nurses.
3. A textbook of Microbiology-Chakraborty.

Introduction to Neuroscience Technology

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

Unit 1: Introduction to Neuroscience

- Overview of neuroscience as a discipline
- Brief history and key milestones
- Neuron structure and function
- Synaptic transmission and neurotransmitters
- Glial cells and brain anatomy
- Functional organization of CNS and PNS

Unit 2: Cellular and Molecular Basis of Neural Function

- Membrane potentials and ion channels
- Action potentials and electrophysiology basics
- Neurotransmitter synthesis, release, and reuptake
- Receptors (ionotropic and metabotropic)
- Neural coding and signal integration

Unit 3: Neuroimaging Techniques

- Principles and applications of the following techniques:
- Structural imaging: CT scan; MRI
- Functional imaging:PET, SPECT
- Electrophysiological imaging: EEG, MEG

Unit 4: Electrophysiological Recording Techniques

An overview of the following recording techniques

- Patch-clamp recording
- Intracellular and extracellular recording
- Local field potentials (LFPs)
- Electroencephalography (EEG) and Event-Related Potentials (ERP)

- Brain–computer interfaces (BCI) basics

Unit 5: Neuromodulation and Stimulation Technologies

- Transcranial Magnetic Stimulation (TMS)
- Transcranial Direct Current Stimulation (tDCS)
- Deep Brain Stimulation (DBS)
- Optogenetics – basics and applications

Unit 6: Neuroinformatics and Data Analysis

- Introduction to neuroinformatics
- Neural data types and formats
- Tools: MATLAB, Python (brief intro)
- Basics of signal and image processing
- Brain atlases and databases (e.g., Allen Brain Atlas)

Unit 7: Neurotechnology in Clinical and Research Applications

- Neuroprosthetics and neural implants
- Brain–machine interfaces
- Cognitive and behavioral neuroscience applications
- Ethical, legal, and social issues in neurotechnology
- AI in neuroscience

Unit 8: Laboratory Practicals / Demos

- Virtual labs or simulations (Neuron simulation software like NEURON or Brainstorm)
- EEG or EMG recording demo

Recommended Textbooks:

1. Principles of Neural Science – Eric Kandel et al.
2. Neuroscience: Exploring the Brain – Mark Bear et al.
3. Neurotechnology: Premises, Potential, and Problems – James Giordano
4. Online Platforms: Allen Brain Atlas; Human Connectome Project; NeuroMorpho.Org; SimBrain; NEURON simulation environment

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
- 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)
- NEURO-ANATOMY IDENTIFY THE SPOTTER
- Cross Section of the Skull
- SYSTEMIC ANATOMY
- Gross Specimen/Spotter (Brain and Spinal Cord)

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

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
- Assessment & Evaluation
- Participation: 20 (Engagement in group discussions and exercises)
- Assignments: 30
- Final Exam (Internal) : 50 marks

Recommended Text Books:

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

SEMESTER III

Neuroanatomy

L/T/P/C

2/-/-/2

Unit 1: Introduction to Neuroanatomy

- Basic terminology and orientation
- Divisions of the nervous system: CNS & PNS
- Functional classification: Somatic vs Autonomic
- Overview of embryological development of nervous system

Unit 2: Gross Anatomy of the Central Nervous System

- Brain: Cerebrum, cerebellum, brainstem (midbrain, pons, medulla)
- Lobes of the brain and their functions
- Ventricular system and cerebrospinal fluid (CSF) circulation

Unit 3: Cerebral Cortex and Functional Areas

- Structure of cerebral cortex: gyri, sulci, and lobes
- Functional areas of the cortex: motor, sensory, association
- Brodmann areas and their significance
- Hemispheric dominance and lateralization

Unit 4: Meninges, Blood Supply, and Blood-Brain Barrier

- Meninges: dura mater, arachnoid, pia mater
- Spaces: subarachnoid, subdural, epidural
- Arterial supply: Circle of Willis, vertebrobasilar system
- Venous drainage and dural venous sinuses
- Blood-brain barrier and clinical relevance

Unit 5: Peripheral Nervous System & Cranial Nerves

- Cranial nerves I–XII: origin, course, function, clinical testing
- Autonomic nervous system: sympathetic and parasympathetic divisions

Unit 6: Sensory and Motor Pathways

- Ascending (sensory) pathways: dorsal columns, spinothalamic tract
- Descending (motor) pathways: corticospinal and extrapyramidal tracts
- Reflex arcs and types of reflexes

- Upper vs lower motor neuron lesions – clinical features

Unit 7: Limbic System and Hypothalamus

- Components of limbic system and their roles in emotion and memory
- Hypothalamus: functions and homeostasis
- Reticular formation and arousal systems

Recommended Books

1. Snell, R. S. – *Clinical Neuroanatomy* (Lippincott Williams & Wilkins)
2. Vishram Singh – *Textbook of Clinical Neuroanatomy* (Elsevier)
3. Inderbir Singh – *Human Neuroanatomy* (Jaypee Publishers)
4. Crossman & Neary – *Neuroanatomy: An Illustrated Colour Text* (Elsevier)
5. Gray's Anatomy for Students – Relevant neuroanatomy chapters

Neurophysiology

L/T/P/C
2/-/-/2

Unit I: Introduction to Neurophysiology

- Overview of the nervous system: CNS and PNS
- Types of neurons and glial cells
- Functional organization of the nervous system
- Neurophysiology vs neuroanatomy

Unit II: Membrane Potential and Action Potential

- Nernst and Goldman equations (conceptual overview)
- Generation and propagation of action potentials
- Saltatory conduction in myelinated neurons

Unit III: Synaptic Transmission and Neurotransmitters

- Structure of a synapse
- Electrical vs chemical synapses
- Excitatory and inhibitory postsynaptic potentials
- Major neurotransmitters: ACh, GABA, glutamate, dopamine, serotonin
- Synaptic plasticity and learning

Unit IV: Sensory Systems and Receptors

- Classification of sensory receptors

- Somatosensory pathways (touch, pain, proprioception)
- Visual, auditory, olfactory, and gustatory systems (overview)
- Sensory coding and adaptation

Unit V: Motor Systems and Reflexes

Organization of motor pathways: pyramidal and extrapyramidal tracts

- Muscle spindle and Golgi tendon organ
- Motor cortex and control of voluntary movement

Unit VI: Higher Functions of the Brain

- Functional areas of the cerebral cortex
- EEG and sleep physiology
- Memory and learning: types and neural basis
- Language and speech areas (Broca's and Wernicke’s areas)

Unit VII: Autonomic Nervous System (ANS)

- Neurotransmitters and receptors in ANS
- Physiological roles: cardiovascular, respiratory, gastrointestinal

Recommended Books

- Guyton and Hall Textbook of Medical Physiology – John E. Hall
- Principles of Neural Science – Eric R. Kandel et al.
- Ganong's Review of Medical Physiology – Barrett et al.
- Textbook of Human Physiology for Dental Students – Indu Khurana
- Essentials of Medical Physiology – K. Sembulingam and Prema Sembulingam
- Human Physiology: From Cells to Systems – Lauralee Sherwood
- Neuroscience: Exploring the Brain – Mark Bear, Barry Connors, Michael Paradiso

Basics of Neurodiagnostics

L/T/P/C

3/-/2/4

Unit 1: Introduction to Neuro diagnostics

- Overview of neuro diagnostics: Definition, scope, history
- Structure and function of the central and peripheral nervous systems
- Introduction to neurophysiological signals
- Role of neuro diagnostics in clinical settings
- Safety, legal, and ethical concerns

Unit 2: Electroencephalography (EEG)

- Basics of EEG: Physiology, waveforms, and brain rhythms
- Types of EEG: Routine, sleep-deprived, ambulatory, video EEG monitoring
- 10–20 electrode placement system
- EEG indications: epilepsy, encephalopathy, tumors, coma, etc.
- Artifacts and troubleshooting
- Case studies and interpretation basics

Unit 3: Evoked Potentials (EPs)

- Concept of evoked responses
- Clinical indications and limitations of EPs

Unit 4: Electromyography (EMG) and Nerve Conduction Studies (NCS)

