



BACHELOR OF PARA MEDICAL TECHNOLOGY (BPMT)

Course Name: - Neurology

Learning Objectives

By the end of the course, the student should be able to :

1. Describe the working of EEG machine.
2. Record EEG of a patient.
3. Record EMG of a patient.
4. Record NCV of a patient.
5. Assist the Neurologist in conducting above tests.
6. Take care of the above machines.
7. Take care of the patient while conducting the above tests .



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1st Year : Assessment System & Syllabus

Sr. No	Paper	Subject	Subject Code	Theory			Practical			Total Marks
				IA	Final	Total	IA	Final	Total	
1	Paper – I	Basic Sciences		30	60	90	30	80	110	200
2	Paper – II	Applied Basics		30	60	90	30	80	110	200
3	Paper – III	Neurology equipments and care		30	60	90	30	80	110	200

Paper – I

Basic Sciences

Sr. No.	Topics	Theory	Practical
1	Introduction to human body as a whole.	1	1
2	Study of cell with special reference to brain, spinal cord,	2	2
3	Blood cells, groups, transfusion reactions.	2	1
4	Joints and their types, names (eg. Elbow, hip etc.)	2	2
5	Muscles- Identification of major groups related to applied anatomy,	4	4
6	Bones (Only nomenclature)	2	2
8	Sense organs (Brief anatomy of eye, nose, ear, skin related to sensations).	2	2
9	Neurology- Identifying different parts of brain, spinal cord and nerves with very brief knowledge about their basic functions	3	3

Paper – II

Applied Basics

Sr. No.	Topics	Theory	Practical
1	Introduction to Head, Neck, Face anatomy	2	2
2	Brief anatomy of brain	2	2
3	Functions of different areas	4	2
4	Spinal cord anatomy	2	2
5	Structure of nerves	4	4
6	Neuromuscular junctions	1	1
7	Spinal cord tracts	1	1
8	Muscle - types and structure	3	1
9	Concepts of flexion, extension, abduction, adduction etc	1	1
10	Muscle groups and their actions at different joints	2	2
11	Power of skeletal muscles	1	1
12	Examination of different muscle groups	1	2
13	Dermatomes	1	2
14	Sensory nervous system	1	1

Paper – III
Neurology equipments and care

Sr. No.	Topics	Theory	Practical
Neurology equipments			
1	Identification and use of resuscitation equipments available on trolley. (Ambu bag, endotracheal tubes size, tracheostomy tray), lumbar puncture needle.	1	1
2	Description and working of machines and appliances like airway, endotracheal tubes, laryngoscopes, nerve conduction, EMG, EEG.	1	1
3	Their component parts, cleaning, sterilization, care, maintenance, assembly,	1	1
4	Drugs- premedication (oxygen, Glycopyrrolate, atropine, ondansetron, ranitidine, midazolam, pentazocine, fentanyl, diclofenac), names of commonly used anti epileptic drugs	1	1
5	Types of anaesthesia. (Local, sedation, general)	1	1
6	Local anaesthetics (Lignocaine, Bupivacaine),	1	1
7	Pre Procedure evaluation, consent for procedure, Preparation, position of patient for lumbar puncture	1	1
8	Lay out of trolley for all types of neurological procedures like lumbar puncture,	1	1
9	O2 cylinders, Central gas pipeline, Manifold system, Liquid O2,	1	1
10	Central suction, electrical, foot suction.	1	1
11	Explosion risks. Fire-fighting.	1	1
12	Maintenance of neurology equipments, records and charts.	1	1
13	Post procedure care.	1	1
14	Recording and labelling of EMG nerve conduction, EEG, taking print outs	1	1
Patient and equipment care			
1	Cleanliness and sterilization of neuroequipments (EEG nerve conduction, EMG)	1	1
2	Washing, cleaning, recyclable disposables and preparing them for sterilization and packing.	1	1
3	Identification use, care, maintenance and sterilisation of common types of instruments, needles,	1	1
4	Lay out of instruments trolley,	1	1
5	Application of bandages, dressings, tourniquets.	1	1
6	Reception and preparation of patients of neurological emergencies including coma	1	1
7	Observation of patients of neurological disorders, recording pulse and BP, urine output, ECG recording,	1	1
8	Attaching patient to multi para monitor	1	1
9	Universal safety precautions	1	1
10	Counselling and rehabilitation of patients with paralysis	1	1
11	Care of unconscious patient and physiotherapy	1	1
2	Is knowledge of O2 supply (No. 9) necessary to such an extensive array	1	1
5	Position of patient to prevent as aspiration.	1	1
6	Managing a patient with seizures .	1	1
7	Management of adverse effects. Syncope, Pain / infection at needle site, Features of respiratory failure	1	1

Practical: Posting in neurology OPD & procedure room with observation of teaching at work



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2nd Year : Assessment System & Syllabus

