

B.SC.
NEUROPHYSIOLOGY
TECHNOLOGY

SYLLABUS 2019-20

Scheme of Examination

Ist Sem

S.NO	Subject Name	Paper Code	Theory Examination		Practical Examination		Total Marks	Credit
			Univ. Exam.	Internal Assessment	Univ. Exam.	Internal Assessment		
1.	Neuro-Anatomy I		60	40			100	4
2.	Neuro- Physiology I		60	40			100	4
3.	Neuro-Pathology		60	40			100	4
4	Basics of electronic concepts related to neurophysiology		60	40			100	4
5.	Neuro electrophysiology lab and DSA lab				60	40	100	4
6.	Communication Skills and Personality Development		60	40	-	-	100	4
	Total						600	24

IInd Sem

S.No	Subject Name	Paper Code	Theory Examination		Practical Examination		Total Marks	Credit
			Univ. Exam.	Internal Assessment	Univ. Exam.	Internal Assessment		
1.	Neuro-anatomy –II		60	40			100	4
2	Neurophysiology II		60	40			100	4
3	Neuro-Biochemistry		60	40			100	4
4	Clinical practice EEG in OPD				60	40	100	4
5	Fundamentals of Computer Science		60	40			100	4
	Total						500	20

IIIrd Sem

S.No	Subject Name	Paper Code	Theory Examination		Practical Examination		Total Marks	Credit
			Univ. Exam.	Internal Assessment	Univ. Exam.	Internal Assessment		
1.	Basics of EEG		60	40	50		150	4+2
2	Basics of EMG & NCV		60	40	50		150	4+2
3	Patient care management and clinical care		60	40			100	4
4	Neuro electrophysiology lab and DSA lab				60	40	100	4
5.	Environmental Science		60	40	-	-	100	4
	Total						500	24

IVth Sem

S.NO	Subject Name	Paper Code	Theory Examination		Practical Examination		Total Marks	Credit
			Univ. Exam.	Internal Assessment	Univ. Exam.	Internal Assessment		
1.	Instrumentation of EEG		60	40	50		150	4+2
2.	Instrumentation of EMG & NCV		60	40	50		150	4+2
3.	Clinical practice EMG & NCV in OPD				60	40	100	4
4	Pharmacology related to neurophysiology and clinical practice		60	40			100	4
5	Evoked potential (BERA/VEP/SSEP)		60	40	50		150	4+2
	Total						650	26

Vth Sem

S.NO	Subject Name	Paper Code	Theory Examination		Practical Examination		Total Marks	Credit
			Univ. Exam	Internal Assessment	Univ. Exam.	Internal Assessment		
1.	EEG and EMG Machines and clinical practice		60	40	50		150	4+2
2.	Instrumentation & technique and clinical practice on EEG, EMG & NCV				60	40	100	4
3.	EEG, EMG in different disease states –I		60	40	50		150	4+2
4.	Clinical practice in OPD				60	40	100	4
5.	Research Methodology & Biostatistics		60	40			100	4
	Total						600	24

VIth Sem

S.NO	Subject Name	Paper Code	Theory Examination		Practical Examination		Total Marks	Credit
			Univ. Exam.	Internal Assessment	Univ. Exam	Internal Assessment		
1.	EEG, EMG in different disease states – II		60	40			100	4
2.	Intra-operative Neuro Monitoring		60	40			100	4
3.	Introduction to Sleep Studies		60	40			100	4
4.	Basics of Neuro-Imaging Modalities		60	40			100	4
5.	Instrumentation and technique and clinical practice on EEG ,EMG & NCV				60	40	100	4
	Total						500	20

(SEMESTER-I)
Neuro anatomy I

Paper Code:

Total hours: 47

S. No.	Topics to be covered	Teaching Hours	Domain
Unit-1	<ul style="list-style-type: none"> • Basic anatomy • Basics of nervous system 	5	Must know
	<ul style="list-style-type: none"> • Sub divisions of nervous system • Central • Peripheral • Autonomic 	2	Desirable to know
	<ul style="list-style-type: none"> • Living anatomy of head and neck 	1	Nice to know
Unit-2	Thalamus <ul style="list-style-type: none"> • Introduction • Division of diencephalon • External features parts of thalamus 	5	Must know
	<ul style="list-style-type: none"> • Nuclei of thalamus • Connections of thalamic nuclei 	2	Desirable to know
	<ul style="list-style-type: none"> • Uses/ functions 	1	Nice to know
Unit-3	Hypothalamus <ul style="list-style-type: none"> • Introduction • Division and boundaries of hypothalamus • Hypothalamic nuclei 	5	Must know
	<ul style="list-style-type: none"> • Connections of hypothalamic 	2	Desirable to know
	<ul style="list-style-type: none"> • Functions/uses 	1	Nice to know
Unit-4	Ventricular system <ul style="list-style-type: none"> • Introduction • Review of skull 	5	Must know
	<ul style="list-style-type: none"> • Classification 	2	Desirable to know
	<ul style="list-style-type: none"> • Functions 	1	Nice to know