- Introduction to EMG: Needle vs surface electrodes
- Motor unit action potentials
- Nerve conduction velocity and latency
- Clinical applications: neuropathies, myopathies, neuromuscular junction disorders
- Practical demo and report reading basics

Unit 5: Neuroimaging and Correlative Diagnostics

- Overview of neuroimaging tools
- CT scan: basics, uses in stroke/trauma
- MRI: structural vs functional
- fMRI and MRS (intro only)
- EEG-MRI correlation in epilepsy
- Role of neuro diagnostics in localizing lesions

Unit 6: Polysomnography & Sleep Studies

- Basics of sleep physiology
- Components of a sleep study (EEG, EMG, EOG, ECG, airflow, oxygen)
- Sleep stages and disorders: apnea, narcolepsy, insomnia

- Clinical indications and sleep lab setup
- Role of neuro diagnostics in sleep medicine

Unit 7: Pediatric and Critical Care Neuro diagnostics

- Age-specific considerations in EEG, EPs, and EMG
- Neonatal EEG interpretation
- Neuro diagnostics in ICU settings: brain death, monitoring seizures
- Continuous EEG and intraoperative monitoring

References

- "Electrodiagnosis in Diseases of Nerve and Muscle" – Jun Kimura
- "Clinical Neurophysiology" – Misulis & Head
- "Practical Guide for Clinical Neurophysiology" – David Burke

Online resources:

- AANEM (American Association of Neuromuscular & Electrodiagnostic Medicine)
- ACNS (American Clinical Neurophysiology Society) guidelines
- EEG sample banks (OpenEEG, PhysioNet)

Basics of Neurodiagnostics (Practicals)

1. Introduction to Neuro diagnostics:
    a. Introduction to the neurodiagnostic lab setup
    b. Safety, hygiene and patient preparation protocols

2. EEG (Electroencephalography):
    c. Introduction to EEG equipment and electrodes
    d. Preparing patient and recording a sample EEG

3. EMG (Electromyography):
    e. Introduction to EMG machines and electrodes
    f. Performing basic motor and sensory nerve conduction studies

4. Evoked Potentials:
    g. Visual Evoked Potentials (VEP): Electrode placement and recording

h. Auditory Evoked Potentials (BAEP/ABR) setup and basic recording

5. Instrumentation Basics:
   i. Operation of amplifiers, filters, and electrodes
   j. Artifact recognition and troubleshooting during recordings

6. Data Analysis and Interpretation:
   k. Basics of waveform interpretation
   l. Identifying normal vs abnormal patterns in EEG and EMG
   m. Report generation basics

7. Case-Based Demonstrations:
   n. Guided analysis of clinical cases using EEG/EMG/VEP data
   o. Clinical correlation of findings

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
b) 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.

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.

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:

1. Davies, Juanita. Essentials of Medical Terminology. 3rd edition. New York. Delmar. 2008
2. Mogli. J.D. Medical Records: Organization & Management 2nd edition New Delhi Jaypee Brothers.
3. 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

Clinical aspects of neuroscience Technology – Practical

L/T/P/C
-/-/8/4

Objective:
To equip students with real-time clinical skills in neurodiagnostic testing, interpretation, patient interaction, and understanding neurological disorders in clinical settings.

Orientation & Hospital Protocols:

- Introduction to neurology departments, labs, ICUs
- Clinical documentation, patient interaction, hygiene & consent procedures

Patient History & Neuro Exams:

- Observation & recording of neurological history
- Assist in basic neurological examination (reflexes, cranial nerves, etc.)

Electroencephalography (EEG):

- Assist in EEG recordings
- Prepare patients, identify artifacts, basic observation

Electromyography (EMG) & Nerve Conduction Studies (NCS):

- -Observe and assist with EMG and NCS procedures
- Handle electrodes, machine prep, waveform observation

Evoked Potentials (EPs):

- Visual, Auditory, Somatosensory EP testing
- Learn placement and patient preparation

Sleep Studies / Polysomnography (PSG):

- Exposure to sleep lab
- Basics of PSG setup, recording and data interpretation

ICU Monitoring & Portable EEG:

- Observe neuro-monitoring in ICUs
- Participate in portable EEG setups and urgent neurological diagnostics

Imaging Integration (CT/MRI + Neurodiagnostics):

- Correlating neuroimaging with neurodiagnostic data
- Attend joint discussions or ward rounds if possible

Clinical Correlation & Case Review:

- Follow-up with neurologists on diagnosis based on neurodiagnostics
- Case discussion sessions

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.

Unit 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

Unit 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.

Unit 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.

Unit 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.

Unit 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.

Unit 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.

Unit 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.

Unit 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

Reference Textbook

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

SEMESTER IV

Clinical neuro electrophysiology

L/T/P/C
3/-/2/4

Unit 1: Introduction to Neuroelectrophysiology

- Definition and scope of clinical neuroelectrophysiology
- Bioelectric signal generation and propagation
- Overview of CNS and PNS relevant to electrophysiology
- Safety protocols and ethical guidelines in neurophysiological testing

Unit 2: Electroencephalography (EEG)

- Types of EEG: routine, sleep-deprived, video EEG, ambulatory EEG
- EEG in epilepsy, encephalopathies, sleep disorders, and coma
- Artifact recognition and signal filtering
- Case studies and hands-on demo (if possible)

Unit 3: Electromyography (EMG) and Nerve Conduction Studies (NCS)

- Physiology of motor units and neuromuscular junction
- Basics of needle and surface EMG
- Motor and sensory nerve conduction velocity
- H-reflex and F-wave studies
- Clinical applications: peripheral neuropathies, radiculopathy, ALS, myasthenia gravis
- Basic interpretation and normal/abnormal findings

Unit 4: Clinical Applications of Neuroelectrophysiology

- Localization of neurological lesions
- Pre-surgical mapping and intraoperative monitoring (brief intro)
- Use in ICU and comatose patients

Unit 6: Instrumentation and Signal Processing Basics

- Components of recording systems: amplifiers, filters, electrodes, cables
- Signal acquisition: sampling, resolution, gain
- Artifact types: electrical, physiological, environmental
- Analog vs digital signals
- Basic introduction to software for signal analysis (e.g., NeuroScan, Nicolet, MATLAB)

Unit 7: Pediatric and Geriatric Considerations

- Age-specific changes in electrophysiological recordings
- Pediatric EEG and EP patterns
- Geriatric EMG/nerve conduction variations
- Special care and safety considerations

Clinical neuro electrophysiology - Practical

Objective:

To introduce students to fundamental neurodiagnostic procedures and develop hands-on skills in basic diagnostic tests related to the nervous system.

1. Introduction & Safety Procedures

- Lab orientation: Equipment overview, workspace ergonomics.
- Patient safety & comfort: Positioning, communication, consent.
- Electrical safety in neuro labs: Grounding, avoiding artifacts.
- Biohazard precautions: Handling electrodes, disposables, and sterilization.
- Basic troubleshooting of instruments.

2. Recording Principles

- Basics of signal acquisition: amplitude, frequency, filters.
- Electrode types: surface, needle, cap electrodes – placement & care.
- Skin preparation techniques.
- Calibration and impedance checks.
- Avoiding and identifying artifacts.

3. Electroencephalography (EEG)

- Electrode placement: 10–20 system (hands-on practice).
- Montages: Referential, bipolar, average reference.
- Setting sensitivity, filters, paper speed/digital equivalent.
- Recording normal EEG in awake and relaxed state.
- Provocative tests: hyperventilation, photic stimulation.
- Identification of normal rhythms (alpha, beta, theta, delta).
- Basics of abnormal pattern recognition.

4. Evoked Potentials (EP)

- Visual Evoked Potentials (VEP): Pattern reversal, flash VEP recording.
- Brainstem Auditory Evoked Potentials (BAEP): Electrode setup, click stimulus.
- Somatosensory Evoked Potentials (SSEP): Median and tibial nerve stimulation.
- Signal averaging and artifact reduction.
- Interpretation basics of latency and amplitude.

5. Nerve Conduction Studies (NCS)

- Motor nerve conduction: setup, stimulation, CMAP measurement.

- Sensory nerve conduction: SNAP measurement.
- F-wave and H-reflex recording.
- Distinguishing normal vs abnormal conduction patterns.
- Temperature influence and standardization.

