



B. Voc. Medical Electrophysiology

(B. Voc. - MEP)

Syllabus

w.e.f Academic Session 2025-2026

DDU KAUSHAL KENDRA

Jamia Millia Islamia

New Delhi-110025

B.VOC. Medical Electrophysiology (B.VOC. MEP)

Duration: Three Years (6 semesters)

Sem.	S. N.	Paper Code	Paper Name	Total Hrs.	Credit	IE	SE	Total
1	1	MEP101	Fundamentals of Human Anatomy	42	3	25	75	100
	2	MEP 102	Fundamentals of Human Physiology	42	3	25	75	100
	3	MEP 103	Basic Biochemistry	42	3	25	75	100
	4	MEP 104	Cell Biology & Medical Genetics	42	3	25	75	100
	Skill Components							
	5	MEP 105	Fundamental of Computer & IT	42	3	25	75	100
	6	MEP 106	English	42	3	25	75	100
	7	MEP 107P	Practical I(MEP 101, MEP 102)	84	6	25	75	100
	8	MEP 108P	Practical II (MEP 103, MEP 104)	84	6	25	75	100
	Total			420	30	200	600	800
2	S. N.	Paper Code	Paper Name	Total Hrs.	Credit	IE	SE	Total
	1	MEP 201	General and Systemic Pathology	56	4	25	75	100
	2	MEP 202	Electronics & Instrumentation	56	4	25	75	100
	3	MEP 203	Introduction to Medical Electrophysiology	56	4	25	75	100
	4	MEP 204	Cardiology & Electrocardiography-I	56	4	25	75	100
	5	MEP 205	Medical Emergencies & Patient Care	56	4	25	75	100
	Skill Components							
	6	MEP 206P	Practical III (MEP 202, MEP 203)	98	8	50	150	200
	7	MEP 207P	Practical IV (MEP 204, MEP 205)	98	8	50	150	200
	Total			476	36	225	675	900
3	S. N.	Paper Code	Paper Name	Total Hrs.	Credit	IE	SE	Total
	1	MEP 301	Cardiology & Electrocardiography-II	56	4	25	75	100
	2	MEP 302	Neuromuscular Disorders	56	4	25	75	100
	3	MEP 303	Electromyography & Nerve Conduction Studies	56	4	25	75	100
	Skill Components							
	4	MEP 304P	Practical V (MEP 301)	56	4	50	50	100
	5	MEP 305P	Practical VI (MEP302, MEP303)	98	8	100	100	200
	6	MEP 306P	Evaluative Clinical Training I	126	6	- - -	100	100
	Total			448	30	225	475	700

Sem	S. N.	Paper Code	Paper Name	Total Hrs.	Credit	IE	SE	Total
4	1	MEP 401	Cardiovascular Techniques & Fitness	56	4	25	75	100
	2	MEP 402	Respiratory Care Technology	56	4	25	75	100
	3	MEP 403	Neurological Disorders	56	4	25	75	100
	4	MEP 404	Brain Waves & Electroencephalography	56	4	25	75	100
	Skill Components							
	4	MEP 405P	Practical VII (MEP 401, 402)	98	8	100	100	200
	5	MEP 406P	Practical VIII (MEP 403, 404)	98	8	100	100	200
	Total			420	32	300	500	800
5	S. N.	Paper Code	Paper Name	Total Hrs.	Credit	IE	SE	Total
	1	MEP 501	Sensory Physiology & Evoked Potential	84	6	25	75	100
	2	MEP 502	Polysomnography & Sleep Studies	84	6	25	75	100
	3	MEP 503	Public Health	56	4	25	75	100
	Skill Components							
	4	MEP 504P	Practical IX (MEP 501, MEP 502)	98	8	100	100	200
	5	MEP 505P	Evaluative Clinical Training II	252	8	- - -	100	100
	Total			574	32	175	425	600
6	S. N.	Paper Code	Paper Name	Total Hrs.	Credit	IE	SE	Total
	1	MEP 601	Quality Assurance & Medical Ethics	56	4	25	75	100
	Skill Components							
	2	MEP 602P	Evaluative Clinical Training & Internship	588	18	- - -	300	300
Total			644	22	25	375	400	
Grand total (Semester I-VI)				2982	182	1150	3050	4200
Total skill component credits in all (I-VI) semesters : 102 Credits								
Total knowledge component credits in all (I-VI) semesters : 80 Credits								
Total credits (I-VI) semesters = 182								
Total marks (I-VI) semesters = 4200								
Total hours (I-VI) semesters = 2982 (Skill components 1862 hrs. & knowledge Components 1120 hrs.								

Semester–1 st						
Paper Code	Paper Name	Total Hrs.	Credit	IA	SE	Total
MEP 101	Fundamentals of Human Anatomy	42	3	25	75	100

Objective: Students will become aware of the terminology used in human anatomy. They will also develop the basic knowledge of body plan and organization of human body, structure of cells, tissues, organs, organ systems and their coordination with each other.

Outcome intended: Students will be able to identify the various anatomical structures in the human body and communicate scientifically with other health-care personnel as a result of the terms and nomenclature taught during anatomy tutorials.

Unit I: General & Systemic Anatomy: Introduction to anatomical terms and organization of the human body. Tissues –Definitions, Types, characteristics, classification, location, functions and formation. Musculoskeletal system: Axial & appendicular skeleton. Structure of Muscles, Bones, Cartilage, Bone formation and growth. Joints –classification and structure. Movements at the joints and muscles producing movements.

Unit II: Nervous System: Structure of Neuroglia & neurons, Classification CNS – Structure of Brain and spinal cord and their functions. PNS - Cranial nerves and spinal nerves ANS - Sympathetic and Parasympathetic. Structure of Skin, Eye, Nose, Auditory and Olfactory apparatus.

Unit III: Circulatory system: Structure of the Heart, Structure of Blood Vessels – arterial and venous system. Gross and microscopic structure of lymphatic tissue.

Unit IV: Respiratory system: Parts, Nasal cavity and Paranasal air sinuses, trachea, Gross and microscopic structure of lungs, Diaphragm and Pleura.

Unit V: Digestive System: Parts, Structure of Tongue, Salivary glands, stomach, Intestines, Liver, Pancreas.

Unit VI: Urinary & Reproductive System: Parts, structure of Kidney, Ureters, Urinary Bladder and Urethra. Gross structure of both male and female reproductive organs.

Unit VII: Endocrine System: Gross structure of Pituitary, Thyroid, Parathyroid, Pancreas, Adrenal glands.

Essential Reading:

1. Chaurasia B D, (2024), Human Anatomy (Vol 1,2,3,4),10th edition
2. Ross & Wilson, (2022), Anatomy & Physiology in health & illness,14th edition
3. Gray's anatomy for students (2020), 42nd Edition
4. Text book of anatomy (Vol 1,2,3)– Vishram Singh, 4th Edition.
5. Text book of anatomy – VOL 1,2 – Inderbir Singh, 6th Edition.

Suggested Readings: Text book of Anatomy – W.J. Hamilton

Semester-1 st						
Paper Code	Paper name	Total Hrs.	Credit	IA	SE	Total
MEP 102	Fundamentals of Human Physiology	42	3	25	75	100

Objective: This paper provides the knowledge of human systems physiology. To understand the functions of all physiological systems including the cardio-respiratory, renal, reproductive and metabolic systems, to perform, analyse and report on experiments and observations in physiology.

Intended Outcome: The student will be able to identify the structures and describe the functions of the musculoskeletal system, the functions of the nervous system, the endocrine system, functions of the special senses, components and relate the functions associated with blood and lymphatic system, physiology of absorption and Excretion, Identify the structures and describe the functions associated with the respiratory system, Structures and the functions associated with the digestive system and the urinary system.

Unit I: Blood– Plasma & Cellular Components: Functions and composition of Blood, morphological features of blood cells, Hematopoiesis, structure of Hemoglobin and its abnormalities. Types of anemia and their causes, Hemostasis.

Unit II: Nerve Muscle Physiology – Structure and functions of neurons and neuroglial cells, Resting membrane potential, Action potential. Properties of nerve fibers: excitability, conductivity, all or none law, accommodation, adaptation summation, refractory period, fatigability, Neuromuscular junction: structure, transmission. Microscopic and electron microscopic structure of skeletal, smooth and cardiac muscles, Single-unit and multi-unit smooth muscle. Muscle proteins and Properties of skeletal muscle. Mechanism of skeletal and smooth muscle contraction and relaxation.

Unit III: Cardiovascular and Respiratory System – Properties of cardiac muscle, Origin and propagation of cardiac impulse, Conduction System of Heart, Cardiac Cycle, Heart sounds. Functions of respiratory muscles, Respiratory and Volume capacities, exchange of oxygen and carbon dioxide, Brief account of respiratory regulation, Hypoxia and its types, Cyanosis, asphyxia, Dead spaces, Factors affecting Oxygen dissociation curve of hemoglobin and myoglobin, factors affecting Carbon dioxide dissociation curve.

Unit IV: Digestive System- Functions of alimentary canal, Physiology of Deglutition, Movements of alimentary canal, Composition, functions and secretion of salivary, gastric, pancreatic and intestinal juices and bile, Digestion and absorption of carbohydrates, lipids, proteins and nucleic acids. Defecation.

Unit V: Excretory and reproductive system – Structure and functions of kidney, components of Nephron, measurement and regulation of GFR, Renin Angiotensin system mechanism of urine formation, Clearance tests, functions of ovaries, sex hormones, menstrual cycle, pregnancy, parturition, lactation, contraception, male sex hormones and spermatogenesis.