Unit-5	Cerebrospinal fluid	2	Must know
	<ul style="list-style-type: none"> • Introduction • Production • Circulation and absorption 	1	Desirable to know
Unit-6	Skull	3	Must know
	<ul style="list-style-type: none"> • Introduction • Bones of the skull • Joints of the skull 	2	Desirable to know
	<ul style="list-style-type: none"> • Anatomical position of skull 	1	Nice to know
Unit-7	Features of the skull- exterior and interior	1	Nice to know
	Cerebellum	3	Must know
	<ul style="list-style-type: none"> • Introduction • Arterial supply of the cerebellum • External features 	2	Desirable to know
Unit-8	<ul style="list-style-type: none"> • Divisions of cerebellum • Internal structure (In brief) 	1	Nice to know
	Boundaries and functions		
Unit-8	<ul style="list-style-type: none"> • Motor and sensory tracts • Sensory receptors • Sensory and motor pathways • Pyramidal system • Upper and lower motor neuron 		

Neuro Physiology I (Semester-I)

Total hours: 48

S. No.	Topics to be covered	Teaching Hours	Domain
Unit-1	Nerve muscle physiology <ul style="list-style-type: none"> • Functional anatomy, biological activities, electrical and physiological properties of nerve fibre, types of nerve fibre, degeneration and regeneration of neurons 	5	Must know
	Structure and function of neuromuscular junction, neuromuscular transmission, <ul style="list-style-type: none"> • Introduction of skeletal muscle, functional anatomy and organization, process and characteristics of muscle excitability and contractility, characteristics of skeletal muscles in intact body, EMG, and common muscle disorders, source of energy and metabolic phenomenon during muscle contraction 	3	Desirable to know
	<ul style="list-style-type: none"> • drugs affecting and disorders of neuromuscular junction • factors promoting neuronal growth, 	2	Nice to know
Unit-2	Cranial nerves <ul style="list-style-type: none"> • Introduction, function of cranial nerve, 	4	Must know
	<ul style="list-style-type: none"> • clinical significance 	3	Desirable to know
Unit-3	Membrane potential <ul style="list-style-type: none"> • Introduction, genesis of membrane potential, recording of membrane potential 	3	Must know
	<ul style="list-style-type: none"> • -Evolution of patients receiving oxygen therapy 	2	Desirable to know
	<ul style="list-style-type: none"> • Hazards of oxygen therapy. 	1	Nice to know
Unit-4	Synapses <ul style="list-style-type: none"> • Definition and its types, • chemical synapse, 	5	Must know
	<ul style="list-style-type: none"> • neurotransmitters 	2	Desirable to know
Unit 5	Pathways <ul style="list-style-type: none"> • Introduction, Salutatory propagation, plexus 	3	Must know

	and roots, afferent and efferent pathways, peripheral nerves of limbs	2	Desirable to know
Unit-6	Cerebellum Introduction, stimulus, sensors and receptors and its types, sensory cortex and its types,	5	Must know
	neural circuits and neuronal activity, functions.	2	Desirable to know
Unit 7	Brain stem Introduction, physiological structure, development, blood supply,	4	Must know
	clinical significance, functions.	2	Desirable to know

Neuro Pathology (Semester-I)

Total hours: 46

S. No.	Topics to be covered	Teaching Hours	Domain
Unit-1	Bone- gross and micro <ul style="list-style-type: none"> • Normal structure of bone and cartilages • Osteomyelitis – pyogenic, acute, chronic and tuberculous • Osteoporosis, osteomalacia , rickets, scurvy • one Tumor- classification, benign 	10	Must know
	<ul style="list-style-type: none"> • malignant and • Giant cell (tumor of bone) • Rheumatoid arthritis • Gout & Gouty arthritis 	5	Desirable to know
	<ul style="list-style-type: none"> • osteomyelitis osteosarcoma (briefly)	3	Nice to know
Unit-2	Muscle- gross and micro <ul style="list-style-type: none"> • Normal structure of muscle • Myasthenia gravis 	8	Must know
	Myopathies – muscular dystrophies	5	Desirable to know
Unit-3	Nerve- gross and micro <ul style="list-style-type: none"> • Normal structure of nerve • Hydrocephalus • Infections – meningitis, acute, chronic, pyogenic, tuberculosis meningitis 	8	Must know
	<ul style="list-style-type: none"> • HIV encephalopathy (AIDS - dementia complex) • Brain hemorrhage • Trauma to the CNS(head injury) • Peripheral nervous system (Normal structure) 	4	Desirable to know
	<ul style="list-style-type: none"> • Peripheral neuropathy • Wallerian degeneration 	3	Nice to know