6. Electromyography (EMG) – Introductory

- Instrument setup and calibration
- Needle EMG safety precautions.
- Voluntary vs spontaneous activity patterns.
- Recording insertional, rest, and contraction activity.
- Recognizing basic myopathic and neurogenic patterns.

7. Polysomnography (PSG) – Basic

- Electrode placement for EEG, EOG, EMG.
- Recording sleep stages.
- Basics of scoring normal sleep architecture.

8. Data Analysis & Report Preparation

- Signal review and artifact marking.
- Measuring latencies, amplitudes, and conduction velocities.
- Creating structured lab reports.
- Case discussions – correlating findings with clinical scenarios.

9. Quality Control & Maintenance

- Routine equipment checks and calibration logs.
- Electrode maintenance and replacements.
- Software updates and data backup protocols.

Recommended Books

1. "Clinical Neurophysiology" – Misulis & Head
2. "Electrodiagnosis in Diseases of Nerve and Muscle" – Jun Kimura
3. "Electroencephalography: Basic Principles, Clinical Applications" – E. Niedermeyer & F. Lopes da Silva

4. Online platforms:
    a. American Clinical Neurophysiology Society (ACNS)
    b. AANEM Guidelines
    c. PhysioNet and NeuroElectro databases

Neurological conditions and disorders

L/T/P/C

3/-/-/3

Unit 1: Introduction to Neurology & Clinical Neuroscience

- Definition and scope of neurology
- Overview of CNS and PNS structure and function
- Neurological examination basics
- Classification of neurological disorders (congenital, acquired, degenerative, infectious, etc.)
- Common symptoms: headache, seizures, tremors, weakness, numbness, altered consciousness

Unit 2: Cerebrovascular Disorders

- Stroke (Ischemic and Hemorrhagic): Pathophysiology, risk factors, clinical features, diagnosis, and treatment, Stroke rehabilitation basics
- Transient Ischemic Attacks (TIAs)
- Aneurysms and AV malformations

Unit 3: Epilepsy and Seizure Disorders

- Types of seizures (focal, generalized, unclassified): Causes and diagnosis (EEG, imaging)
- Seizure first aid and emergency care
- Antiepileptic drugs (AEDs)
- Epilepsy syndromes and surgical options

Unit 4: Neurodegenerative Disorders

Signs, symptoms, pathophysiology, and management principles of the following disorders

- Alzheimer's Disease and other dementias
- Parkinson's Disease
- Amyotrophic Lateral Sclerosis (ALS)
- Huntington's Disease
- Cognitive and motor impacts

Unit 5: Demyelinating and Autoimmune Disorders

- Multiple Sclerosis (MS): types, symptoms, relapses, MRI findings
- Guillain-Barré Syndrome (GBS)
- Neuromyelitis Optica (NMO)

Immune mechanisms and treatment approaches (immunotherapy, rehabilitation) of MS, GBS and NMO

Unit 6: Neuromuscular Disorders

Diagnosis (EMG, nerve conduction studies), Symptoms, management and physiotherapy of the following disorders

- Myasthenia Gravis
- Muscular Dystrophies (Eg: Duchenne)
- Peripheral Neuropathies (diabetic, toxic, genetic)

Unit 7: Neuro infections and Inflammatory Disorders

Diagnostics (CSF analysis, MRI etc) and treatment strategies of the following disorders

- Meningitis and Encephalitis
- Brain abscesses, neurosyphilis, neurocysticercosis
- HIV-related neurological issues

Unit 8: Pediatric Neurological Conditions

- Cerebral Palsy
- Autism Spectrum Disorder (ASD) – neurological basis
- Epileptic encephalopathies
- Neurogenetic disorders (brief overview)
- Developmental delays and early diagnosis

Unit 9: Neuro-oncology and Brain Tumors

- Common CNS tumors: glioma, meningioma, pituitary adenoma
- Symptoms and diagnosis (MRI, biopsy)
- Treatment: surgery, radiotherapy, chemotherapy
- Neurological impact of treatment

Unit 10: Functional and Psychiatric-Neurological Interface

- Functional Neurological Disorders (FND)
- Interface between ps
- ychiatry and neurology
- Overview of psychosomatic symptoms and disorders (e.g., conversion disorder)

References:

1. Adams and Victor's Principles of Neurology – Ropper & Samuels
2. Clinical Neurology – Roger P. Simon et al.
3. Bradley's Neurology in Clinical Practice (Essentials) – Daroff et al.
4. WHO & CDC Fact Sheets on Neurological Disorders
5. Case studies and videos from reputable neuroclinical sources (e.g., NINDS, Epilepsy Foundation)

Basics of nerve conductions and evoked potentials

L/T/P/C
3/-/2/4

Unit 1: Basics of Physics for instrumentation and recordings

- Ion channels and neuronal excitability

- Basics of electrical signal generation and propagation in nerves
- Introduction to bioelectrical recording: concepts of latency, amplitude, and conduction velocity
- Instrumentation basics: electrodes, amplifiers, filters, grounding

Unit 2: Nerve Conduction Studies – Motor

- Physiology of motor neurons
- Motor NCS technique: procedure, sites, and protocols
- Common nerves tested: median, ulnar, peroneal, tibial
- Interpretation: distal latency, CMAP amplitude, conduction velocity
- Pathological findings in motor neuropathies

Unit 3: Nerve Conduction Studies – Sensory

- Sensory nerve physiology
- Technique for sensory NCS: orthodromic and antidromic methods

- Common nerves: median, ulnar, radial, sural, superficial peroneal
- Interpretation of SNAP amplitude, latency, and velocity
- Sensory neuropathies: clinical correlation

Unit 4: Specialized Nerve Conduction Techniques

- F-waves: principles, technique, significance
- H-reflex: physiology, technique, interpretation
- Blink reflex
- Repetitive nerve stimulation studies (RNST) for NMJ disorders (introductory level)
- Factors affecting nerve conduction: age, temperature, limb length, pathology

Unit 5: Introduction to Evoked Potentials

- What are evoked potentials?
- General principles: stimulus, response recording, averaging
- Components: latency, amplitude, waveform morphology
- Indications and clinical applications
- Comparison with spontaneous potentials like EEG

Unit 6: Visual Evoked Potentials (VEP)

- Anatomy and physiology of the visual pathway
- Techniques for pattern-reversal VEP and flash VEP
- Electrode placement (O1, O2, Oz)
- Interpretation: P100 latency, amplitude
- Clinical applications: optic neuritis, multiple sclerosis, amblyopia

Unit 7: Brainstem Auditory Evoked Potentials (BAEP/ABR)

- Auditory pathway anatomy and physiology
- Stimulation methods: click and tone-burst
- Waveform components: Waves I–VII
- Interpretation of latencies and interpeak intervals
- Clinical use: hearing assessment, acoustic neuroma screening

Unit 8: Somatosensory Evoked Potentials (SSEP)

- Somatosensory pathway overview
- Nerve stimulation: median and tibial
- Recording sites and montage

- Interpretation of P37, N20, etc.
- Application in spinal cord injury, intraoperative monitoring

Basics of nerve conductions and evoked potentials (Practical)

Objective:

- Equip students with practical knowledge and skills in performing and interpreting basic nerve conduction and evoked potential studies in a clinical setting.

1. Overview of clinical neurophysiology lab - Patient safety, consent, infection control - Equipment handling basics
2. Principle and physiology of NCS - Equipment settings and electrode types - Preparing the patient
3. Median and Ulnar nerves (Upper limb) - Peroneal and Tibial nerves (Lower limb) - Hands-on recording and interpretation
4. Sensory NCS of Median, Ulnar, Sural nerves - Recording techniques and artifact minimization
5. Concept and clinical relevance - Recording H-reflex from soleus, F-wave from median nerve
6. Basic setup and demonstration - Use in neuromuscular junction disorders
7. Introduction to VEP and pattern stimuli - Electrode placement and recording - Interpretation of latency/amplitude
8. Principles, waveforms, and placement

References:

- “Electrodiagnosis in Diseases of Nerve and Muscle” – Jun Kimura
- “Practical Guide for Clinical Neurophysiology” – David Burke
- “Evoked Potentials in Clinical Medicine” – Chiappa
- AANEM guidelines and ACNS protocols
- Online resources:

a) NeuroMep, EMG Simulator
b) PhysioNet waveform databases
c) LabTutor or virtual neurodiagnostic simulation kits

Biomedical instrumentation and neuroimaging

L/T/P/C
2/-/6/5

Unit I: Sensors and Transducers in Biomedical Applications

- Principles of sensors and transducers
- Types: Pressure, temperature, displacement, flow, pH, oxygen sensors
- Biomedical transducers for cardiovascular and respiratory systems
- Smart sensors and wearable health monitoring systems
- Calibration and signal conditioning

Learning Outcome: Learn about key sensors used in medical diagnostics and patient monitoring systems.