Essential Reading:

1. Medical physiology – Indu Khurana
2. Text book of physiology – prof A. K. Jain
3. A text book of practical physiology – Prof. A.K. Jain
4. Essential of medical physiology – K Sembulingam, Prema Sembulingam
5. Review of medical physiology – Ganong's

Suggested Readings:

1. Harrison's principles of internal medicine
2. Text book of medical physiology – Guyton
3. Text book of practical physiology – C. L. Ghai

Semester-1 st						
Paper Code	Paper Name	Total Hrs.	Credit	IA	SE	Total
MEP103	Basic Biochemistry	42	3	25	75	100

Objective: The students will understand the chemical nature, function, metabolic pathways and biological importance of carbohydrates, proteins, lipids, vitamins and enzymes.

Intended outcome: The students will understand the structure, function and biological importance of carbohydrates, proteins, lipids, nucleic acids, enzymes, vitamins and the regulation of biochemical processes. They will also become aware how deficiency or excess of these will cause disease.

Unit I: Carbohydrates: Definition, function and classification of carbohydrate. Monosaccharide, glycoside formation, oligosaccharides and polysaccharides. Glycolysis, catabolic fates of pyruvate, metabolic fate of Acetyl-CoA and Citric acid cycle, gluconeogenesis, glycogen metabolism, pentose phosphate pathway.

Unit II: Enzymes and Biological Oxidation: Introduction, definition, classification, coenzymes, active site of enzyme, cofactors of coenzyme, isoenzymes, properties, mechanism of enzyme action. Biological oxidation and enzymes involved. Electron transport chain. Oxidative phosphorylation. Substrate level phosphorylation. Inhibitors of electron transport chain.

Unit III: Amino acids, proteins and nucleic acids: Definition, structure, classification, essential & non-essential amino acids. Proteins definition and classification. Primary, secondary, tertiary and quaternary structure of proteins. Purine and Pyrimidine nucleotides, biosynthesis and degradation, denovo and salvage pathway.

Unit IV: Vitamins and nutrition: Definition and classification of vitamins, difference between fat soluble and water-soluble vitamins. Balanced diet. Nutritional importance and Calorific value of food- BMR, Protein energy malnutrition- Kwashiorkor and Marasmus

Unit V: Lipids: Definition, classification and function of lipids. Fatty Acids, Triacylglycerols or Triacylgcerides or neutral fat. Fatty acid metabolism. Ketone body metabolism.

Essential readings:

1. Lehninger, (2013), Principles of Biochemistry, 6th edition, W H Freeman
2. Satyanarayan, (2008), Essentials of Biochemistry, 2nd edition, Standard Publishers
3. Biochemistry for students, V.K. Malhotra

Suggested readings:

1. Pankaja Naik, Biochemistry, 4th ed

Semester-1 st						
Paper Code	Paper Name	Total Hrs.	Credit	IA	SE	Total
MEP 104	Cell Biology & Medical Genetics	42	3	25	75	100

Objective – To develop an understanding that cell is the fundamental unit of life. The students will also learn the structure and function of cells, cell organelles and their life processes. In genetics, the students will learn the basis of heredity and variation in humans

Outcome intended – Students will be able appreciate the general properties shared by all cells and the highly complicated functions of some specialized cells. They will also learn how changes in the human genome result in disease and disability.

Unit I: Cell Structure: Cell as a basic unit of life - discovery of cell, prokaryotic and eukaryotic cell; unicellular and multicellular organisms; Microscopic Study of Cell: tools and techniques (compound microscope, electron microscope and cell fractionation); Ultrastructure of prokaryotic and eukaryotic cell - cell wall, cell membrane - unit membrane concept (fluid mosaic model); membrane transport; cellular movement (exocytosis, endocytosis)

Unit II: Organelles of Cell: Cell organelles and their functions- nucleus, mitochondria, plastids, endoplasmic reticulum, Golgi complex, lysosomes, centrosome, mesosomes, vacuole, cytoskeleton, cilia, flagella and ribosomes.

Unit III: Cell Cycle: Eukaryotic Cell Cycle, Regulation of Cell cycle progression, Cell division, Mitosis & meiosis, Events of Mitotic, events of Meiosis nondisjunction, Fertilization. Programmed Cell Death -- Apoptosis, Stem Cells - Embryonic, Tissue and induced pluripotent stem Cells, cloning - reproductive and therapeutic.

Unit V: Organization of the Genome: Structure of gene. Central Dogma of Molecular biology, Pathway for the transfer of genetic information, Replication of DNA, Transcription of DNA to RNA, Translation, Transcriptional control, The operon concept, DNA repair, DNA mutations.

Unit IV: Medical Genetics: Structure of DNA & RNA, chromatin, comparison between Bacterial and eukaryotic chromosome, human genome, Karyotyping, autosomes, sex chromosomes, Chromosomal basis of inheritance, linkage and crossing over, mutations, Mendelian inheritance, other patterns of inheritance - incomplete dominance, multiple allelism, quantitative inheritance. Human genetics - methods of study, overview of genetic disorders.

Essential Readings:

1. S. C. Rastogi, (2005), Cell Biology, 3rd ed.
2. Essentials of Human Genetics. Manu L. Kothari, Lopa A. Mehta, Sadhana S. Roychoudhury (2009), 5th ed.
3. Kapur & Suri's Basic Human Genetics, Dipali S. Trivedi.

Semester-1 st						
Paper Code	Paper Name	Total Hrs.	Credit	IA	SE	Total
MEP 105	Fundamentals of Computer & IT	42	3	25	75	100

Objective: To develop a basic understanding of computers and their role in the practice of modern medicine.

Outcome intended: The students will get an idea of the computer hardware, software, programming languages, networking and applications in a clinical setting.

Unit I: John Von Neumann Architecture, Different Type of Computer, Hardware, CPU, Input Devices, Output Devices, Storage Devices, Communication Devices, Configuration of hardware devices and their applications, convert decimal to binary and vice versa.

Unit II: Networking: Basic idea of Local Area Network (LAN), MAN, Wide Area Network (WAN), E-mail, browsers and servers, Multimedia, Operating System: Software needs, application software, programming language. Windows, print, control panel, Paint, calculator, desktop, find, Run, Snipping tool, Sticky note, Word pad, Notepad, Gadgets, Windows defender, Firewall.

Unit III: Microsoft Office: Ms Word - basic commands, formatting-text and documents, sorting and tables, background images, hyperlinks, Mail merge, graphics, columns, smart art, spelling & grammar, thesaurus.

Microsoft Excel: Conditional formatting, formulas & functions, sort & filter, wrap text, merge & centre. Insert- Tables, illustrations, charts, background, remove duplicates.

Ms Power Point: Designs, slide transition, Smart Art, animation, hyperlinks, automatic slide advance, background images

Unit IV: Adobe Creative Cloud and Internet: Photoshop- Photo editing and retouching, graphic design digital painting and drawing, web development, basics of internet, www, IP address, domain, Network-based services (Cloud & Grid Computing).

Unit V: Artificial Intelligence, Machine Learning: An introduction to Artificial Intelligence and Machine Learning (ML), Overview of ML (supervised, unsupervised), AI application in data analysis and healthcare solutions. Biological data analysis software: graph pad prism, sigmaplot, MedCalc etc.

List of Practicals:

1. Microsoft Word
2. Microsoft Powerpoint
3. Microsoft Excel
4. Microsoft Access

Essential reading:

1. Computers Fundamentals by P.K. Sinha, 6th edition, BPB Publications
2. Fundamentals of Computers by E Balagurusamy

Semester-1 st						
Paper Code	Paper Name	Total Hrs.	Credit	IA	SE	Total
MEP 106	English	42	3	25	75	100

Objective: The students will learn to communicate in English, make simple sentences and understand the significance of English comprehension in healthcare industry.

Outcome intended: The students will be able to speak, write and understand simple English and improve their vocabulary required for personal and professional life.

Unit I: Grammar: Articles, Prepositions, Verb, Conjunctions, Tenses, Voices, Direct and Indirect Speech, Subject- Verb Agreement.

Unit II: Vocabulary: Common Vocabulary, Words Often Confused, Common Errors, Prefixes, Suffixes.

Unit III: Medical Vocabulary and Terminology: terms associated with medical professions, correct usage of the medical terminology, essential concepts of punctuations in medical field, an understanding of principles of medical word formation, familiarity with many prefixes, roots and suffixes that commonly appear in medical terminology, knowledge of basic(and some not so basic) medical term, an understanding of other aspects of medical terminology such as abbreviations and nomenclature, knowledge of strategies and resources for further terminology.

Unit III: Formal Correspondence: Letters and Applications, Letter to the Editor. Professional letter: sales, enquiry, order, complaints and other. Applications for jobs and higher studies: cover letter/ resume/ CV

Unit IV: Spoken English: Speech/ Extempore/ Group Discussions/ Interview/ Dialogue Session.

Unit V: Writing Skills: Paragraph writing, Description and Report Writing, Note-taking/ Summary/ Paraphrasing/ Briefs of Medical Passages

Essential reading:

1. High School English Grammar & Composition by Wren & Martin, Blackie ELT Books
2. Business English. Department of English, University of Delhi, Pearson

Suggested reading:

1. English Grammar Composition & Usage by J.C. Nesfield, Macmillan Publishers

Semester-1 st						
Paper Code	Paper Name	Total Hrs.	Credit	IA	SE	Total
MEP 107P	Practical I (MEP 101, MEP 102)	84	6	25	75	100

List of Practical:

Fundamentals of Human Anatomy:

1. Demonstration of various human tissues through permanent slides.
2. Demonstration of human skeletal system.
3. Demonstration of various joints in the human body.
4. Demonstration of parts of circulatory system through charts and models.
5. Demonstration of parts of respiratory system through charts and models.
6. Demonstration of parts of nervous system through charts and models.
7. Demonstration of parts of eye and ear through charts and models.
8. Demonstration of parts of digestive system through charts and models.
9. Demonstration of parts of urinogenital system through charts and models

Fundamentals of Human Physiology:

1. Estimation of Haemoglobin
2. RBC count
3. WBCs Count
4. Bleeding Time, Clotting Time
5. Blood Group
6. Arterial Blood pressure

Semester-1 st						
Paper Code	Paper Name	Total Hrs.	Credit	IA	SE	Total
MEP 108P	Practical II (MEP103, MEP 104)	84	6	25	75	100

List of Practicals:

Cell biology & Medical Genetics:

1. Parts of a microscope, usage & caring for the microscope
2. Differences between prokaryotic and eukaryotic cells
3. Buccal smear - characteristic features of human cheek cells
4. Mitosis in onion root tip – demonstration by teaching slides
5. Mitosis in onion root tip – preparation and observation of a crush smear
6. Meiosis in grasshopper testes

Basic Biochemistry:

1. Identification of carbohydrates: Molisch's test, Benedict's test, Fehling's test, Tollen's test, Iodine test, Seliwanoff's test, Barfoed's test, Osazone test and Bial's test
2. Estimation of blood glucose by Folin-Wu method
3. Identification of cholesterol by Salkowski's test.
4. Identification of lipids by Sudan III test.
5. Identification of protein and amino acids by Ninhydrin test, Biuret test, Xanthoproteic test, and Millon's test.
6. Investigating the effect of temperature and pH on enzyme (amylase, urease) activity.