Communication skill and personality development (Semester 1)

Total hours: 48

Sl. No	TOPICS TO BE COVERED	Domain	Teaching Hours
Unit-I	Listening Comprehension <ul style="list-style-type: none"> • Speeches • Interviews • audio-video clippings followed by exercises • Introduction to Communication • Importance of Communication • Barriers to Communication and ways to overcome them 	Desirable to know Must Know Nice to know	10 hours
Unit-II	Conversation Skills <ul style="list-style-type: none"> • Greetings and Introducing oneself • Framing questions and answers • Role play • Buying: asking details etc • Word formation strategies • Vocabulary building: Antonyms, Synonyms, Affixation, Suffixation, One word substitution 	Must Know Desirable to know	5 Hours
Unit-III	Reading Comprehension <ul style="list-style-type: none"> • Simple narration and Stories • Newspaper and articles clippings • Sentence types • Note Making • Paragraph Writing • Comprehension • Report Writing: types, characteristics 	Must Know	8 Hours
Unit-IV	Pronunciation <ul style="list-style-type: none"> • Pronunciation • Syllable and Stress • Intonation and Modulation 	Must Know	10 Hours
Unit-V	Writing Comprehension <ul style="list-style-type: none"> • Letters: types, format, style • Précis Writing • Paragraph: Order, Topic sentence, consistency, coherence • Report and Proposal • Project Writing: Features, Structure 	Must Know	15 Hours

Basics of electronics concepts related to Neurophysiology

Total hours: 45

S. No.	Topics to be covered	Teaching Hours	Domain
Unit-1	Electric Current Ohm's Law Resistivity/Resistance Capacitance Inductance & transformers	8	Must know
	Decibel, dB Transformer basics Basics of electrical power	4	Desirable to know
Unit-2	Voltage RLC circuit Basics of voltage Semiconductors	8	Must know
	Q, quality factor Bandwidth, wavelength, frequency, amplitude	4	Desirable to know
Unit-3	Characteristics Calibration Damping, Low frequency Filter, Sensitivity,	8	Must know
	Amplitude Linearity,	4	Nice to know
Unit-4	Noise Introduction, Types	5	Must know
	Technique for noise removal Grounding	4	Desirable to know

Neuro Anatomy II (Semester-II)

Total hours: 49

S. No.	Topics to be covered	Teaching Hours	Domain
Unit-1	Spinal cord <ul style="list-style-type: none"> • Introduction • Blood supply • External features 	5	Must know
	<ul style="list-style-type: none"> • Fissures and sulci • Attachment of spinal nerve roots • Internal structure 	2	Desirable to know
	Enlargement of spinal cord Spinal nerves Formation of plexus	1	Nice to know
Unit-2	Cranial nerves <ul style="list-style-type: none"> • Introduction • Types – Motor, special sensory, mixed cranial nerves 	5	Must know
	Functions	2	Desirable to know
Unit-3	Autonomic nervous system <ul style="list-style-type: none"> • Organization of nervous system • Anatomy of autonomic motor pathway 	5	Must know
	<ul style="list-style-type: none"> • Structure of sympathetic and parasympathetic divisions • Neuro transmitters and receptors 	2	Desirable to know
	Functions	1	Nice to know
Unit-4	Brain vascular supply <ul style="list-style-type: none"> • Introduction • Blood brain barrier 	5	Must know
	<ul style="list-style-type: none"> • Characteristics of artery and veins Supply in different areas in brain Muscles <ul style="list-style-type: none"> • Origin • Insertion nerve supply 	1	Desirable to know
Unit 5	Cerebrum <ul style="list-style-type: none"> • Introduction and structure of cerebrum • Cerebral cortex • Gyri, sulci, cortical areas - demonstration • Lobes of the cerebellum • Association commissural areas • Basal nuclei 	3	Must know