Unit II: Principles of Neuroimaging Techniques

- Introduction to neuroimaging
- CT (Computed Tomography) of the brain
- MRI (Magnetic Resonance Imaging): physics, sequences, safety
- fMRI (functional MRI): BOLD signals, activation mapping
- Diffusion Tensor Imaging (DTI)
- Role of neuroimaging in disease diagnosis

Learning Outcome: Understand major neuroimaging modalities and their neurological applications.

Unit III: Advanced Neuroimaging and Integration with Instrumentation

- PET (Positron Emission Tomography), SPECT
- MEG (Magnetoencephalography)
- Integration of EEG and MRI (EEG-fMRI)
- Brain-computer interface (BCI) basics
- Image processing and reconstruction basics
- Ethics and safety in neuroimaging

Learning Outcome: Explore advanced neuroimaging technologies and their integration in research and clinical diagnostics.

Biomedical instrumentation and neuro imaging - Practical

Biomedical Instrumentation

1. Bioelectrical Signal Acquisition: Electrode placement, signal amplification, and noise reduction

2. ECG Recording: 3-lead and 12-lead ECG setup, recording and analysis
3. EMG Signal Recording: Electrode setup, recording muscle potentials, signal filtering
4. EEG Signal Recording: Electrode cap placement, 10–20 system, recording EEG signals
5. Blood Pressure and Heart Rate Monitoring: Using manual and digital sphygmomanometer, pulse sensors
6. Spirometry and Lung Function Testing: Hands-on with spirometer, FVC, FEV1 measurements
7. Pulse Oximetry and Temperature Sensors: Clinical oximeter use, thermistor/thermocouple demos
8. Instrument Calibration and Maintenance: Troubleshooting and calibration of biomedical devices

Neuroimaging Techniques

1. Introduction to Neuroimaging Modalities: Basics of MRI, CT, PET, and fMRI (theoretical + virtual labs)
2. Structural Brain Imaging (CT & MRI): Interpreting CT/MRI brain images (anatomical landmarks)
3. Functional MRI (fMRI) Basics:
4. Virtual lab: Blood-oxygen-level-dependent (BOLD) signals, task-based imaging
5. PET Imaging: Overview of radiotracers, reading PET scans for brain metabolism
6. EEG-Based Brain Mapping: Event-related potentials (ERP), spectral analysis, brainwave localization
7. Brain-Computer Interface (BCI) Introduction:
8. Use of EEG for simple BCI demo (e.g., motor imagery tasks) Neuroimaging Software Tools:
9. Hands-on with software like SPM, FSL, BrainSuite or 3D Slicer
10. Case Studies in Neuroimaging: Real-life clinical imaging case analysis – stroke, tumor, epilepsy

Recommended Textbooks and References

1. Webster, J. G. – Medical Instrumentation: Application and Design, 4th Edition, Wiley
2. Rangayyan, R. M. – Biomedical Signal Analysis: A Case-Study Approach, Wiley
3. Niedermeyer, E., da Silva, F.L. – Electroencephalography: Basic Principles, Clinical Applications
4. Suri, J. S. et al. – Advanced Biomedical Image Analysis, Wiley-IEEE Press
5. Huettel, S.A., Song, A.W., McCarthy, G. – Functional Magnetic Resonance Imaging, 3rd Edition, Sinauer
6. Salman S. et al. – Neuroimaging: Clinical and Physical Principles, Springer
7. Research papers and recent reviews from PubMed, IEEE Xplore, and ScienceDirect for advanced and updated concepts.

Clinical postings - I

L/T/P/C
-/-/6/3

1. **Neurological Conditions and Disorders**
   - Introduction to the Neurology Department: patient flow and clinical setup
   - Common Neurological Disorders: Stroke (ischemic & hemorrhagic), Epilepsy & seizure types, Parkinson's disease & movement disorders, Multiple sclerosis & demyelinating diseases, Neuromuscular disorders (myasthenia gravis, muscular dystrophy), Peripheral neuropathies disorders (Alzheimer's, ALS)
   - Neurodegenerative Clinical Signs & Symptoms: observation of case presentations and rounds
   - Basics of Neurological Examination: cranial nerves, motor, sensory, coordination tests
   - Exposure to outpatient clinics, inpatient care, and rehabilitation units

2. **Basics of Nerve Conductions and Evoked Potentials**
   - Introduction to Neurophysiology Lab setup and safety
   - Principles of Nerve Conduction Studies (NCS):
   - Motor & sensory conduction techniques
   - Recording and interpretation of latency, amplitude, conduction velocity
   - Introduction to Electromyography (EMG) – demonstration and patient preparation
   - Basics of Evoked Potentials:
   - Visual Evoked Potentials (VEP)
   - Brainstem Auditory Evoked Potentials (BAEP)
   - Somatosensory Evoked Potentials (SSEP)
   - Hands-on practice with electrode placement and data acquisition (under supervision)
   - Observing patient testing and learning basic reporting formats

3. **Basic Biomedical Instrumentation and Neuroimaging**
   - Introduction to Biomedical Instruments used in Neurology:
   - EEG machines
   - EMG/NCS systems
   - Evoked potential recorders
   - Patient monitors in neurology ICU
   - Basic maintenance, calibration, and troubleshooting of instruments
   - Introduction to Neuroimaging Techniques:
   - X-ray of skull & spine
   - CT scan – principles and demonstration of scan procedure
   - MRI basics – safety protocols, patient positioning, and console overview
   - Viewing sample MRI & CT images for basic interpretation
   - PACS (Picture Archiving and Communication System) overview for case viewing

- Role of imaging in diagnosing neurological disorders (case-based discussions)

Health and Well-Being

L/T/P/C
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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

Assessment and Evaluation:
Class Participation :20
Assignments/ case study presentations: 30 Final: 50

Reference Textbook

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

SEMESTER V

Advanced Neuro Diagnostics

L/T/P/C
3/-/4/5

Unit 1: Intraoperative Neurophysiological Monitoring (IONM)

- Introduction and principles of IONM
- Modalities: MEP, SSEP, BAEP, EMG, EEG
- Setup, signal interpretation, and artifacts
- IONM in spine, brain, vascular, and tumor surgeries
- Role of technologist and real-time decision-making

Unit 2: Advanced Electromyography and Nerve Conduction Studies

- Single-fiber EMG and jitter analysis
- Repetitive nerve stimulation in neuromuscular junction disorders
- Advanced waveform interpretation
- Use in diagnosing ALS, CIDP, and myasthenia gravis
- EMG in facial, bulbar, and paraspinal muscles

Unit 3: Multimodal Evoked Potentials

- Combined sensory and motor EPs
- Cortical and subcortical evoked responses
- Use in multiple sclerosis, spinal cord lesions
- Interpretation and differential diagnosis
- Case-based exercises

Unit 4: Neuroimaging Integration in Diagnostics

- Functional MRI (fMRI): BOLD signal, paradigms, brain mapping
- Diffusion tensor imaging (DTI) and tractography
- Magnetoencephalography (MEG): comparison with EEG
- Image fusion (EEG-MRI, PET-MRI)
- Role of imaging in surgical planning

Unit 5: Neurodiagnostics in Critical Care and Neonatology

- Neonatal and pediatric EEG/EPs
- Seizure detection and status epilepticus
- Coma and encephalopathy monitoring
- Multimodal monitoring: EEG + ICP + NIRS
- Ethical concerns in critically ill patients

Unit 6: Neuroinformatics, AI, and Digital Tools

- Introduction to neuroinformatics and signal databases
- Use of AI and machine learning in EEG/EMG analysis
- Tele-neurodiagnostics and cloud-based platforms