Semester–2 nd						
Paper Code	Paper Name	Total Hrs.	Credit	IA	SE	Total
MEP 201	General & Systemic Pathology	56	4	25	75	100

Objective: To develop the basic understanding of why and how diseases develop and the changes that occur at the macroscopic, tissue and cellular level.

Outcome intended: At the end of the semester, the student will become familiar with the terminology used in pathology, identify changes that occur at the macroscopic and microscopic level, perform various basic clinical pathology tests like routine examination of urine and body fluids.

Unit I: General Pathology: Introduction to pathology – study of pathology, an overview – health and disease. Etiology – cause of disease - multi – factorial causation of disease–significance of etiology, natural history of disease, pathogenesis, clinical manifestations- signs and symptoms, morphological changes – macroscopic and microscopic - in disease - common terms in pathology

Unit II: Cell injury: Cellular adaptations –Causes, types and morphology. Atrophy, Hypertrophy, Hyperplasia, Metaplasia Etiology of injury, Types of Injury: Reversible and Irreversible Injury, morphology of reversible injury, hydropic, hyaline, mucoid and fatty change. Intracellular Accumulation, endogenous and exogenous pigments, morphology of irreversible injury – cell death – autolysis – apoptosis – necrosis. Patterns of necrosis: coagulative, liquefactive, caseous, fibrinoid.

Unit III: Inflammation and Healing: Types of inflammation -Acute and Chronic, chemical mediators of inflammation, Inflammatory Cells, Morphology and Fate of inflammation -Chronic inflammation – chemical mediators and morphology – types of chronic inflammation. Healing – Regeneration, Repair, Healing in Skin --Healing by primary and secondary intention, healing in other tissues

Unit IV: Pathophysiology of Haemodynamic: fluid compartments of the body – types of pressure gradients, pathogenesis of oedema –types of oedema, haemorrhage, hyperaemia and congestion, Thrombosis, embolism, ischaemia & infarction.

Unit V: Neoplasia: Overview, classification- benign and malignant tumours, nomenclature of neoplastic disease, Carcinogenesis. Clinical and Gross Features of tumours. Dysplasia, invasion and metastasis.

Unit VI: Systemic Pathology: Atherosclerosis, ischaemic heart disease, COPD, ischaemic brain damage, cerebral infarction, intracerebral haemorrhage, degenerative diseases, Hepatitis, Cirrhosis of Liver, Nephritic & Nephrotic Syndrome, Hydronephrosis and Pyelonephritis, Myopathies- muscular dystrophy

Essential reading:

1. Harshmohan (2017), Textbook of Pathology, 7th edition, Jaypee Publications
2. Robbins, (2012), Text book of Pathology, 3rd edition, Elsevier Publications

Suggested reading:

1. Boyd's Textbook of Pathology (Systemic Pathology), 10thed, Dr. J.R. Bhardwaj
2. Essentials of Clinical Pathology, Kawthalkar, Shirish M

Semester-2 nd						
Paper Code	Paper Name	Total Hrs.	Credit	IA	SE	Total
MEP 202	Electronics & Instrumentation	56	4	25	75	100

Objectives: To familiarise students with various basic electrical quantities and circuits, and to make them aware of basic electrical safety techniques regarding various medical equipments.

Outcome intended: After successful completion of the semester, the students will be able to understand the underlying circuits and operate various medico-electrical devices with proper safety and precautions.

Unit I: Basic Concepts: Definition and Units of Basic Electrical Quantities: Voltage, Current, Charge, Power, Resistance, Capacitance, Impedance Reactance, AC and DC, Power Factor, RMS, Average and Maximum Value of AC. Waves Form: Sine Wave, Square Wave, Triangular Waves, Ramp Signals. Basic Circuit Elements: Resistors, Capacitors, Inductors-Types Symbol, Colour Code Representation Series and Parallel Combination and Their Equivalent. Transformer. Circuit Laws: Ohm's Law, Wheat Stone Bridge. Motors: Types and Uses. Thermocouples.

Unit II: - Elements of Electronics: Material Classification According to their Conduction. Semi-Conductors- Intrinsic, Extrinsic, P Type, N Type, Diodes, Transistors, Characteristics & Schematic Representation. Application of Diodes as a Switch & Rectifier, HWR – Half Wave Rectifier, FWR – Full Wave Rectifier, Bridge Rectifier. Application of Transistor, Amplifier. Power Supply Unit, Introduction to Integrated Circuit, Introduction To Operational Amplifiers - Adder, Subtractor Multiplier, Generator - Sine Wave, Square Wave, Triangular Wave.

Unit III: - Digital Circuits: Binary Number System, Bits, Bytes, Octal, Hexadecimal, Addition, Subtraction, 1'S Complement and 2'S Complement. Gates: Universal Gates Or and Not. Exor, Exnor. Truth Table and Boolean Expression. A-D Convertor, D-A Converter.

Unit IV: – Electrical Safety and Medical Equipment-

Physiological Effect of Electrical Current, Shock Hazards from Electrical Equipment, Methods of Accident Prevention. Classification of Medical equipment According to the 1. Type of Protection 2. Mode of Protection.

Essential books: Theraja B.L, Basic Electronics, S Chand & Co Ltd

Semester–2 nd						
Paper Code	Paper Name	Total Hrs.	Credit	IA	SE	Total
MEP 203	Introduction to Medical Electrophysiology	56	4	25	75	100

Objectives: To develop a fundamental understanding of human physiological mechanisms that underpin electrophysiological techniques. To provide an overview of electrophysiological tools and methods used in diagnosis, monitoring, and research in medical sciences.

Outcome intended: Students will understand the physiological basis of electrophysiological signals and techniques. Students will acquire working knowledge of key electrophysiological tools including EMG, NCV, and EEG, along with their clinical and research applications.

Unit I: Cellular Neuro-electrophysiology: Cell membrane structure and membrane transport mechanisms, Sodium and potassium ion channels: voltage-gated and ligand-gated, Resting membrane potential, postsynaptic potentials, Action potential generation and propagation, Compound action potential, Synaptic transmission: mechanisms and types, Skeletal muscle structure and function, Neuromuscular junction physiology, Motor units and motor unit recruitment, Motor unit action potential (MUAP): basic characteristics and features.

Unit II: Techniques in Neuro-electrophysiology: Overview of Clinical Electrophysiology, General principles of electrophysiological recording, Classification: Invasive vs. Non-invasive techniques, Non-invasive electrophysiological recording techniques: Advantages of non-invasive procedures, Recent clinical neuro-electrophysiological approaches i.e. Electroencephalography, Electromyography, Nerve conduction studies and Event-related potentials. Invasive electrophysiological recording techniques: Electro-corticography- definition, procedure and clinical application, Intramuscular Electromyography- uses, advantages and disadvantages. Brief introduction to instrumentation: amplifiers, filters, electrodes etc.

Unit III: Basic Electromyography: Definition, Type of recording procedure, Surface vs. needle EMG: basic procedures and uses, instrumentations, Electrode types and placement, Signal characteristics, Types of activities- insertional activity, spontaneous activity, Applications in neuromuscular disorders

Unit IV: Basic Electroencephalography: Definition, Origin of EEG signals: cortical potentials, Instruments, Electrode placement: 10–20 system, Waveforms: alpha, beta, delta, theta, Basic recording setup and montages, Clinical uses: epilepsy, sleep disorders, brain monitoring.

Unit V: Basic Nerve Conduction Studies: Definition, Principle of nerve conduction: motor and sensory pathways, Types of nerve conduction studies: motor, sensory, orthodromic, antidromic studies, Key parameters: latency, amplitude, conduction velocity, Clinical relevance: peripheral neuropathies, radiculopathies etc.

Essential Books –

1. Sembulingam. K, (2012) Essentials of Medical Physiology, 6th edition, Jaypee B. M. P. (P) Ltd, New Delhi
2. Hall, John, E. (2016), Guyton and Hall Medical Physiology, Elsevier Churchill
3. Cooper, R. (2005), Techniques in Clinical Neurophysiology, Elsevier Churchill
4. Suggested books: Sembulingam. P, (2009), Viva voce in Physiology, 2nd edition, Jaypee B. M. P. (P) Ltd, new Delhi
5. Misra, U.K., (2014) Clinical Neurophysiology, Elsevier Churchill
6. Chatterjee, K. (2015), Manual of Electrophysiology, Jaypee B.M.P. (P) Ltd, New Delhi

Semester-2 nd						
Paper code	Paper name	Total Hrs.	Credit	IA	SE	Total
MEP 204	Cardiology & Electrocardiography-I	56	4	25	75	100

Objective-Provide students with a basic Cardiac Anatomy and physiology. Demonstrate clinical skills of medical history and physical examination, with specific attention to electrocardiography. Students will be expected to perform and interpret 12-lead ECGs, on normal subjects in their Practical Classes.