	<ul style="list-style-type: none"> • Limbic system Functions <ul style="list-style-type: none"> • Dissection hall 	2	Desirable to know
Unit-6	Meninges <ul style="list-style-type: none"> • Introduction • Meninges of brain 	3	Must know
	Subdural and Subarachnoid Space	2	Desirable to know
Unit-7	Brain stem <ul style="list-style-type: none"> • Introduction • External features • Structure • Arterial supply 	4	Must know
	<ul style="list-style-type: none"> • Development of functional column and nuclei Reticular formation	2	Desirable to know
	Medulla <ul style="list-style-type: none"> • Introduction • External features • Structure • Arterial supply 	3	Must know
	Function	1	Desirable to know

Neurophysiology II (Semester-II)

Total hours: 50

S. No.	Topics to be covered	Teaching Hours	Domain
Unit-1	Nervous system Physiological structure of human brain, .	5	Must know
	properties and function	3	Desirable to know
Unit-2	Cerebrum Introduction, physiological anatomy, cerebral cortex,	5	Must know
	cerebral hemisphere, functions	2	Desirable to know
Unit-3	Reflexes : Introduction, types, reflexes Involving	5	Must know
	cranial nerves.	2	Desirable to know
	Functions of cranial nerves	1	Nice to know
Unit-4	Motor system : Introduction , types of motor system	5	Must know
	functions and application areas	2	Desirable to know
Unit-5	Sensory system: Introduction, stimulus,	5	Must know
	sensors and receptors and its types,	2	Desirable to know
	sensory cortex and its types	1	Nice to know
Unit-6	Basic neurological examination: Introduction, absence and presence of disease in nervous system,	5	Must know
	aspects of neurological examination	1	Desirable to know
Unit 7	Basics of NCV and EMG : • Introduction, block diagram,	4	Must know
	• Basic instrumentation of NCV & EMG equipments	2	Desirable to know

Neuro Biochemistry (Semester-II)

Total hours: 47

S. No.	Topics to be covered	Teaching Hours	Domain
Unit-1	Introduction to Cell <ul style="list-style-type: none"> • Definition of the cell • Difference between prokaryotic & eukaryotic cell 	8	Must know
	<ul style="list-style-type: none"> • Structure of cell • Structure of cell membrane • Structure of various cell organelles i.e. nucleus, mitochondria, golgi body, lysosomes, ribosomes, endoplasmic reticulum, centrioles etc 	5	Desirable to know
	Detailed function of above mentioned cell organelles	3	Nice to know
Unit-2	Chemistry of Proteins <ul style="list-style-type: none"> • Definition of the proteins & amino acids • Structure & function of proteins and amino acids • Classification of proteins & amino acids 	8	Must know
	<ul style="list-style-type: none"> • Biologically important peptides & amino acids • Amino acids & peptides which act as neurotransmitters • Organization of protein structure 	5	Desirable to know
	Denaturation		
Unit-3	Protein Metabolism <ul style="list-style-type: none"> • Transamination • Deamination • Oxidative deamination • Decarboxylation • Synthesis, transport, disposal and toxicity of ammonia 	5	Must know
	<ul style="list-style-type: none"> • Urea cycle and its disorders • Metabolism of individual amino acids specifically related to nervous tissue 	3	Desirable to know
	Inborn errors of amino acid metabolism	2	Nice to know
Unit-4	Nervous Tissue <ul style="list-style-type: none"> • Introduction, Types and functions of neurotransmitters 	5	Must know

	<ul style="list-style-type: none">• Morphogenesis• Neurulation	3	Desirable to know
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Fundamentals of computer science (Semester II)

Max hours: 47

S.no	Topic	Domain	Hours
1	<p>Introduction about computers What are Computers? Its various characteristics, applications and limitations. Functional Block Diagram of computer.</p> <p>Computer Architecture: Classification of computer on basis of Purpose, signal and size and portability.</p>	Must know	8
	<p>Evolution of computer from 1st generation to fourth generation. Some description about fifth generation.</p>	Desirable to know	4
	<p>Data representation in memory.</p>	Nice to know	1
2	<p>Hardware: To study the various input devices used: Keyboard, mouse, OMR, OCR, MICR, BCR, Scanner etc. To study the internal structure of CPU: Registers, ALU, Motherboard, HD, Memory, Cache, and Virtual Memory. TO study the various Secondary storage devices: Magnetic Disk, Optical Disk, Flash memory</p> <p>To cover what are Monitor, Its types, Printer: Dot matrix, Daisy wheel. Line printer, Laser printer, Thermal Printer, Ink Jet printers etc.</p>	Must know	8
3	<p>To cover the types of Software, Languages and their types (High level and low level language.) To cover the definition of operating system, its types and what are the various functions and types of operating system. Basic introduction about Interfaces: its types character user and graphical user interface (DOS and Windows)</p>	Must know	8