Unit 7: Clinical Case Interpretation & Capstone

- Integration of multimodal diagnostics
- Complex case studies: epilepsy, tumors, movement disorders, ICU cases
- Diagnostic algorithms and differential diagnosis
- Capstone mini-project or group presentation
- Viva and feedback session

Advanced Neurodiagnostics (Practical)

1. Advanced Electroencephalography (EEG)

- Review of basic EEG principles and instrumentation
- **Montage selection**: Referential, bipolar, and Laplacian
- **Advanced artifact recognition and removal** (eye blink, muscle, ECG, movement)
- High-density EEG setup (64–256 channels)
- Evoked potential studies (visual, auditory, somatosensory)
- EEG in special conditions:
    - Neonatal and pediatric EEG
    - Intraoperative EEG monitoring
- Hands-on: Recording & interpretation of abnormal EEG (epileptiform discharges, encephalopathy patterns)

2. Advanced Nerve Conduction Studies (NCS) & Electromyography (EMG)

- Motor and sensory NCS in upper and lower limbs

- F-wave and H-reflex studies
- Repetitive nerve stimulation in myasthenia gravis
- Quantitative EMG and single-fiber EMG
- EMG in neuromuscular junction disorders
- Needle EMG handling, insertion techniques (with simulation models)
- Data analysis and reporting

3. Intraoperative Neurophysiological Monitoring (IONM)

- Principles and setup of IONM
- Somatosensory evoked potentials (SSEP)
- Motor evoked potentials (MEP)
- Practical: Simulated intraoperative monitoring and event recognition

4. Polysomnography & Sleep Studies

- Sleep staging (N1–N3, REM) scoring
- Sleep-disordered breathing diagnostics (Apnea-Hypopnea Index calculation)
- Multiple sleep latency test (MSLT) procedure
- Troubleshooting sensors (nasal cannula, thoracic/abdominal belts, SpO_2)
- Artifact management in PSG
- Case-based interpretation

5. Advanced Evoked Potentials

- Visual evoked potentials (pattern reversal, flash VEP)
- Auditory brainstem response (ABR)
- Middle latency and late cortical potentials
- Multimodal evoked potentials in demyelinating diseases
- Hands-on: Recording and comparing normal vs pathological responses

6. Advanced Neuroimaging Integration in Diagnostics

- Correlating EEG/NCS findings with MRI, CT, and fMRI data
- 3D EEG source localization
- Case-based diagnostic correlation sessions

7. Quality Assurance & Safety in Neurodiagnostics

- Equipment calibration and maintenance
- Patient safety protocols (infection control, electrode hygiene)
- Electrical safety and grounding in labs

- Documentation and legal aspects of neurodiagnostic procedures

8. Case-Based Practicals & Mini-Projects

- Comprehensive diagnostic workup for selected neurological disorders (e.g., multiple sclerosis, epilepsy, neuropathies)
- Mini-research projects: Data collection, analysis, and presentation
- Viva & practical exam preparation

References:

1. "Clinical Neurophysiology" – Misulis & Head
2. "Atlas of EEG in Critical Care" – Hirsch et al.
3. "Intraoperative Monitoring" – Devin K. Binder
4. "Practical Guide to EMG and Nerve Conduction Studies" – Honet & Rea
5. Software/Tools:
    - EEGLAB (MATLAB toolbox)
    - BCI2000
    - Brainstorm
    - OpenNeuro and PhysioNet databases

Neuromonitoring in Critical Care

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

Unit 1: Fundamentals of Neuromonitoring

- Definition and scope of neuromonitoring
- Importance in neurocritical care (e.g., TBI, stroke, coma)
- Anatomy and physiology of brain relevant to monitoring
- Types of brain injuries needing monitoring
- Introduction to neurocritical care environment and roles

Unit 2: Intracranial Pressure (ICP) Monitoring

- Physiology of intracranial pressure
- Monroe-Kellie doctrine
- Types of ICP monitoring:
- Intraventricular catheters
- Subdural/epidural sensors
- Waveform interpretation and management strategies

Unit 3: Cerebral Perfusion and Oxygenation Monitoring

- Cerebral blood flow (CBF) and autoregulation
- Jugular venous oxygen saturation ($SjvO_2$)
- Brain tissue oxygen tension ($PbtO_2$)

- Applications in stroke, SAH, head trauma

Unit 4: Electroencephalography in ICU (cEEG)

- Basics of EEG and waveforms
- Indications in ICU: seizures, status epilepticus, ischemia, brain death
- Continuous EEG monitoring (cEEG)
- EEG patterns: burst suppression, periodic discharges, epileptiform activity
- Artifacts and troubleshooting
- ICU-specific EEG interpretation

Unit 5: Evoked Potentials & Electromyography in ICU

- Role of evoked potentials (VEP, SSEP, BAEP) in unresponsive patients
- Somatosensory EPs in spinal cord ischemia
- Brainstem auditory EPs for brainstem function
- ICU applications of EMG (critical illness myopathy, NMJ dysfunction)

Unit 6: Intraoperative Neuromonitoring (IONM)

- Concept and purpose of IONM
- Modalities used: EEG, EMG, MEPs, SSEPs
- Role in spinal, brain, and vascular surgeries
- Interpretation and alert criteria
- Case examples and limitations

-

Unit 7: Ethical, Practical & Safety Aspects

- Informed consent and legal issues in unconscious patients
- Infection control with invasive probes
- Alarm fatigue, data overload, and human factors
- Neuromonitoring data integration and EHR documentation
- End-of-life decisions and neuromonitoring

References:

1. “Neurocritical Care Monitoring” – Chad Miller & Jonathan M. Friedman
2. “Principles of Critical Care Neuromonitoring” – Ed. Gupta & Koenig
3. ACNS Guidelines – American Clinical Neurophysiology Society
4. Textbook of Clinical Neurophysiology – Misulis
5. ICU-specific protocols from reputed institutions (e.g., Neurocritical Care Society)

Quality Assurance in Neuroscience

L/T/P/C

3/-/-/3

Unit 1: Introduction to Quality Assurance in Neuroscience

- Definitions: QA, QC, accreditation, audit
- Importance of QA in clinical and research neuroscience
- Differences between QA and QC
- Regulatory bodies and standards (e.g., NABL, CAP, ISO, FDA)
- Ethics and compliance in neuroscience

Unit 2: Documentation and SOPs in Neuroscience Settings

- Preparing and maintaining SOPs
- Good Documentation Practices (GDP)
- Data recording, validation, and audit trails
- Logs: calibration, maintenance, incident reports
- Case study: SOP for EEG/EMG lab

Unit 3: Quality Control of Neurodiagnostic Equipment

- Routine maintenance and calibration of:
- EEG machines
- EMG/NCV equipment
- Evoked potential systems
- Signal quality checks and artifact minimization
- Use of phantoms and test signals
- Preventive maintenance logs

Unit 4: Quality in Neuroimaging and Laboratory Safety

- QA in CT, MRI, and PET imaging
- Image quality parameters: contrast, resolution, noise
- Radiation safety in CT/PET
- Lab safety protocols (chemical, electrical, biological)
- Waste management in neuro labs

Unit 5: Internal and External Audits in Neuroscience Facilities

- Internal audits: planning, checklists, execution
- External quality assessments (EQA) and proficiency testing
- Root cause analysis and corrective actions
- Case review: lab audit findings and improvements

Unit 6: Clinical Data Management and Validation

- Accuracy and integrity of patient records
- Data entry and verification protocols
- Electronic Health Records (EHR) and neurodata systems
- Data anonymization and ethical handling
- Case study: error tracking in patient reporting

Unit 7: Quality Assurance in Research Neuroscience

- Reproducibility and transparency in neuroscience research
- Experimental controls and bias elimination
- Animal/human study protocols and QA checkpoints
- Research misconduct and data falsification risks
- Laboratory notebooks and digital data logs

Unit 8: Training, Competency, and Continuous Improvement

- Staff training and periodic assessments
- Competency evaluations in neuro labs
- Feedback mechanisms and patient satisfaction
- Total Quality Management (TQM) in neuroscience
- Continuous quality improvement cycle (PDCA model)