Outcome intended - Students will be able to give a detailed account of normal cardiac anatomy, physiology and blood flow through the heart, calculating heart rate, explaining conduction system of heart, classify normal and abnormal rhythm and components on ECG i.e. Assessment of rhythm, Measure intervals and segments and evaluate other relevant waves.

Unit I: Cardiac Cycle – Excitation & Contraction: Events During Cardiac Cycle, Cardiac conduction system, SA and AV node function, Electrical Potential in Cardiac Muscle, Origin & distribution of Cardiac Impulse, Assessment of cardiac output - Fick principle, Thermodilution and indicator dilution methods, Heart Rate, Autonomic regulation of the heart rate, Cardiovascular Regulation-Neural, Humoral & Local Control, Arterial Pulse, Jugular Venous Pulse, Heart Sounds (S1, S2, S3, S4).

Unit II: Hemodynamic & Cardiac Output:

Relationship between pressure, flow and resistance Frank-Starling law preload, afterload and contractility control of stroke volume and Cardiac Output, Regulation of Cardiac Output, Types of Blood Flow, Pressure and Flow (Arteries, Arterioles & Microcirculation), Blood Pressure (Determinants, Variations- Hypertension& Hypotension), Regulation of blood Pressure.

Unit-III Introduction to Electrocardiography: Recording of ECG-ECG Leads, Electrocardiograph, Normal Electrocardiogram, Calibration of Time & Voltage, Waves of ECG, Interval & Segments of ECG and Characteristic Features of ECG Complex in Unipolar Chest Leads & Limb Leads.

Unit-IV: Vectorial Analysis of ECG & Vector Cardiography: Concept of Cardiac Vectors, Mean Electrical Axis, Abnormalities of Mean Electrical Axis (RAD & LAD), Vector Cardiography, His Bundle Electrocardiogram, Clinical Application of Electrocardiography- Determination of rhythm along with calculation of heart rate, Sinus rhythm, Sinus bradycardia, Sinus tachycardia, types of conduction defects, Myocardial Ischemia/Infarction, Cardiac Arrhythmias Cardiac Arrhythmia & Heart Block.

Essential Reading:

1. Master visual diagnosis of ECG. Shahzad khan, Ren Jiang Hua
2. Bedside cardiology. An illustrated textbook vol. 1,2 – Kanu Chatterjee, Mark Anderson, Donald Hiistad, Richard E Kerber
3. Essential of clinical cardiology. Ayant C. Bhalerao
4. Harrison's principles of internal medicine

Suggested Readings–

1. Medical physiology–Indu Khurana
2. Text book of Physiology. Prof A. K. Jain
3. Text book of medical physiology. Guyton
4. A Textbook of practical physiology –C.L. Ghai
5. A Text book of practical physiology – Prof. A.K. Jain
6. Essential of Medical Physiology. K. Sembulingam, Prema Sembulingam
7. Review of medical physiology. Ganong

Semester-2 nd						
Paper Code	Paper Name	Total Hrs.	Credit	IA	SE	Total
MEP 205	Medical Emergencies & Patient Care	56	4	25	75	100

Objective - The primary objectives of Medical Emergency & Patient Care are to train the students to reduce the effects of emergency incidents in Electrophysiology Labs and prevent exposures from turning into larger emergency incidents. It also prepares students to manage the emergency's immediate consequences. Patient care part of the paper trains students to utilize excellent communication skills with patients, families and other members of the health care team and also teach ethical principles and their professional responsibilities.

Intended Outcome – Students will be able to perform Foley's Catheterization, RT Insertion, Cannulation, IV/IM Injections etc), chart patient information and handle critically ill, geriatric group and Pediatric Patients. Students will aware of different departments and units of Hospitals.

Unit I: Introduction to Emergency Services: Organization of Emergency Department, Guidelines in Emergency, Clinical Monitoring of patients, Fluid Therapy and Blood Transfusion, Airway Management, Cardiopulmonary Resuscitation, Principal of Mechanical Ventilation, Injection (I/M, I/V, S/C), Infusion Method, Management of Acid Base and Electrolyte Imbalance.

Unit II: Handling of Different Emergencies: Head Injuries, Vasovagal Syncope, Seizure, Epilepsy, Conjunctival and Corneal Foreign Body, Foreign Body in Nose & in Ear, Epistaxis, Haemoptysis, Poisoning – Classification of Poisons, Clinical Signs of poisoning and management, Food Poisoning, Diarrhoea, Urine Retention, Hypo & Hyperthermia

Unit III: Fundamentals of Patient Care: Concept of health & Illness, Health Determinants, Concept of Patients & Their Types, Patient Centred Care & Fundamentals of Communications, Reporting & Recording of Patients, Rights of Patients, Care & Prevention of Accident, Trauma & Infections

Unit IV: Patients Care, Associated Units & Departments: Ambulatory Units, Critical Care Units, Paediatric and Neonatal Intensive Care Unit (NICU)- Commonly encountered cases, Emergency Department, Oncology Unit, Orthopaedic Unit, Psychiatry Unit, Neurology and Neurosurgical Unit, Renal transplant and Dialysis Unit, Gastroenterology/Endocrinology Unit, Radiology Department, Surgical Units, Cardiac Catheterization Lab, Operating Room, Post Anaesthesia Care Unit, Managing patients with disabilities, Geriatric Care, OBG, Pathology lab, Biochemistry lab and Microbiology lab.

Essential Reading-

1. Textbook of Adult Emergency Medicine–Peter Camron, George Jelimek, Anne- Maree Kelly, Anthony Brown, Mark Little.
2. Medical Emergencies in General Practice–S. P. Gupta, D. K. Gupta
3. Critical Care Emergency Medicine–David A. Farcy, WILLIAM C. Chiu, Jhon P. Marshall, Tiffany M. Osborn

Suggested Readings–

1. Oxford handbook of Emergency Medicine –Joathan Wyatt, Robin Illingworth, Colin Graham, Kerstin Hogg

Semester-2 nd						
Paper Code	Practical	Total Hrs.	Credit	IE	SE	Total
MEP 206 P	Practical III (MEP 202, MEP 203)	98	8	50	150	200

Exercise Related to MEP 202:

1. To verify ohm's law, and to find the value of unknown resistance using ohm's law (Experimentally & graphically).
2. To draw the characteristic curve p n junction diode in forward bias.
3. To draw the characteristic curve of p n junction diode in reverse bias.
4. To study the characteristics of half and full wave rectifiers.
5. To study the Basic Logic Gates.

Exercise Related to MEP 203:

1. To introduce different component connections, optimum setting and calibration of EMG machine.
2. To record normal electrical activity of particular muscle.
3. To introduce different component connections, optimum setting and calibration of EEG machine.
4. To apply scalp electrodes utilizing 10-20 international system for electrode placement on a normal healthy subject.
5. To record normal electrical activity of brain from the scalp.
6. To introduce different component connections, optimum setting and calibration of NCV machine.
7. To record normal electrical activity of a particular nerve.

Semester-2 nd						
Paper code	Paper name	Total Hrs.	Credit	IA	SE	Total
MEP 207 P	Practical IV (MEP 204 & MEP 205)	98	8	50	150	200

Exercises related to MEP 204:

1. Study the features of ECG Machine (Single/Multichannel), ECG paper (Calibration), Gel & Electrodes.
2. Placements of Limb & Chest Electrodes.
3. Study the concept of 12 leads ECG (Standard, Augmented & Chest Leads).
4. Study the normal features of ECG Waves.
5. Study the normal features of intervals & Segments.
6. Determination of Cardiac Rhythm, Rate & Axis.

Exercises related to MEP 205

1. Clinical Examination of CVS,
2. Only Demonstration of following Skills-
3. Endotracheal Tube Insertion,
4. Tracheostomy,
5. Naso-gastric tube Insertion,
6. Foley's Catheterization,
7. Fluid Therapy

Semester-3 rd						
Paper code	Paper name	Total Hrs.	Credit	IA	SE	Total
MEP 301	Cardiology & Electrocardiography-II	56	4	25	75	100

Objective: Theory classes of Cardio pathology will train students to know about Clinical signs and symptoms, pathogenesis of Congenital, Hereditary & Acquired Cardiovascular Conditions and prepare them for diagnostic skills i.e. ECG, Echocardiography, Angiography & Cardio Radio imaging. Only theoretical knowledge of Echocardiography, Angiography and Radio Imaging Techniques will be given in their theory classes. Students will have the opportunity to observe these procedures during their clinical postings. They will be expected to perform and interpret 12-lead ECGs, analyze the ECG in Coronary Heart Diseases and Cardiac Arrhythmias and to observe abnormal waveforms in their practical classes.

Outcome Intended: Students will be able to give a detailed account of Congenital, Hereditary & Acquired Cardiovascular Conditions and abnormal components of ECG related with cardiac pathologies with conduction defects. They will know the proper use of the TMT, Holter and ECG machine, preparation of patients for tests and precautions before, during and after tests.

Unit I: Congenital and Heredofamilial Disorder: Cyanotic Congenital Heart Diseases(Tetralogy of Fallot, Transposition of the great vessels, Total anomalous pulmonary venous return, Truncus arteriosus, Pulmonary atresia, Tricuspid valve abnormalities, Ebstein's Anomaly), Noncyanotic Congenital Heart Diseases(Left to right shunting heart defects include - Ventricular septal defect(VSD), Atrial septal defect (ASD), Atrioventricular septal defect (AVSD), Patent ductus arteriosus (PDA), Acyanotic heart defects without shunting include - Pulmonary stenosis, Aortic stenosis, Coarctation of the aorta, Heredofamilial Disorder (Prolonged Q-T Syndrome, Marfan's Syndrome, Brugada Syndrome, Wolff –Parkinson –White Syndrome.)