	Basic introduction about linux, Unix operating system	Desirable to know	4
	To study the various HTML tags (Bold tags, Italic, Underline, Marquee, Img, anchor etc.)	Nice to know	1
4	<p>Network: Data Communication, Structure of Universal Resource Locator, Domains (.com, .in, .country specific, .org and rationale behind them), HTTP Practicals: TO cover the various MS Excel Formulas and preparation of spreadsheets. Basics of E-mail, Web browsers (IE, Google Chrome, Mozilla),</p> <p>LAN, LAN topologies, WAN, MAN, Internet: Introduction, Internet, extranet and Intranet.</p>	Must know	8
	Network devices (Hub, Switches, Modems, Routers etc), DNS, Network Security and Search Engine	Desirable to know	4
	IP address, Structure of IP Address Backbone network, Network connecting devices,	Nice to know	1

Basics of EEG (Semester-III)

Total hours: 45

S. No.	Topics to be covered	Teaching Hours	Domain
Unit-1	Anatomical and physiological structure of Human brain.	5	Must know
	Division Clinical significance	4	Desirable to know
Unit-2	Electroencephalography : brain waves, frequency , 10-20 electrode placement system, montage,	5	Must know
	amplitude, source of EEG	4	Desirable to know
Unit-3	Review of EEG machine: basic components (designing and working), block diagram of EEG machine	5	Must know
	Functioning of each component	4	Nice to know
Unit-4	Amplifiers, preamplifiers, noise and its types,	5	Must know
	Basic of filters.	4	Desirable to know
Unit 5	Neonatal EEG: Introduction, Frequency, Amplitude	5	Must know
	EEG in different age groups Normal and abnormal EEG	4	Desirable to know

Basics of EMG & NCV

Total hours: 46

S. No.	Topics to be covered	Teaching Hours	Domain
Unit-1	Anatomical and physiological structure of human nervous system Lymphatic system Upper and lower limbs	8	Must know
	Sensory and motor nerves .	5	Desirable to know
Unit-2	Electromyography (working principle) Nerve conduction velocity Nerve muscle stimulator	8	Must know
	Electrode placement Stimulator applications	4	Desirable to know
Unit-3	Review of EMG machine: basic components (designing and working), block diagram of EMG machine	8	Must know
	Advancement in EMG machine design	4	Nice to know
Unit-4	Amplifiers Preamplifiers, noise and its types,	5	Must know
	Basics of filters.	4	Desirable to know

Patient care management and clinical care

Total hours: 46

S. No.	Topics to be covered	Teaching Hours	Domain
Unit-1	Maintain patient, ward record. Proper labelling of patient investigation. History taking	8	Must know
	Investigations.	3	Desirable to know
Unit-2	Patient preparation for procedure. Pre procedure	8	Must know
	Neurology procedure. Post procedure care.	4	Desirable to know
Unit-3	Observation Examination, Physical examination, Nursing care, Ward management, Patient care during seizures	8	Must know
	Differential diagnosis provisional diagnosis ,Medication	3	Nice to know
Unit-4	Factual report writing	8	Must know
	Receiving patient in procedure room (EEG and EMG room), Decision for treatment/ admission	4	Desirable to know

ENVIRONMENTAL SCIENCE

Total Hours : 50

S.No.	Topic	Teaching Hours	Domain
1.	The Multidisciplinary nature of environmental studies	2hr.	Must know
2.	<ul style="list-style-type: none"> • Definition, scope and importance. • Need for public awareness 	2hr.	Must Know
3.	Natural Resources Renewable and non-renewable resources: Natural resources and associated problems	2 hr.	Must Know
4.	Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.	2 hr.	Must Know
5.	Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams benefits and problems.	2 hr.	Must Know
6.	Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.	2 hr.	Nice to Know
7.	Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.	2hr.	Must Know
8.	Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources. Case studies.	2 hr.	Must Know
9.	Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.	2 hr.	Good to Know
10.	Unit 2: Ecosystems Concept of an ecosystem. Structure and function of an ecosystem. Producers, consumers and decomposers.	2 hr.	Must Know
11.	Energy flow in the ecosystem. Ecological succession. Food chains, food webs and ecological pyramids.	2 hr.	Good to Know
12.	Biodiversity and its conservation Hot-spots of biodiversity. Threats to biodiversity : habitat loss, poaching of wildlife, man-wildlife conflicts Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity	2hr.	Must Know