References

1. "Quality Assurance in the Clinical Laboratory" – Amitava Dasgupta
2. "Good Clinical, Laboratory and Manufacturing Practices" – WHO Guidelines
3. "Clinical Neurophysiology" – Misulis & Head (QA sections)

Online Resources:

- NABL Accreditation Guidelines
- ISO 15189 for Medical Labs
- CAP Laboratory Checklists
- EHS safety manuals (University/Institute)

An Introduction to Electromyography

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

Unit 1: Basics of Neuromuscular Physiology

- Structure of skeletal muscle and motor unit
- Neuromuscular junction: physiology and signal transmission
- Types of muscle contractions and recruitment patterns
- Anatomy and physiology of motor and sensory neurons

Unit 2: Principles of Electromyography

- What is EMG? Overview and objectives
- History and development of EMG
- EMG signals: generation and characteristics
- Types of EMG: surface EMG vs needle EMG
- Instrumentation overview: amplifiers, filters, electrodes

Unit 3: Surface Electromyography (sEMG)

- Electrode types and placement techniques
- Preparation of skin and patient
- Factors affecting sEMG signals (skin impedance, movement artifacts)
- Applications of sEMG in sports science, rehabilitation, ergonomics

Unit 4: Needle Electromyography

- Types of EMG needles
- Technique of insertion and recording
- Motor unit action potential (MUAP) analysis
- Abnormal spontaneous activity: fibrillations, fasciculations
- Safety, sterilization, and patient comfort
- Contraindications and complications

Unit 5: Nerve Conduction Studies (NCS) and EMG Correlation

- Motor and sensory nerve conduction studies
- H-reflex and F-wave studies
- Interpreting latency, amplitude, and conduction velocity
- Differentiating between myopathy and neuropathy
- Case-based correlation with EMG findings

Unit 6: Clinical Applications of EMG

- Diagnosing neuromuscular disorders:
- Peripheral neuropathy
- Radiculopathy
- Myopathy
- Neuromuscular junction disorders (e.g., myasthenia gravis)
- EMG in stroke, spinal cord injury, motor neuron disease
- EMG-guided botulinum toxin injection (overview only)
- Intraoperative and ICU EMG monitoring

Unit 7: Basics of EMG Data Analysis & Interpretation

- Signal acquisition and noise reduction
- EMG waveform characteristics
- Introduction to EMG software (e.g., LabChart, EMGWorks, MATLAB)
- EMG data analysis: time domain vs frequency domain
- Report generation and documentation

Unit 8: EMG Laboratory Practicals and Simulation

  - Surface EMG electrode placement and recording
  - Needle EMG demo on simulation models
  - NCS using standard protocols
  - Interpretation exercises using real patient data
  - Troubleshooting common technical and clinical issues
  - Ethics and communication during patient interaction

Reference Books

1. Electrodiagnosis in Diseases of Nerve and Muscle – Jun Kimura
2. Clinical Electromyography: Nerve Conduction Studies – David Preston & Barbara Shapiro
3. Essentials of Electromyography – William Campbell
4. Surface Electromyography: Physiology, Engineering, and Applications – Roberto Merletti
5. Online Resources:
6. AANEM educational resources
7. PhysioNet EMG data bank
8. OpenBCI tutorials for sEMG
9. Interactive EMG signal simulators

Clinical Postings II– Neuro critical care

L/T/P/C

-/-/10/5

1. Neuromonitoring in Critical Care
   - Orientation to ICU setup
   - Introduction to EEG, ICP, NIRS, and BIS monitoring Shadowing senior technologists
   - Monitoring brain-injured and ventilated patients
   - Recording and interpreting EEG/NIRS/Misrecognizing critical waveforms
   - Daily reporting and documentation
   - Case discussions with neurointensivists

2. Introduction to Electromyography
   - Observing nerve conduction studies (NCS)Electrode placements and safety protocols
   - Case-based learning (e.g. neuropathies, radiculopathies)
   - Electromyography - Practice & Interpretation
   - Hands-on under supervision: motor/sensory NCSEMG needle insertion techniques (simulation/dummy)
   - Interpretation of EMG/NCS reports End-of-posting assessment
   - Evaluation Methods

Evaluation Methods

Logbook maintenance
Daily case presentation
End-of-posting clinical exam (OSCE/Practical viva)
Feedback from clinical supervisor

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

SEMESTER VI

Applied Neuroscience

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

Unit 1: Fundamentals of Applied Neuroscience

- What is applied neuroscience?
- Key fields: Clinical neuroscience, neuropsychology, neuromarketing, neuroeducation
- Overview of nervous system structure and functions (CNS, PNS)
- Neural communication: neurotransmitters, synapses
- Brain plasticity and neural networks

Unit 2: Cognitive and Behavioral Neuroscience

- Neural basis of perception, attention, memory, learning
- Emotion and motivation: limbic system and prefrontal cortex
- Language and decision-making networks
- Brain lateralization and executive functions
- Impact of brain injury on behavior and cognition

Unit 3: Applied Neuroanatomy and Neuropathology

- Functional areas of the brain (motor, sensory, association cortex)
- Basal ganglia, cerebellum, brainstem functions
- Overview of major neurological disorders (stroke, Parkinson's, Alzheimer's, epilepsy)
- Case studies linking anatomy to clinical signs

Unit 4: Clinical Applications of Neuroscience

- Neurodiagnostic tools (EEG, MRI, PET, CT, fMRI, TMS)
- Applications in psychiatry and neurology (depression, schizophrenia, anxiety, ADHD)
- Neuropharmacology and psychotropic drugs
- Neuropsychological assessment: tests, batteries, interpretations

Unit 5: Neuroscience in Therapy and Rehabilitation

- Neuroplasticity and rehabilitation principles
- Stroke rehab, traumatic brain injury (TBI), and neurodegenerative disease therapy
- Cognitive rehabilitation techniques
- Role of occupational and physical therapy in neurorehab

Unit 6: Neuroscience and Artificial Intelligence

- Neural networks and artificial neurons
- Brain-inspired computing and AI models
- Brain–Computer Interfaces (BCI): concepts and applications

- Neurotechnology in prosthetics and communication aids

Unit 7: Applied Neuroscience in Learning and Education

- Neuroscience of learning and memory
- Neurodevelopmental disorders (e.g., dyslexia, ADHD, ASD)
- Educational neuroscience: classroom implications
- Enhancing cognitive performance with brain-based strategies

Unit 8: Emerging Frontiers and Ethics in Applied Neuroscience

- Neuromarketing and consumer neuroscience
- Legal and forensic neuroscience
- Neuroenhancement and transhumanism
- Ethical issues in brain manipulation, AI in neuroscience, neuroprivacy
- Future directions in applied neuroscience

Unit 9: Laboratory and Practical Exposure

- Virtual brain mapping or simulation tools (e.g., BrainFacts.org, 3D Brain)
- Interpretation of EEG/fMRI case studies
- Cognitive task experiments (Stroop test, memory recall, reaction time)
- Observation or demo in neurodiagnostics lab (optional)

References:

1. "Principles of Neural Science" – Eric Kandel et al.
2. "Cognitive Neuroscience: The Biology of the Mind" – Gazzaniga, Ivry, Mangun
3. "Fundamentals of Human Neuropsychology" – Kolb & Whishaw
4. "Applied Neuroscience for the Allied Health Professions" – Douglas McBean
5. Online Resources:
    - NIH Brain Initiative
    - OpenBCI, Human Connectome Project
    - BrainFacts.org, Neurosynth

Neurotherapeutics

L/T/P/C

3/-/-/3

Unit 1: Introduction to Neurotherapeutics

- Definition and scope of neurotherapeutics
- Historical evolution of therapies for brain disorders
- Classification of neurotherapies: pharmacological, neuromodulatory, behavioral, surgical
- Overview of CNS diseases treatable by neurotherapies

Unit 2: Pharmacological Neurotherapies

General principles of CNS drug action

- Neuropharmacology of:
- Antidepressants
- Antipsychotics
- Antiepileptics
- Anxiolytics and sedatives
- Cognitive enhancers (nootropics)
- Drug delivery across the blood-brain barrier
- Side effects and pharmacovigilance