Unit-II: Acquired Heart Disease: Hypertrophic Cardiomyopathies, Dilated Cardiomyopathies, Myocarditis, Endocarditis, Pericarditis, Kawasaki Disease, Rheumatic Fever, Acute Cor Pulmonale, Atherosclerosis, Angina pectoris Myocardial Infarction, Peripheral Vascular Disease.

Unit III: Electrocardiographic Manifestations: P Wave Abnormalities, ECG Changes in Ventricular Hypertrophy, Electrocardiographic Manifestation of Myocardial Ischemia, Myocardial Infarction.

Unit-IV: Miscellaneous Disorder: Hyper/Hypothyroidism, Acromegaly, Cushing Syndrome, Pheochromocytoma, Electrolyte Disturbances- Hypo/Hyperkalemia, Hypo/Hypercalcemia, Hypo/Hypermagnesemia

Essential Reading:

Master Visual Diagnosis of ECG. Shahzad khan, Ren Jiang Hua.

1. Bedside Cardiology- An illustrated Textbook (Vol 1,2). Kanu Chatterjee, Mark Anderson, Donald Hiistad, Richard E. Kerber.
2. Essential of Clinical Cardiology–Jayant C Bhalerao
3. Principles of Internal Medicine - Harrison

Suggested Readings:

1. Medical Physiology by Indu Khurana.
2. Text book of Physiology. Prof A. K. Jain
3. Textbook of Medical Physiology. Guyton
4. A Textbook of Practical Physiology. C.L. Ghai.
5. A Textbook of Practical Physiology. Prof. A.K. Jain.
6. Essential of Medical Physiology. K. Sembulingam, Prema Sembulingam

Semester-3 rd						
Paper Code	Paper Name	Total Hrs.	Credit	IA	SE	Total
MEP 302	Neuromuscular Disorders	56	4	25	75	100

Objectives: To provide foundational and clinical understanding of the structure and function of the neuromuscular system. To familiarize students with the pathophysiology, classification, and clinical presentation of neuromuscular disorders. To emphasize the role of electrophysiological and clinical diagnostic tools in evaluating these disorders.

Outcome Intended: Students will understand the anatomy and physiology of the neuromuscular system, including peripheral nerves, muscles, and neuromuscular junctions. Students will be able to differentiate between various neuropathies, myopathies, and junctional disorders. Students will learn the diagnostic criteria, clinical features, and electrophysiological findings associated with key neuromuscular disorders.

Unit I Neuro-muscular Anatomy & Physiology: Overview of the nervous system with emphasis on the Peripheral Nervous System (PNS), Anatomy and physiology of skeletal muscle and neuromuscular junction (NMJ), Structure and function of motor neurons, motor units, and muscle fibers, Role of neurotransmitters (e.g., acetylcholine) in synaptic transmission, Synaptic cleft dynamics and NMJ physiology, Basic pathophysiology: demyelination, axonopathy, denervation, Assessment techniques- Clinical examination of motor and sensory function in peripheral nerve assessment.

Unit II: Peripheral Neuropathies- Classification & Common Syndromes: Mononeuropathy (e.g., upper & lower limb mono neuropathies), Compressive neuropathies (e.g., ulnar, median nerve entrapments), Polyneuropathy (e.g., diabetic neuropathy), Mononeuritis multiplex, Radiculopathy and plexopathy, Hereditary neuropathies (Charcot-Marie-Tooth disorder), Overview of management

Unit III Acute & Progressive Neuropathies and Motor Neuron Diseases: Guillain-Barré Syndrome (GBS) and Acute Inflammatory Demyelinating Polyneuropathy (AIDP), Chronic Inflammatory Demyelinating Polyneuropathy (CIDP), Poliomyelitis and Post-polio Syndrome, Motor Neuron Diseases (MND)-Amyotrophic Lateral Sclerosis (ALS), Spinal muscular atrophy (SMA), Overview of management

Unit IV: Myopathies: Muscular Dystrophies: Duchenne Muscular Dystrophy (DMD), Becker Muscular Dystrophy (BMD), Facioscapulohumeral Dystrophy (FSHD), Limb-Girdle Muscular Dystrophy (LGMD), Inflammatory Myopathies: Polymyositis, Dermatomyositis, Inclusion Body Myositis, Overview of metabolic and mitochondrial myopathies, Overview of management.

Unit V: Neuromuscular Junction Disorders: Autoimmune NMJ disorders: Myasthenia Gravis (MG), Lambert-Eaton Myasthenic Syndrome (LEMS), Toxin and channelopathy-related disorders: Neuromyotonia (Isaacs' syndrome), Botulism, Overview of management: immunotherapy, symptomatic drugs, supportive care

.Essential Books –

1. Fuller, G. (2017), Neurological Examination Made Easy.
2. Williams and Wilkin Amato, Anthony, A. (2008), Neuromuscular disorders
3. Roger Bannister, Brain and Bannister's Clinical Neurology (Oxford Medical Publications) 7th Edition

Suggested Books –

Kenkre, Rajendra Bhalchandra (2008), Neurological Examination Made Easy, Jaypee B. M. P. (P) Ltd, New Delhi

Semester-3 rd						
Paper Code	Paper Name	Total Hrs.	Credit	IA	SE	Total
MEP 303	Electromyography & Nerve Conduction Studies	56	4	25	75	100

Objectives To provide a comprehensive understanding of neuromuscular physiology and the principles of nerve conduction and electromyography. To familiarize students with equipment, recording techniques, and interpretation of normal and abnormal findings. To develop a clinical approach to evaluating neuromuscular disorders using NCS and EMG.

Outcome Intended: Students will understand the physiology and pathophysiology underlying EMG and nerve conduction studies. Students will be proficient in the setup, execution, and interpretation of basic NCS and EMG. Students will be able to apply electrophysiological knowledge to clinical case evaluations of neuromuscular dysfunction

Unit I: Neuromuscular Physiology & Functional Basis: Anatomy and physiology of nerve and muscle, Neuromuscular transmission: synaptic cleft and neurotransmitters (acetylcholine), Motor unit structure and function, Functional organization: motor and sensory pathways, Disorders by functional level: Neuron cell body dysfunction, Axonal dysfunction, Myelin sheath dysfunction, Neuromuscular junction disorders, Primary muscle disorders, Physiological basis of EMG and nerve conduction signals

Unit II: Basics of Nerve Conduction Studies: Indications & Contraindications of NCV, Principles of Nerve Conduction Studies (NCS), Motor NCS: techniques, parameters (latency, amplitude, conduction velocity), Sensory NCS: techniques, parameters, sensory nerves commonly tested, Instrumentation and Setup: Electrodes: types and placement, Stimulus characteristics: strength, duration, frequency, recording: gain, filters, sweep speed, Common abnormalities in nerve conduction studies.

Unit III Specialized Nerve Conduction Techniques: Late Responses: F-wave: physiology, procedure, interpretation, H-reflex: origin, methodology, significance, Blink reflex: cranial nerve assessment, Tests for Neuromuscular Junction Disorders: Repetitive Nerve Stimulation (RNS), Brief intro to single-fiber EMG in NMJ testing, Factors affecting nerve conduction: age, temperature, limb length, pathology, Troubleshooting artifacts and technical errors

Unit IV :Basics of Electromyography: Indications & contraindications of EMG, Types of EMG: Conventional needle EMG, Surface EMG (sEMG), Macro EMG, Single-fiber EMG (introductory level), Instrumentation: Electrodes, filters, amplifier, averager, gain, sweep time, Procedure: Electrode placement, rest activity, insertional activity, minimal and maximal contraction, Identification of normal vs. abnormal motor unit potentials (MUAPs), Spontaneous activities: fibrillations, fasciculations, positive sharp waves and other abnormalities

Unit V- Clinical applications & interpretations: Clinical presentations and electrophysiological approach: Focal neuropathies (carpal tunnel, ulnar neuropathy), Generalized neuropathies (e.g., diabetic polyneuropathy), Radiculopathies and plexopathies, Evaluation of specific muscles and nerves, EMG findings in: Myopathic disorders, Neurogenic disorders, Neuromuscular junction dysfunction, Case-based interpretation and clinical correlation, Role of EMG/NCS in disease progression and prognosis

Essential Books –

Shapiro, B and Preston, D. (2013), Electromyography and Neuromuscular disorders- Clinical electrophysiological correlation, Elsevier

Suggested Books –

Misra, U.K., (2014) Clinical Neurophysiology, Elsevier Churchill Chatterjee, K. (2015), Manual of Electrophysiology, Jaypee B.M.P. (P) Ltd, New Delhi.

Semester-3 rd						
Paper Code	Practical	Total Hrs.	Credit	IE	SE	Total
MEP 304P	Practical V (MEP 301)	56	4	50	50	100

Exercises related to MEP 301 –

1. Study the Pathological features of P Wave
2. Study the Pathological features of QRS Complex / Waves
3. Study the Pathological features of T Wave
4. Study the Pathological features of PR Interval
5. Study the Pathological features of ST Segment

Semester-3 rd						
Paper Code	Practical	Total Hrs.	Credit	IE	SE	Total
MEP 305 P	Practical VI (MEP302, MEP303)	98	8	100	100	200

Spotting & assessment techniques related to PNS (MEP 302)

1. Neuro-Muscular Physiology,
2. PNS assessment
3. Neuropathies,
4. Myopathies
5. Neuromuscular Junction Disorders

Exercises related to MEP 303 –

1. To record and analyse electromyography from upper & lower limb muscles.
2. To record and analyse motor nerve conduction study of peripheral nerves of upper & lower limbs.
3. To record and analyse sensory nerve conduction study of peripheral nerves of upper & lower limbs.
4. To record and analyse F-wave in normal subject from peripheral nerves.
5. To record and analyse H-reflex in normal subject from peripheral nerves.
6. To record and analyse repetitive nerves stimulation from peripheral nerve.