13.	Unit 3: Environmental Pollution Definition, causes, effects and control measures of:-	2hr.	Must Know
14.	a. Air pollution	2hr.	Must Know
15.	b. Water pollution	1hr.	Must Know
16.	c. Soil pollution	1hr.	Good to Know
17.	d. Marine pollution	1hr.	Good to Know
18.	e. Noise pollution	1hr.	Must Know
19.	f. Thermal pollution	1hr.	Nice to Know
20.	g. Nuclear hazards	1hr.	Nice to Know
21.	Solid waste Management: Causes, effects and control measures of urban and industrial wastes.	1hr.	Must Know
22.	Fireworks, their impacts and hazards	2hr.	Must Know
23.	Pollution case studies.	2hr.	Good to Know
24.	Disaster management: floods, earthquake, cyclone and landslides.	1hr.	Good to Know
25.	Unit 4 : Social Issues and the Environment From Unsustainable to Sustainable development	1 hr.	Must Know
26.	Urban problems related to energy Water conservation, rain water harvesting, watershed management	1hr.	Must Know
27.	Resettlement and rehabilitation of people; its problems and concerns. Case studies.	1hr.	Nice to Know
28.	Environmental ethics: Issues and possible solutions. Consumerism and waste products. Environmental Legislation (Acts and Laws)	1hr.	Good to Know
29.	Issues involved in enforcement of environmental legislation Human Population and the Environment	1hr.	Nice to Know
30.	Population growth, variation among nations with case studies Population explosion – Family Welfare Programmes and Family Planning Programmes	21hr.	Must Know
31.	Human Rights. Value Education. Women and Child Welfare.	1 hr.	Good to know

Semester IV
Instrumentation of EEG

Total hours: 48

S. No.	Topics to be covered	Teaching Hours	Domain
Unit-1	Nervous system:	8	Must know
	<ul style="list-style-type: none"> • Anatomical and physiological structure of human brain. • Dissections of human brain 		
Unit-2	EEG	8	Must know
	<ul style="list-style-type: none"> • Brain waves, frequency , amplitude, source of EEG, • clinical significance of brain waves 		
Unit-3	EEG machine	5	Must know
	<ul style="list-style-type: none"> • Components (designing and working principle), block diagram of EEG machine, • Difference between portable EEG machine and normal EEG machine 		
Unit-4	Traveller/Portable EEG machine	5	Must know
	<ul style="list-style-type: none"> • Design, working, • advantages & disadvantages 		
Unit-5	<ul style="list-style-type: none"> • Advancement in EEG machine • Design and manufacturing 	5	Nice to know

Instrumentation of EMG & NCV

Total hours: 47

S. No.	Topics to be covered	Teaching Hours	Domain
Unit1	Sensory motor and integrative system: Sensory nerves, process of sensation, sensory receptors, somatic sensory pathways, somatic motor pathways	8	Must know
		5	Desirable to know
Unit-2	EMG/NCV: Introduction, abnormalities, spontaneous activity, Motor unit potential waveform analysis	8	Must know
		5	Desirable to know
Unit-3	Instrumentation of EMG/NCV: Block diagram, working principle, stimulator Advantage and disadvantage.	8	Must know
		5	Nice to know
Unit-4	Advancement in EMG/NCV machine Design and manufacturing	2	Desirable to know
Unit-5	Analysis of spontaneous activity in EMG Analysis of MUP Routine upper extremity, Facial And Phrenic Nerve Conduction Techniques.	6	Desirable to know

Evoked potential (BERA/VEP/SSEP)

Total hours: 45

S. No.	Topics to be covered	Teaching Hours	Domain
Unit1	Evoked Potential Introduction, Types, Visual pathways Late Response Blink Reflex	8	Must know
	Clinical significance	5	Desirable to know
Unit-2	BERA Introduction, auditory pathways, electrode (shielded electrodes) Repetitive Nerve Stimulation	8	Must know
	Clinical significance	5	Desirable to know
Unit-3	Pattern reversal Introduction, working principle, partial field stimulation, check board	8	Must know
	Clinical significance	5	Nice to know
Unit-4	Stroboscope Introduction, working principle	6	Desirable to know