Unit 3: Neuromodulation and Stimulation Therapies

- Electroconvulsive Therapy (ECT) – mechanism, indications, controversies
- Transcranial Magnetic Stimulation (TMS)
- Transcranial Direct Current Stimulation (tDCS)
- Vagus Nerve Stimulation (VNS)
- Deep Brain Stimulation (DBS) – targets, use in Parkinson's, OCD, depression
- Safety and long-term effects

Unit 4: Behavioral and Cognitive Therapies

- Cognitive Behavioral Therapy (CBT) in neurological and psychiatric care
- Biofeedback and neurofeedback techniques
- Mindfulness, meditation, and yoga-based neurotherapies
- Virtual reality and gaming interventions for cognitive rehabilitation

Unit 5: Surgical and Interventional Neurotherapies

- Neurosurgical approaches in epilepsy, tumors, Parkinsonism
- Stereotactic surgery and lesioning
- Minimally invasive techniques
- Neuroendoscopy and spinal cord interventions

Unit 6: Rehabilitation Neurotherapies

- Motor rehabilitation (post-stroke, spinal injury)

- Cognitive rehabilitation (TBI, dementia)
- Speech and language therapy
- Occupational and sensory integration therapy
- Role of multidisciplinary teams

Unit 7: Gene, Stem Cell, and Emerging Therapies

- Gene therapy for neurological disorders (e.g., SMA, Parkinson's)
- Stem cell therapies – sources, mechanisms, challenges
- mRNA, CRISPR-Cas9, and neuroregeneration
- Biomaterials and nanotechnology in neurotherapeutics
- Neuroprosthetics and brain–computer interfaces

Unit 8: Ethics, Policy & Personalized Approaches

- Ethical concerns in neuromodulation, genetic therapies
- Informed consent and vulnerable populations
- Clinical trials in neurotherapeutics
- Role of personalized and precision medicine
- Future perspectives and societal implications

Unit 9: Practical Demonstrations and Case-Based Learning

- Case studies: Parkinson's disease, epilepsy, depression, TBI
- Pharmacotherapy planning and side effect management
- Demonstration or videos: TMS, DBS, rehabilitation protocols
- Interpreting therapy response and clinical outcome scales

References:

1. "Neurotherapeutics: Principles and Practice" – Michael J. Aminoff (Editor)
2. "Basic Neurochemistry" – Siegel et al.
3. "Clinical Neurology" – David Greenberg
4. Journals: Neurotherapeutics, Brain Stimulation, Nature Reviews Neurology
5. Online: ClinicalTrials.gov, NIH Brain Initiative, OpenNeuro

Advanced neuroimaging

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

Unit 1: Fundamentals of Neuroimaging

- Imaging planes and neuroanatomical orientation
- Contrast agents and radiation safety
- Ethical issues in brain imaging

Unit 2: Magnetic Resonance Imaging (MRI)

- Physics of MRI: relaxation times (T1, T2), magnetization
- Pulse sequences: Spin Echo, Gradient Echo, FLAIR, DWI
- Structural brain imaging applications
- Diffusion-weighted imaging (DWI) and Diffusion Tensor Imaging (DTI)
- MR angiography and perfusion imaging
- Limitations, artifacts, and safety considerations

Unit 3: Functional MRI (fMRI)

- Principles: BOLD signal, hemodynamic response
- Block vs event-related designs
- fMRI task paradigms (motor, language, memory)
- Preprocessing and analysis (SPM, FSL basics)
- Clinical and research applications (e.g., presurgical mapping, cognitive neuroscience)
- Resting-state fMRI

Unit 4: Computed Tomography (CT)

- Principles of CT scanning
- Image acquisition, contrast enhancement
- Brain pathologies: stroke, hemorrhage, trauma
- 3D reconstructions and multiplanar views
- Radiation dosage and protection
- Comparison with MRI

Unit 5: Nuclear Medicine Techniques

- PET: Principles, tracers (FDG, Amyloid, Dopamine), and resolution
- SPECT: Mechanism and tracers
- Applications: epilepsy, Parkinson's, dementia, tumors
- Safety, interpretation, and limitations
- Hybrid imaging: PET/CT, PET/MRI

Unit 6: Advanced Techniques

- MR Spectroscopy (MRS): brain metabolites
- Magnetoencephalography (MEG): principles, spatial/temporal resolution
- Arterial Spin Labeling (ASL)
- Neuroradiology informatics: image storage (PACS), DICOM standards
- Connectomics and brain atlases (Human Connectome Project)

Unit 7: Image Processing & Data Analysis

- Image formats and standardization (DICOM, NIfTI)
- Brain segmentation and parcellation
- Basic tools: SPM, FSL, FreeSurfer (intro level)
- Preprocessing steps: motion correction, registration, normalization
- Visualization software: MRIcron, 3D Slicer
- Case-based interpretation

Reference Books

1. Neuroimaging: Clinical and Physical Principles – J. Paul Sidhu
2. Functional Magnetic Resonance Imaging – Scott A. Huettel
3. MRI from Picture to Proton – Donald McRobbie
4. PET and SPECT in Neurology – Rudi Dierckx et al.
5. Online Platforms and Tools:
    a. Human Connectome Project
    b. OpenNeuro.org
    c. BrainVoyager, FreeSurfer, SPM, FSL, MRIcron

Advanced neuroscience techniques

L/T/P/C

2/-/-/2

Unit 1: Introduction to Advanced Neuroscience Techniques

- Overview of classical vs. modern techniques in neuroscience
- Ethical considerations in animal and human neuroscience research
- Good Laboratory Practices (GLP) and biosafety

Unit 2: Advanced Neuroimaging Techniques

- Functional Magnetic Resonance Imaging (fMRI)
- Diffusion Tensor Imaging (DTI)
- Positron Emission Tomography (PET)
- Magnetoencephalography (MEG)
- Near-Infrared Spectroscopy (NIRS)
- Image analysis basics: brain mapping, functional connectivity

Unit 3: Electrophysiological Techniques

- Patch clamp technique (whole-cell, single-channel)
- EEG (Advanced applications, sleep studies, epilepsy diagnosis)
- Evoked potentials (Visual, auditory, somatosensory)
- Single-unit and multi-unit recordings
- Brain–Computer Interfaces (BCI)

Unit 4: Molecular and Cellular Neuroscience Techniques

- Immunohistochemistry and immunofluorescence
- Western blotting in neuroscience research
- qPCR and gene expression analysis
- RNA-seq for neuronal transcriptomics
- CRISPR/Cas9 gene editing in neural models

Unit 5: Optical and Imaging Techniques in Neuroscience

- Confocal microscopy
- Two-photon microscopy
- Calcium imaging
- Optogenetics: concepts and applications
- Voltage-sensitive dye imaging

Unit 6: Neuropharmacological and Behavioral Techniques

- Microdialysis and in vivo neurochemical monitoring
- Intracerebral injections and drug delivery systems
- Behavioral paradigms in animal models (Morris water maze, open field, fear conditioning)
- Pain, anxiety, and cognition assessment tools

Unit 7: Computational Neuroscience and Data Analysis Tools

- Neural data analysis: basics of signal processing
- Machine learning in neuroscience
- Neural modeling tools (e.g., NEURON, Brian)
- MATLAB / Python for neurodata processing

Unit 8: Translational and Emerging Techniques

- Brain organoids and lab-grown neural networks
- Neuroprosthetics
- Neuromodulation techniques (TMS, tDCS)
- AI in neurodiagnostics
- Real-time monitoring and wearable neurotech

Unit 9: Clinical exposure of students to advanced neuroscience techniques

- Real-time EEG monitoring in critical care
- Observation of setting up monitoring equipment during surgery
- Image acquisition protocols and artifacts

- Advanced EEG: Sleep studies, seizure mapping, quantitative EEG (qEEG)
- Transcranial Magnetic Stimulation (TMS): principles and practice
- Pupillometry and clinical scoring (GCS, FOUR)

- Bedside neuroimaging tools (portable EEG, ultrasound, transcranial Doppler)
- Practical rounds with Neuro ICU teams

Suggested Reference Books & Resources

1. Nicholls, J.G., Martin, A.R., Fuchs, P.A. – From Neuron to Brain
2. Kandel, E.R., Schwartz, J.H., Jessell, T.M. – Principles of Neural Science
3. Bear, M.F., Connors, B.W., Paradiso, M.A. – Neuroscience: Exploring the Brain
4. Stufflebeam, S.M., et al. – Clinical Neuroimaging: Cases and Key Concepts
5. Sanes, D.H., Reh, T.A., Harris, W.A. – Development of the Nervous System

05. Clinical postings

L/T/P/C

-/-/10/5

Objective: Understanding and participating in treatment and rehabilitation strategies for neurological disorders.