Semester-3 rd						
Pape Code	Paper Name	Total Hrs.	Credit	IA	SE	Total
MEP 306 P	Evaluative Clinical Training-I	126	6	-	100	100

Exercise related to MEP203, MEP204 & MEP205

1. Training of ECG Recording in Wards,
2. ICU, Emergency,
3. Recording of Arterial Blood Pressure,
4. Oxygen Therapy,
5. Intramuscular, intravenous, subcutaneous injection,
6. Ven flon Insertion,
7. Only can assist in Endotracheal Tube Insertion, Wound Care, Nasogastric Tube Insertion, Care of critically ill, tracheotomise patient,
8. Surface EMG Recording,
9. Assist Intramuscular EMG Recording,
10. EEG Recording.

Semester-4 th						
Paper code	Paper name	Total Hrs.	Credit	IA	SE	Total
MEP 401	Cardiovascular Techniques & Fitness	56	4	25	75	100

Objectives - Objective of this paper is to give the basic knowledge of Cardio Pharmacology and the indications/ contraindications, principles, precautions, preparation, procedure of Cardiac Ablation, Catheterization, Pacemaker/ICD Implantation and Coronary Angioplasty/Stenting. Students will observe these procedures being performed but will not be directly involved in performing any invasive procedures during clinical training. Students will have the opportunity to perform and interpret 12-lead ECG, Cardiac Exercise Testing – TMT, Holter Monitoring, Handling of Cardiac Monitoring, and Defibrillation in their practical classes on normal subjects/mannequins.

Intended Outcome – Students will be able to give a detailed account of Congenital, Hereditary & Acquired Cardiovascular Conditions, Give a detailed account of abnormal components of ECG related with cardiac pathologies and conduction defects. Students will investigate basic non-invasive procedures by using Holter monitors, administering stress tests and checking pacemaker functions. In an invasive cardiac technology student learn only theoretically how to perform heart catheterizations, preparation for an invasive procedure, use of radiographic equipment.

Unit 1: Cardiovascular Pharmacology & Invasive Techniques: Anti-anginal agents - Beta blockers, Nitrates, Calcium channel blocker, Anti-failure agents Diuretics, Angiotensin converting enzyme inhibitors. ARB (Angiotensin Receptor Blocker), ACE inhibitors for diabetics and hypertensive renal disease, Digitalis and acute ionotropes, Anti-hypertensive drugs, Anti- arrhythmic agents, Antithrombotic agents, Anticoagulants, Lipid lowering and anti-atherosclerotic drugs

Unit II: Cardiac Imaging& Echocardiography: Chest Film Techniques, Overview of Cardiomedastinal Anatomy, Imaging in Cardiac Disease, Contrast- Enhanced Echocardiography, Transthoracic, Stress, Transesophageal & Three Dimensional Echocardiography.

Unit III: Exercise Electrocardiography & Holter Monitoring: Exercise Test, Indication of Test, Safety & Risk, Method, Protocol, Preparation, Lead System, Techniques, Electrocardiographic Manifestation of Stress Testing, ST Segment Changes, T, U, Q & QRS Complexes Changes, Exercise induced arrhythmia, Pharmacological Methods of Stress Testing, Holter Recording System (Continuous & Event), Patient's Dairy, Analysis, Artifacts &Errors.

Unit IV: Artificial Pacemaker, Cardiac Arrest &Resuscitation: Artificial Pacemaker-Types, Components, Method of pacing, Physiology of Pacemaker, Electrocardiographic Pattern, Pacemaker Syndrome, Catheter Ablation of Arrhythmias, Cardiac Resynchronization Therapy, Cardiac Arrest & Resuscitation.

Unit V: Preventive Strategies, Exercise and Rehabilitation: Prevention of Shock and Heart Failure, Smoking & Cardiac Disease, Definition, Goals, Phases & Core Components Of Rehabilitation, Exercise Physiology & Athlete's Heart.

Essential Reading:

1. Master Visual Diagnosis of ECG. Shahzad khan, Ren Jiang Hua.
2. Bedside Cardiology- An illustrated Textbook (Vol 1,2). Kanu Chatterjee, Mark Anderson.
3. Essential of Clinical Cardiology–Jayant C Bhalerao
4. Principles of Internal Medicine - Harrison

Suggested Readings:

1. Medical Physiology by Indu Khurana.
2. Text book of Physiology. Prof A. K. Jain
3. Textbook of Medical Physiology. Guyton
4. A Textbook of Practical Physiology. C.L. Ghai.
5. A Textbook of Practical Physiology. Prof. A.K. Jain.
6. Essential of Medical Physiology. K. Sembulingam, Prema Sembulingam
7. Review of Medical Physiology. Ganong's

Semester-4 th						
Paper Code	Paper name	Total Hrs.	Credit	IA	SE	Total
MEP 402	Respiratory Care Technologies	56	4	25	75	100

Objective – In this paper students learn respiratory applied anatomy and physiology as well as correlate with clinical signs and symptoms of acute/chronic respiratory disease, such as Asthma, Chronic Bronchitis, Tuberculosis, Pneumonia etc. They also learn the management and handling of Respiratory emergencies. Students will perform Pulmonary Function Test on normal subjects, Oxygen Therapy (Demonstration) and interpret chest radiograph in their practical classes.

Intended Outcome – Students will be able to give a detailed account of applied respiratory anatomy/physiology and respiratory pathologies. Students will be able to investigate respiratory defect with the help of PFT and chest Radiography.

Unit I: Functional Anatomy of Respiratory System: Respiratory Passage, Pleura & Pleural Cavity, Respiratory Parenchyma, Mechanism of Breathing, Pressure & Volume Change During Respiration, Lung volume & Capacities (Static & the dynamic), Pulmonary Elastance & Compliance, Regulation of Respiration

Unit II: Physiology of Diffusion & Transport of Gases: Alveolar Ventilation, Alveolar Ventilation Perfusion Ratio, Respiratory Membrane, Factor affecting Diffusion, Diffusion Capacity of Lung, Transport of Oxygen, Transport of Carbon dioxide.

Unit III: Respiratory Pathologies and Imaging Techniques: Tuberculosis, Pneumonia, Asthma, Bronchiectasis, Lung Abscess, COPD, Pulmonary Embolism, Chest Radiograph, Computed Tomography, M R I, HRCT-High Resolution Computed Tomography, thoracocentesis, bronchoscopy, Bronchoalveolar lavage

Unit IV: Respiration: Applied Aspects: Abnormal Respiratory Pattern (Apnoea, Hypo/Hyperventilation, Dyspnoea, Periodic Breathing), Disturbances Related To Respiratory Gases (Hypoxia, Hyper/Hypercapnia, Asphyxia), High Altitude Physiology, Artificial Respiration (Mechanical Ventilation), Oxygen Therapy, Non-Invasive Positive Pressure Ventilation-CPAP, Bi-PAP).

Essential reading –

1. Principle of respiratory medicine. Farokh Erach, Zarir F Udwadia, Anirudh F Kohli
2. Respiratory medicine. Emma Baker, Dilys Lai
3. Medical physiology. Indu Khurana
4. Text book of physiology. Prof A. K. Jain
5. Text book of medical physiology. Guyton

Suggested Readings -

1. A text book of practical physiology. C. L. Ghai
2. A text book of practical physiology. Prof. A.K. Jain
3. Essential of medical physiology. K. Sembulingam, Prema Sembulingam
4. Essential of Anaesthesia & critical care – Anshul Jain

Semester-4 th						
Paper Code	Paper Name	Total Hrs.	Credit	IA	SE	Total
MEP 403	Neurological Disorders	56	4	25	75	100

Objectives: Define and classify various neurological disorders. Understand their pathophysiology. Identify diagnostic tools and interpret findings. Formulate management plans and recognize preventive strategies.

Outcome Intended - Students will be able to identify and assess various neurological disorders, differentiate between normal and abnormal clinical presentations. Students can implement evidence-based management protocols and develop preventive strategies to reduce the incidences under supervision.

Unit I: Cerebrovascular disorders: Definition and classification of hypoxia, ischemia, infarction and stroke, pathophysiology, diagnosis, management and prevention of acute stroke, TIA, spinal cord injury, hemorrhage and hematoma, cerebral palsy.

Unit II Seizures and Epilepsy: Seizures, Epilepsy, Status Epilepticus, Types and clinical characteristics of seizures, Pathophysiology, Diagnosis, Management of seizures and epilepsy, Post seizure care.

Unit III: Neurodegenerative disease: Definition and types of dementia, Alzheimer's Disease, Dementia with Lewy Bodies, Frontotemporal Dementia, Vascular Dementia, Normal Pressure Hydrocephalus, Creutzfeldt Jakob Disease, Mild cognitive impairment, Secondary dementia, multiple sclerosis.

Unit IV: Movement Disorders: Classification of Movement disorder, Specific movement disorder, Tremor, Parkinson's disease, Parkinson's plus syndrome, Hereditary Ataxia, Huntington's Disease, Tardive Dyskinesia, Dystonias, Wilsons Disease, Gilles de la Tourette's Syndrome Myoclonus, Chorea, Athetosis, Tics.

Unit V: Infections and Tumors: CNS infections- acute and chronic meningitis, brain abscess, tuberculosis, neurosyphilis, rabies, herpes, meningitis, tumors and space occupying lesions- gliomas and malignant tumors.

Essential books:

1. Roger Bannister, Brain and Bannister's Clinical Neurology (Oxford Medical Publications) 7th Edition.
2. Satish V. Khadilkar and Gagandeep Singh (2nd Ed), IAN Textbook of Neurology, Jaypee publishers.

Suggested books:

1. Kumar, A. (2014) Textbook of Movement Disorder, Jaypee B.M.P. (P) Ltd, New Delhi.

Semester-4 th						
Paper Code	Paper Name	Total Hrs.	Credit	IA	SE	Total
MEP 404	Brain Waves & Electroencephalography	56	4	25	75	100

Objectives: To provide a comprehensive understanding of the physiological and technical basis of EEG. To train students in recognition of normal and abnormal EEG rhythms. To introduce advanced EEG applications including neonatal EEG, brain death, and quantitative EEG

Outcome Intended: Students will understand the generation and classification of brainwaves. Students will identify normal and pathological EEG patterns across age groups. Students will become familiar with EEG instrumentation, recording, and interpretation techniques. Students will understand the use of EEG in specialized contexts such as epilepsy, brain death, and neonatal monitoring.