Pharmacology related to neurophysiology and clinical practice

Total hours: 45

S. No.	Topics to be covered	Teaching Hours	Domain
Unit1	Introduction to Pharmacology <ul style="list-style-type: none">• Pharmaco-kinetics• Pharmaco-dynamics	12	Must know
Unit-2	Drugs <ul style="list-style-type: none">• Adverse effects of drugs• Classification of drugs• Antibiotics• Neuro tonic• Anti inflammatory	12	Must know
	<ul style="list-style-type: none">• Analgesic and antipyretic• Muscle relaxant etc.	8	Desirable to know
Unit-3	Effects of drugs <ul style="list-style-type: none">• Classification of disease, effects,• mechanism of action,	8	Must know
	<ul style="list-style-type: none">• Indication and contra indication	5	Nice to know

Semester V
EEG and EMG Machines and clinical practice

Total hours: 48

S. No.	Topics to be covered	Teaching Hours	Domain
Unit1	Instrumentation of EEG: Block diagram, waveform analysis, sleep studies,	10	Must know
	difference between neonatal and adult EEG waveforms	5	Desirable to know
Unit-2	Instrumentation of EMG/NCV: Block diagram, working, waveform analysis, differentiate between sensory and motor nerves	8	Must know
Unit-3	Filters: Classification, circuit diagrams,	5	Must know
	Implementation	2	Nice to know
Unit-4	Differential Amplifiers: block diagram, circuit diagram, working,	5	Must know
	Implementation	2	Nice to know
Unit 5	Recording technique and parameter, Source of artefacts & methods of elimination Activation procedure; Hyperventilation, Photic stimulation	8	Must know
	Electrode , Types, Electrode Impedance,	5	Desirable to know

EEG, EMG in different disease states -I

Total hours: 47

S. No.	Topics to be covered	Teaching Hours	Domain
Unit1	Epilepsy <ul style="list-style-type: none"> • Introduction • Symptoms and causes • Epileptic seizures 	8	Must know
	<ul style="list-style-type: none"> • Treatment • Major areas of brain suffers from epilepsy 	5	Desirable to know
Unit-2	Meningitis <ul style="list-style-type: none"> • Introduction • Symptoms and causes • Types • Risk factors 	8	Must know
	<ul style="list-style-type: none"> • Complications and prevention • Treatment 	3	Desirable to know
Unit-3	Brain abcess <ul style="list-style-type: none"> • Introduction • Symptoms and causes • Complications and prevention 	5	Must know
	<ul style="list-style-type: none"> • Treatment/ diagnosis 	2	Nice to know
Unit-4	Intracranial tumors <ul style="list-style-type: none"> • Introduction • Symptoms and causes 	5	Must know
	<ul style="list-style-type: none"> • Diagnosis • Prevention 	2	Nice to know
Unit 5	Neurological disorders Types of Neuropathy Types of Plexopathy Types of Myopathy	8	Must know
	<ul style="list-style-type: none"> • Introduction • Classification • Symptoms and causes <ul style="list-style-type: none"> • Diagnosis • Treatment 	5	Desirable to know

RESEARCH METHODOLOGY & BIOSTATISTICS

Total hours : 40

Chapter 1-	Introduction- Definition and characteristics of statistics Importance of the study of statistics	Must Know	2
	Branches of Statistics		2
	Statistics of and health sciences including nursing		2
	Parameters and estimates		2
	Descriptive and inferential statistics	Desirable to Know	2
	Variables and their types Measurement scales		
Chapter 2-	Tabulation of Data Raw Data, the array, frequency distribution	Must Know	2
	Basic principles of graphical representation		
	Types of diagrams – histograms, frequency polygons, smooth frequency polygon, cumulative frequency curve, normal probability curve	Desirable to Know	2
Chapter 3-	Measures of Central Tendency Introduction: Uses, applications and practical approach	Must Know	2
	Definition and calculation of mean for ungrouped and grouped data Meaning, interpretation and calculation of ungrouped and grouped data		2
	Meaning and calculation of mode		2
	Comparison of mean and mode	Nice to know	2
	Guidelines for the use of various measures of central tendency	Must Know	2
Chapter 4-	Measures of Variability Introduction: Uses, applications and practical approach	Must Know	2
	The range, average deviation or mean deviation		2
	The variance and standard variation	Desirable to know	2
	Calculation of Variance and standard variation for ungrouped and grouped data		2
	Properties and uses of variance and standard deviation	Nice to know	2
Chapter 5-	Sampling Techniques Introduction: Uses, applications and practical approach Criteria for good samples	Must Know	2
	Application of Sampling in Community		2
	Sampling Methods, Sampling and Non- Sampling errors Sampling variation and tests of significance	Nice to know	2