Neurology Ward & OPD

- Observe diagnosis, clinical examination, and case discussions.
- Learn about pharmacological treatment plans (e.g., anti-epileptics, neuroprotective agents).

Neurorehabilitation Unit

- Physiotherapy for stroke, spinal cord injury, and neurodegenerative disorders.
- Occupational therapy techniques for fine and gross motor recovery.
- Cognitive rehabilitation programs for memory, speech, and executive functions.

Pain & Spasticity Clinics

Neuropsychology Services

- Cognitive-behavioral therapy, counselling for patients with brain injury, dementia, epilepsy.

Neuro ICU Follow-ups

- Acute-phase interventions, ventilator weaning, neuroprotection protocols.

Sleep Lab

- Basics of polysomnography and sleep disorder evaluation.
- Movement Disorders Clinic
- Assessment of Parkinson's disease, dystonia, tremors; deep brain stimulation programming.

Epilepsy Monitoring Unit

- Long-term EEG monitoring, seizure mapping, presurgical evaluation.

Neuroimaging Department

- MRI (structural & functional), DTI, PET scans interpretation in neurological diseases.

Research Methodology and Biostatistics

L/T/P/C

3/-/-/3

1. 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

2. **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

3. **Ethical issues in Research**
   - Introduction to research ethics (Historical background, Nuremberg, Belmont Report)
   - Ethical principles: Autonomy, beneficence, non-maleficence, justiceInformed 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

4. **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

5. **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

6. **Types of Data: Qualitative data; Quantitative data**

7. **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

8. **Sampling Methods**

9. **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:

1.Methods in biostatistics by Mahajan
2.Research methodology by C R Kothari
3. Textbook of biostatistics by Sundar Rao
4.Textbook of biostatistics and research methodology by U. Satyanarayana
5.Creswell, J.W., & Creswell, J.D. (2023). Research Design: Qualitative, Quantitative, and Mixed Methods Approaches
6.Shamoo, A.E., & Resnik, D.B. (2015). Responsible Conduct of Research.
7.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.

Unit 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.

Unit 12

- 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.

Assessment and Evaluation:

- Class Participation :20
- Assignments/ case study presentations: 30 Final: 50
- Reference Textbook
- How to Win Friends and Influence People" by Dale Carnegie
- The Seven Habits of Highly Effective People" by Stephen R. Covey

SEMESTER VII

Project work I L/T/P/C
-/-/2/1

Internship-I L/T/P/C
-/-/40/20

Healthy Eating for Healthy Living L/T/P/C:

1/-/-/1

Course Description:

This course is designed to teach students the foundational principles of nutrition, the relationship between food and health, and practical strategies for making sustainable, healthy eating choices. Students will learn how to create balanced meals, understand dietary guidelines, and navigate the modern food environment to support long-term health and well-being.

Unit 1

- Introduction to Nutrition and Healthy Eating
- What is nutrition?
- Overview of macronutrients (carbohydrates, proteins, fats) and micronutrients (vitamins, minerals).
- The importance of hydration.
- Understanding energy balance: Calories in vs. Calories out.
- Introduction to MyPlate (or other dietary guidelines).

Unit 2

- Building a Balanced Plate
- The principles of meal planning.
- Portion control and serving sizes.
- Healthy fats vs. unhealthy fats.
- Carbohydrates: Simple vs. complex sugars.
- Protein sources: Animal vs. plant-based.

Unit 3

- Reading Food Labels and Understanding Food Marketing
- How to read food labels (nutritional facts, ingredients list, serving sizes).
- Decoding food claims (low-fat, organic, non-GMO).
- Understanding food marketing and its impact on consumer choices.
- Navigating grocery stores and making informed decisions.

Unit 4

- The Role of Fruits and Vegetables in Healthy Eating
- The importance of fruits and vegetables in the diet.
- Health benefits of fiber, antioxidants, and phytochemicals.

- Incorporating more plant-based foods into your meals.
- Seasonal and local produce: Why it matters.

Unit 5

- Special Diets and Nutrition for Different Lifestyles
- Overview of popular diets (e.g., Mediterranean, vegetarian, vegan, paleo, ketogenic).
- Nutrition for athletes and active individuals.
- Special considerations for children, seniors, and pregnant women.
- Managing food allergies and intolerances (e.g., gluten, lactose).

Unit 6

- Mindful Eating and Emotional Health
- What is mindful eating?
- The connection between emotions and eating habits.
- Managing stress and emotional eating.
- Developing a healthy relationship with food.

Unit 7

- Sustainable Eating and Environmental Impact
- The environmental impact of food choices (e.g., food miles, carbon footprint).
- Sustainable eating practices: Local, seasonal, and organic foods.
- Reducing food waste: Practical tips.
- The role of plant-based eating in sustainability.

Unit 8

- Putting It All Together: Creating a Sustainable, Healthy Eating Plan
- Review of key concepts: Macronutrients, micronutrients, balanced eating, mindful eating.
- Goal setting: How to set achievable health goals.
- Meal prep and planning for a busy lifestyle.
- Long-term strategies for maintaining a healthy diet.

Reference Textbook

1. Nutrition and You" by Joan Salge Blake

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

SEMESTER VIII

Project work I L/T/P/C
-/-/20/10

Internship-I L/T/P/C
-/-/20/10

Professionalism in the Workplace

L/T/P/C:
1/-/-/1

Course Description:

This course is designed to provide students with the foundational knowledge and skills required to demonstrate professionalism in a variety of workplace settings. Topics will include communication, ethics, accountability, time management, problem-solving, conflict resolution, and maintaining a positive and effective work ethic. Students will engage in practical activities that promote personal and professional growth.

Course Objectives:

By the end of this course, students will:

- Understand the key elements of professional behavior in the workplace.
- Demonstrate effective communication, both verbal and non-verbal, in a professional environment.
- Learn to manage time effectively and handle workplace challenges with a positive attitude.
- Cultivate emotional intelligence and adaptability in professional settings.
- Understand workplace ethics, integrity, and how to make ethical decisions.
- Develop skills for conflict resolution and teamwork in diverse work environments.

Unit 1

- Introduction to Professionalism
- What is professionalism?
- Characteristics of a professional: Appearance, behaviour, and attitude
- The importance of professional ethics and integrity

Unit 2

- Effective Communication in the Workplace
- Verbal and non-verbal communication
- Active listening and responding
- Communicating across cultures

Unit 3

- Workplace Etiquette and Networking
- Social etiquette in the workplace
- Networking best practices
- Building relationships with colleagues, managers, and clients

Unit 4

- Time Management and Organization
- Prioritizing tasks and setting goals
- Managing deadlines and avoiding procrastination
- Tools and techniques for effective time management

Unit 5

- Accountability and Reliability
- Taking responsibility for your actions
- Being reliable and dependable in the workplace
- How accountability affects professional reputation

Unit 6

- Problem Solving and Decision Making
- Approaches to critical thinking and decision-making
- Strategies for solving workplace problems effectively
- The role of creativity and innovation in problem-solving

Unit 7

- Teamwork and Collaboration
- Working with diverse teams
- Building trust and collaboration in teams
- Managing team conflicts and maintaining harmony

Unit 8

- Conflict Resolution and Handling Difficult Conversations
- Understanding conflict dynamics
- Techniques for resolving conflicts professionally
- Role-playing difficult conversations in the workplace

Unit 9

- Ethical Dilemmas in the Workplace
- Recognizing ethical challenges
- Making decisions based on ethical principles
- The role of transparency and honesty

Unit 10

- Building Emotional Intelligence and Adaptability
- What is emotional intelligence and why does it matter?
- Developing self-awareness and self-regulation
- Adapting to changing work environments

Reference Textbook

1. Professionalism: Skills for Workplace Success" by Deborah C. Dillon
2. The Professional Workplace: The Skills You Need to Succeed" by Ronald W. Holmes