Unit I: EEG Fundamentals and Brainwave Generation: Generation of EEG rhythms: cortical and scalp potentials, Basic EEG waveforms: Alpha, Beta, Theta, Delta rhythms, Epileptiform discharges: Spikes, sharp waves, and complex discharges, Technical aspects of EEG: EEG equipment: amplifiers, filters, sensitivity, time base, Electrodes: types and placements (10–20 system), Montages: bipolar, referential, and Laplacian, Calibration and standard settings, Activation procedures & recordings

Unit II: Normal EEG patterns across lifespan: EEG in adults: Anterior and posterior cerebral activity, EEG in children: Age-wise maturation of EEG, Development of posterior dominant rhythm, Normal transients and benign variants: Mu rhythm, Lambda waves, Wicket spikes, Rhythmic mid-temporal theta, Slow alpha variant, Subclinical rhythmic electrographic discharges, Artefacts in EEG: Eye movements, muscle artefacts, ECG and pulse artefacts, Movement and mechanical artefacts, Strategies to recognize and eliminate artefacts

Unit III: Abnormal EEG: Slow activity: Diffuse vs. focal slowing, Polymorphic delta, intermittent rhythmic delta activity, Epileptiform patterns: Spikes and sharp waves: focal and generalized, Periodic lateralized epileptiform discharges (PLEDs), Generalized periodic discharges and triphasic waves, Photic stimulation responses: Normal photic driving, Abnormal responses: photomyoclonic, photo convulsive responses

Unit IV: Special EEG Studies and Applications: Neonatal EEG: Recording setup and interpretation guidelines, Maturation patterns and abnormal background activity, Identification of neonatal epileptiform discharges, EEG in altered states: Sleep and coma patterns (overview), EEG criteria in encephalopathy and metabolic disorders, Brain death assessment: Electrocerebral inactivity, National/international guidelines in adults and children.

Unit V: Advanced EEG Analysis and Clinical Integration: Quantitative EEG (qEEG): Brain mapping techniques, Event-related potentials (brief intro), EEG monitoring in ICU and epilepsy units, Automated spike detection and computerized interpretation, Correlation of EEG with neuroimaging (introductory), Clinical case discussions and interpretation practice, EEG documentation and report writing basics.

Essential books - C. Chicot J. Vas, (2013) Clinical EEG, Ane Books Pvt Ltd, New Delhi

Suggested books –

1. Kurupath Radhakrishnan, Jagarlapudi M K Murthy, Chaturbhuj Rathore, EEG in Clinical Practice
2. Satish Khadilkar, Girish Soni, Pravina Shah, EEG Simplified

Semester-4 th						
Paper Code	Paper name	Total hrs.	Credit	IA	SE	Total
MEP 405 P	Practical VII (MEP 401, MEP 402)	98	8	100	100	200

Exercises related to MEP 401 –

1. Multi parameter Patient Monitoring – Study the electrical and pressure waveforms of the cardiovascular system, Hemodynamic monitoring - blood pressure . Body temperature monitoring,
2. Treadmill Testing - Investigated the exercise performance in a healthy Subjects, Cardiac stress testing,
3. Ambulatory Electrocardiography – Holter Monitoring
4. Defibrillator – Study the features of Resuscitation Device

Exercises related to MEP 402 –

1. Examination of Respiratory System.
2. Measurement of the saturated percentage of oxygen in the blood(SpO₂)
3. Respiratory rate monitoring.
4. Determination of Forced vital capacity (FVC) through spirometry.
5. Determination of Slow vital capacity (SVC) through spirometry.
6. Determination of Maximum Voluntary Ventilation (MVV) through spirometry.
7. Study of Oxygen therapy Equipments

Semester-4 th						
Paper Code	Paper Name	Total Hrs.	Credit	IA	SE	Total
MEP 406 P	Practical VIII (MEP 403, MEP 404)	98	8	100	100	200

Exercise related to MEP403 –

Neurological Assessment

Neurological Assessment

1. History Taking,
2. Examination of Consciousness
3. Sensory Assessment,
4. Motor Assessment,
5. UMN Vs LMN, Reflexes,
6. Balance and Coordination Assessment

Spotting related to –

1. Strokes
2. Seizures and Epilepsy
3. Dementia
4. Movement Disorders
5. Multifocal CNS Disorders

Exercise related to MEP404 –

1. To record single channel EEG in a normal healthy subject.
2. To study the effect of visual information and mental task on the alpha activity of EEG in normal healthy subjects.
3. To demonstrate various eye movement artifacts, EMG and ECG potentials during routine EEG recording in normal healthy subjects.
4. To perform different activation procedures on fronto-parietal EEG in normal healthy subjects.
5. To study age dependent variations in wake EEG using previously recorded and printed EEG graphs.
6. To study the pathological variations in EEG using previously recorded and printed EEG graphs.

Essential books:

1. Roger Bannister, Brain and Bannister's Clinical Neurology (Oxford Medical Publications) 7th Edition
2. **Suggested books:** Kumar, A. (2014) Textbook of Movement Disorder, Jaypee B.M.P. (P) Ltd, New Delhi.

Semester-5 th						
Paper Code	Paper Name	Total Hrs.	Credit	IA	SE	Total
MEP 501	Sensory Physiology & Evoked Potentials	84	6	25	75	100

Objectives: To make the students aware of special human senses like vision, auditory, gustation and olfaction, and various techniques used to differentiate normal and abnormal senses.

Outcome Intended: Students will be able to perform and record various types of evoked potentials to assess different human senses.

Unit I: Basic Sensory Physiology: Basic function of nervous system, synapse classification properties, receptors, classification of sensory receptors-Touch, Pressure, Pain and Temperature, Somatic and Visceral Senses, Exteroceptors, Viseroreceptor, Proprioceptors. Taste Receptors, Taste Pathway, Physiology of Taste, Applied – Ageusia, Hypogeusia & Dysgeusia. Olfactory Receptors, Physiology of Olfaction, Olfactory Pathway, Applied – Anosmia, Parosmia & Hyposmia.

Unit II: Physiology of Eye: Physiology of vision, significance, layers of retina, extra ocular muscle, visual association area, rhodopsin, retinal Visual Cycle, visual Pathway, Image Forming Mechanism, Photochemistry of Vision, Electrophysiology of Vision, Photopic and Scotopic Vision, Adaptation, Colour Vision, Colour Blindness, theories of colour vision optic neuritis, ocular disorders, Nystagmus.

Unit III: Physiology of Ear: Ear structure and function of external middle and internal ear-cochlea, organ of corti, Auditory Pathway, Auditory association areas, Physical Properties of Sound, Mechanism of Hearing, Electrophysiology of Hearing, pitch discrimination, volley principle, factors affecting pitch of sound, Applied Aspect – Deafness, Tinnitus. Audiometry, Acoustic neuroma.

Unit IV: Evoked Potentials- Visual, Auditory and Somatosensory: Neural generators, General principles, Acquisition of signal, Recording parameters, Waveform identification and interpretation, Electrode placement and montages.

Unit V: Clinical Correlation: Visual Evoked potentials, Auditory Evoked potentials Somatosensory Evoked Potentials in Peripheral neuropathy, Stroke, Coma, Brain death B12 deficiency, Spinal cord injury & Multiple sclerosis.

Essential books –

1. Cooper, R. (2005), Techniques in Clinical Neurophysiology, Elsevier Churchill
2. Jain, AK, Textbook of Physiology, Avichal Publishing Company, 5th edition
3. John E Hall, Guyton and Hall Textbook of Medical Physiology (Guyton Physiology), 13th edition

Suggested books:

1. Varshney, VP, Ghai's textbook of Practical Physiology, 9th edition, Jaypee B.M.P. (P) Ltd, New Delhi

Semester-5 th						
Paper Code	Paper Name	Total Hrs.	Credit	IA	SE	Total
MEP 502	Polysomnography & Sleep Studies	84	6	25	75	100

Objectives: To provide a foundational understanding of sleep physiology and neurobiology. To introduce techniques for conducting and interpreting sleep studies. To familiarize students with sleep disorders and their electrophysiological correlates. To understand diagnostic protocols and clinical applications of sleep-related testing.

Outcome Intended: Students will be able to describe sleep stages, mechanisms, and neurotransmitter roles. Students will understand the components and protocols of polysomnography (PSG). Students will be able to classify, identify, and evaluate common sleep disorders. Students will become familiar with sleep scoring methods, daytime sleepiness testing, and actigraphy. Students will interpret basic sleep studies in clinical scenarios

Unit I Sleep Physiology sleep wake regulation: Normal sleep-wake cycle: circadian and ultradian rhythms, Sleep architecture and stages: Wake state, NREM stages (N1, N2, N3), REM sleep, Sleep onset and transitions, Neurophysiology of NREM and REM: Thalamocortical mechanisms, Pontine and hypothalamic regulation, Neurotransmitters involved in sleep (GABA, serotonin, dopamine, hypocretin, etc.)