Semester VI
EEG, EMG in different disease states – II

Total hours: 46

S. No.	Topics to be covered	Teaching Hours	Domain
Unit1	Metabolic & toxic disorders <ul style="list-style-type: none"> • Introduction • Symptoms and causes • Types • Risk factors 	8	Must know
	<ul style="list-style-type: none"> • Complications and prevention • Treatment 	5	Desirable to know
Unit-2	Head injury <ul style="list-style-type: none"> • Introduction • Symptoms and causes • Types • Risk factors 	8	Must know
	<ul style="list-style-type: none"> • Complications and prevention • Treatment 	3	Desirable to know
Unit-3	Cerebrovascular disease <ul style="list-style-type: none"> • Introduction • Symptoms and causes • Types • Risk factors 	5	Must know
	<ul style="list-style-type: none"> • Complications and prevention • Treatment 	2	Nice to know
Unit-4	Dementia <ul style="list-style-type: none"> • Introduction • Symptoms and causes • Risk factors 	5	Must know
	<ul style="list-style-type: none"> • Complications and prevention • Treatment 	2	Nice to know
Unit 5	Coma of various causes <ul style="list-style-type: none"> • Introduction • Symptoms and causes • Types • Risk factors 	8	Must know
	<ul style="list-style-type: none"> • Complications and prevention • Treatment 	3	Desirable to know

Intra-operative Neuro Monitoring

Total hours: 46

S. No.	Topics to be covered	Teaching Hours	Domain
Unit1	IONM Basics and Common Modalities Introduction to IONM and Basics of Recording Somatosensory Evoked Potentials (SSEPs) Electromyograms (EMGs) and Transcranial Electrical Motor Evoked Potentials (TceMEPs) Brainstem Auditory Evoked Responses (BAERs) Electroencephalograms (EEGs) and Other IONM Modalities	10	Must know
	Factors Affecting Daily Job Performance of IONM Personnel	8	Desirable to know
Unit-2	Fundamentals and principles of IONM Requirements for IONM in a Hospital Organization: Challenges & Integration in Medical Care	10	Must know
	Programs, Financing, Education programs and Credentialing Features and Limitations	5	Desirable to know
Unit-3	MEP Introduction, Clinical significance	8	Must know
	Long term monitoring of EEG	5	Nice to know

Introduction to Sleep Studies

Total hours: 48

S. No.	Topics to be covered	Teaching Hours	Domain
Unit1	Introduction to sleep 10-20 electrode placement Montages used in sleep (bipolar and referential)	8	Must know
	Electrode application techniques	5	Desirable to know
Unit-2	EEG and sleep staging Major brain structures and their NREM/REM involvement in sleep Neurons, Synapses, Dendrites Neurotransmitters; what they are and which ones are involved in sleep and wakefulness	8	Must know
	Sources of EEG activity	2	Desirable to know
Unit-3	Sleep and cardio/respiratory monitoring Generation of the ECG Electrode placement Cardiac arrhythmias Breathing mechanics Ventilatory control / REM and NREM differences	5	Must know
	Skin preparation Electrode application techniques	2	Nice to know
Unit-4	Sleep disorders Insomnia SLEEP APNEA Snoring Oxygen desaturation Narcolepsy Stokes breathing pattern	5	Must know
	Periodic limb movement disorder Night time behaviour like sleep walking Restless/lack sleep Psychiatric Disorders	2	Nice to know
Unit 5	Polysomnography Introduction, EEG in routine PSG Applications	8	Must know
	Clinical features	5	Desirable to know

Neuro – Imaging Modalities

Total hours: 46

S. No.	Topics to be covered	Teaching Hours	Domain
Unit1	Introduction to neuro- imaging techniques Principles Advantages & Disadvantages	10	Must know
	Recent advances	5	Desirable to know
Unit-2	Introduction to Emission Computed Tomography (ECT) systems. Principles and applications of SPECT Principles and applications of PET Principles and applications of CT System components of CT	10	Must know
	Contrast Scale for different neuro- imaging techniques.	5	Desirable to know
Unit-3	Introduction to MRI system Principles of MRI and fMRI Basic MR components Biological Effect on MR Imaging	5	Must know
	Advantage of MR Imaging system.	3	Nice to know
Unit-4	Introduction to BCI Applications of BCI Introduction to MEG Applications of MEG	5	Must know
	Advantage and disadvantage of MEG	3	Nice to know