Unit II: Polysomnography- Principles and Protocols: Indications & contraindications of PSG, Components of PSG: EEG, EOG, chin/submental EMG, ECG, nasal/oral airflow, Thoracic and abdominal effort belts, Blood oxygen saturation (SpO₂), CO₂ monitoring (EtCO₂ or transcutaneous), Body position and limb movement sensors, Audio-visual and body movement monitoring, PSG setup and calibration, Electrode placement (AASM guidelines), Standard overnight study protocol, Technical considerations in acquisition and quality assurance, PSG interpretation: sleep staging, event scoring, artifact identification

Unit: III Sleep Disorders: Classification based on ICSD-3 (International Classification of Sleep Disorders): Insomnia disorders, Sleep-related breathing disorders: Obstructive Sleep Apnea (OSA), Central Sleep Apnea, Mixed Apnea, Central disorders of hypersomnolence: Narcolepsy (Type 1 and 2), Idiopathic hypersomnia, Parasomnias: NREM and REM-related, Circadian rhythm sleep-wake disorders, Sleep-related movement disorders, Epidemiology, risk factors, symptoms, Basic management strategies and preventive approaches

Unit IV: Daytime Sleep Testing and Subjective Assessments: Multiple Sleep Latency Test (MSLT): procedure, indications, interpretation, Maintenance of Wakefulness Test (MWT), Actigraphy: device setup, analysis, interpretation, Subjective sleepiness scales: Epworth Sleepiness Scale, Stanford Sleepiness Scale, Pittsburgh Sleep Quality Index, Out-of-lab/home-based tests: protocols and limitations, Sleep diaries and patient questionnaires, Clinical application of daytime testing and its integration with PSG.

Unit V: Sleep Scoring, Interpretation, and Clinical Applications : Sleep scoring rules (AASM guidelines): Sleep stages (N1, N2, N3, REM), Arousals and transitions, Respiratory events (apneas, hypopneas, RERAs), Limb movements, Cardiac rhythm changes, Sleep architecture interpretation: hypnograms and trends, Effects of sleep deprivation and fragmentation, Interpretation of case

examples and PSG reports, Overview of therapeutic monitoring: CPAP/BiPAP titration, Role of sleep studies in: Epilepsy, Neuromuscular disorders, Psychiatric conditions.

Essential Books

1. Robertson, B. (2014), Polysomnography for the sleep technologist, Elsevier Churchill
2. Chokroverty, S. (2009), Sleep disorders medicine, 3rd edition, Saunders, Elsevier

Suggested Books

1. Christian Guilleminault, (2005) Clinical Neurophysiology of Sleep Disorders, Volume 6, 1st Edition

Semester-5 th						
Paper code	Paper name	Total Hrs.	Credit	IA	SE	Total
MEP 503	Public Health	56	4	25	75	100

Objective – Main objective of this paper is to train the students to improve the quality of life through prevention of disease by taking precaution during invasive and non-invasive procedures in Cardio/ Neuro Labs. To teach the students how they can help in treatment by making electrophysiological investigatory procedure more accurate for diagnosis. Statistic analysis trains the students to collect patient-oriented data used in support of analytical and/or research projects.

Intended Outcome – Students will be able to identify current public health problems nationally and globally. Students will aware of food borne, waterborne disease, food safety, water safety, vaccination, exercise, obesity, exposure to toxins and hospital and lab waste management. Students will make an oral presentation, in which they will compare the developed country health care system with another country.

Unit I: Concept of Health and Disease: Concept, Dimensions, Determinants & Indicator of Health, Health Promotion, Concept of Disease, Concept of Causation-Germ Theory, Epidemiological Triad, Natural History of Disease—Pathogenesis (Agent, Host, environmental & Risk Factors), Spectrum of Disease, Iceberg of Disease, Disease Elimination and Eradication, Monitoring and Surveillance, Prevention (Primary, Secondary and Tertiary).

Unit II: Health Programme & Organization: National Vector Borne Disease Control Programme-Malaria, Lymphatic Filariasis, Kala Zar, Japanese Encephalitis & Dengue Fever, Revised National Tuberculosis Control Programme, National AIDS Control Programme, Iodine Deficiency Disorders and National Viral Hepatitis Control Program.

Unit III: Hospital Waste Management: Health Hazards of Health Care waste, Treatment and Disposal Technologies, Incineration and its Type, Biomedical Waste Management in India.

Unit-IV: Basic Medical Statistics: Presentation of Statistical Data-Tabulation (Simple & Frequency Distribution Table), Chart and Diagram-Bar charts (Simple bar, Multiple Bar & Component Bar), Histogram, Line Diagram, Pie chart, Pictogram, Statistical Averages- The Mean, The Median, The Mode.

Essential reading –

1. Park's text book of preventive & social medicine – K. Park
2. Introduction to public health. Marry-Jane Schneider

Suggested Readings-

1. Oxford textbook of global public health. Roger Detels, Martin Gullifor Quarraisha Abdool Karim, Chorh Chuan Tan
2. Public health nutrition from principle to practice. Mark Lawrence & Tony Worsle

Semester-5 th						
Paper Code	Paper name	Total Hrs.	Credit	IA	SE	Total
MEP 504P	Practical IX (MEP 501, MEP 502)	98	8	100	100	200

Exercise Related to MEP501 –

1. To examine cranial nerves
2. To study, record and analyse visual evoked potentials.
3. To study record and analyse brainstem evoked potentials.
4. To study, record and analyse Audiometry.

Essential books

1. Cooper, R. (2005), Techniques in Clinical Neurophysiology, Elsevier Churchill
2. Jain, AK, Textbook of Physiology, Avichal Publishing Company, 5th edition
3. John E Hall, Guyton and Hall Textbook of Medical Physiology (Guyton Physiology), 13th edition

Suggested books

Varshney, VP, Ghai's textbook of Practical Physiology, 9th edition, Jaypee B.M.P. (P) Ltd, New Delhi

Exercise Related to MEP502 –

1. To assess quality and quantity of sleep using sleep diary, and to get familiarized with sleep hygiene techniques.
2. To subjectively assess sleep using various validated sleep questionnaires.
3. To record and analyse polysomnography of a normal subject.
4. To record and analyse multiple sleep latency test of a normal subject.
5. To record and analyse maintenance of wakefulness test of a normal subject.

Semester-5 th						
Paper code	Paper name	Total Hrs.	Credit	IA	SE	Total
MEP 505 P	Evaluative Clinical Training II	252	8	----	100	100

Exercises Related to Neuro. /Cardio. electrophysiology -

1. Treadmill Test
2. Pulmonary Function Test
3. Defibrillation of Heart
4. Bedside Cardiac Monitoring in ICU & Emergency
5. Sensory & Motor Nerve Conduction Studies
6. F Wave & H Reflex Studies
7. Repetitive Nerve Stimulation Test
8. 16 Channel EEG Recording EEG Activation Procedures
9. EEG Artefacts Rectification Method

Semester-6 th						
Paper Code	Paper name	Total Hrs.	Credit	IA	SE	Total
MEP 601	Quality Assurance & Medical Ethics	56	4	25	75	100

Objectives - Quality Assurance prepare students to detect, reduce and correct deficiencies in laboratories analytical process to release patient results and improve the quality of test result. Quality assurance is aimed at ensuring quality test results. Bioethicists often refer to the four basic principles of health care ethics which teach students to respect all four principles - autonomy, justice, beneficence, and non-maleficence.

Intended Outcome - Student will become able to monitor and evaluate the quality of the total testing process as well as to recognize the importance of ethical issues within everyday lab investigations and the ethical concerns of patients, as well as participants in research.

Unit I: Quality in Health Care: Concept of quality of life, dimensions, international scenario for quality in health care, indian scenario, cost of quality (economic feasibility), improvement of quality of services, quality improvement tools, certification/accreditation, patient safety goal.

Unit-II: Programme for Improvement of Services: Patient safety management programme, disaster management programme, infection control programme, Bio medical waste management programme, equipment management programme, training programme, patient's information & education programme, rights & responsibilities of patient's.

Unit III: Basic Concept of Ethics: Medical ethics definition and code of conduct, principle of ethics-autonomy, beneficence, non-maleficence, justice, accountability, confidentiality, ethical guidelines, good clinical practices, protocol, standard operating procedure, inclusion exclusion criteria, informed consent form, ascent form, case record form, ethics committee, reporting of adverse event and serious adverse events.

Unit IV: Medical Records: Introduction to medico-legal aspects, structure and maintenance of medical records, confidentiality of medical records, privileged communication, release of medical information, retention and disposal of medical records, medico-legal cases I involving medical records, digital health records and legal considerations, medical records in research and public health, regulatory and accreditation standards.

Unit V: Evaluation of Performance – Evaluation through statistical approach-criteria & standard, comparison of pre & post data, through medical audit-objectives, process & indicator, through equipment audit-benefits, process & indicators, through patient's satisfaction survey-process & methodology.

Essential Reading -

1. Quality management in hospital. S K Joshi
2. Quality assurance in hospitals: Strategies for assessment & implementation. Grahm, Nancy O.

Suggested Readings –

1. Hospital quality assurance; risk management & programme evaluation. Jesus J.Pena.
2. Quality assurance in hospital nutrition services. Renner Mc Caffrey.

Semester-6 th						
Paper Code	Paper Name	Total Hrs.	Credit	IE	SE	Total
MEP 602 P	Evaluative Clinical Training & Internship	588	18	---	300	300

Exercise Related to Cardio electrophysiology –

1. Training of ECG Recording in Wards, ICU, Emergency
2. Recording of Arterial Blood Pressure,
3. Treadmill Test,
4. Pulmonary Function Test
5. Can assist Defibrillation,
6. Defibrillators – Study the features and use resuscitation devices
7. Bed side patient monitoring,
8. Treadmill Testing - Investigated the exercise performance in healthy subjects
9. Cardiac stress testing, Ambulatory Electrocardiography- Holter Monitor Electrocardiography.
10. One case study (Cardiac Disease)/Presentation

Exercise Related to Neuro electrophysiology –

1. Surface EMG Recording,
2. Assist Intramuscular EMG Recording,
3. EEG Recording, Sensory and Motor Nerve Conduction Studies
4. F Wave and H Reflex Studies,
5. Repetitive nerve stimulation test,
6. 16 Channel EEG Recording,
7. EEG activation procedure,
8. EEG Artifacts Rectification Methods
9. Sleep Study
10. One case study (Neurological/ Neuromuscular Disorder)/ Presentation