Sr No	Paper	Subject	Subject Code	Theory			Practical			Total Marks
				IA	Final	Total	IA	Final	Total	
1	Paper - I	Basic Nerve and Muscle physiology, Electric conduction, Neurotransmitters, Near and for field potentials. - I		30	60	90	30	80	110	200
2	Paper - II	Basic & applied physics related to neuroscience, Introduction to equipments - EEG, EMG, etc. - II		30	60	90	30	80	110	200
3	Paper - III	Applied neurosciences, neurological case, role of technician in common neurological problems, basics & Neuroimaging - III		30	60	90	30	80	110	200

Paper - I

Basic Nerve and Muscle physiology, Electric conduction, Neurotransmitters, Near and for field potentials. - I

Sr. No	Subject	Hours		
		L	L/D	P
Basic Neurosciences - Part I & II				
1	Basic Physiology & Physics	2	-	-
2	Nerve & Muscle Physiology	4	-	-
3	Physiology of excitable tissues	5	10	20
4	Membrane potentials, Equilibrium potentials, Generator potentials	3	-	-
5	Electronic conduction, Action potentials, Action potential propagation	4	10	20
6	Neurotransmitter release, receptor binding, post synaptic potentials	7	12	34
	Revision & Tests	7	02	30

Paper – II
Basic & applied physics related to neuroscience, Introduction to equipments - EEG, EMG, etc. – II

Sr. No	Subject	Hours		
		L	L/D	P
Basic Neurosciences - Part III & IV				
1.	What we record during electrophysiological studies- Near Field potentials, far-field potentials and revision of topics 1-6	06	06	24
2.	Atomic structure, Conductors, Nonconductors and Semiconductors, Fields, Electric fields, Magnetic fields	11	13	92
3.	Current Flow, Circuit theory, Circuit elements Resistors, Capacitors, Inductors, Diodes, Transistors	03	04	25
4.	Digital Signal Analysis, Analog to digital conversion, Electrode and the patient- Equipment interfaces	15	12	107
5.	Equipments – EMG Machine, EEG Machine, Portable equipments	64	55	111
6.	Revision & Tests	08	03	30

Paper – III

Sr. No	Subject	Hours		
		L	L/D	P
Clinical Neurology				
1	Approach to a neurological case	05	05	05
2	Common neurological problems	7	7	5
3	Infections of central nervous system	5	5	5
4	Disorders of peripheral nerves and plexuses	10	10	30
5	Revision & Tests	05	04	15



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3rd Year : Assessment System & Syllabus

Sr. No	Paper	Subject	Subject Code	Theory			Practical			Total Marks
				IA	Final	Total	IA	Final	Total	
1	Paper – I	Neurological equipment- EEG machine, Physiology of EEG, normal and abnormal EEG patterns. – I		30	60	90	30	80	110	200
2	Paper – II	Nerve conduction, EMG evoked potentials, evaluations, of single nerve polysomnography – II		30	60	90	30	80	110	200
3	Paper – III	Role of technician in CNS disorders, epilepsies, disorders of peripheral nerves, skeletal muscles, tumors of CNS - III		30	60	90	30	80	110	200

Paper – I

Neurological equipment- EEG machine, Physiology of EEG, normal and abnormal EEG patterns. – I

Sr. No	Subject	Peri		
		L	L/D	P
Fundamental and Clinical application of EEG				
1.	Revision of basics of physics and electronics, Physiology of EEG	4	-	-
2.	Generation of EEG rhythm-cortical potentials, Basic EEG rhythms-Alpha, Beta, Theta, Delta, Generation of Epileptiform activity-spikes and sharp waves, paroxysmal depolarisation	5	10	20
3.	Technical aspects of EEG, EEG equipment, Digital Vs Analog display, montages, number of channels, Electrodes (needle, surface, sphenoidal, sudural, depth) and electrode position	3	-	-
4.	Routine EEG-Calibration, Biological calibration, Pen pressure, damping, sensitivity, duration, filters, activation methods, electrode impedance	4	10	20
5.	Normal EEG patterns- EEG in adults- wake record- anterior cerebral activity, posterior cerebral activity, vertex waves EEG in children- Maturation of posterior rhythm Sleep Encephalography	7	12	34

6.	Normal transients and variants-Lambda waves, Mu rhythm, POTS, Wicket spikes, 14-16 positive spikes, slow alpha variant Non cerebral potentials: Eye movements, Muscle artifact, Glossokinetic artifact, Movemnet artifact Activation methods	06	06	24
7.	Abnormal EEG patterns- Slowing, spike and sharp waves, Generalised and localized interictal epileptiform abnormalities, slow activity, polymorphic delta activity, spikes and sharp waves, periodic patterns-PLEDS, Burst suppression pattern, Neonatal EEG, EEG monitoring- In- patients, Ambulatory monitoring	11	13	92
8.	Revision & Tests	8	03	30

Recommendation:- Video EEG is currently in use. Hence the basis of Video EEF which is relevant in cases like pseudo signees and during neuro surgical procedures need to be taught

Paper – II

Nerve conduction, EMG evoked potentials, evaluations, of single nerve polysomnography – II

Sr. No	Subject	Hours		
		L	L/D	P
Nerve Conduction, EMG and Evoked Responses				
1	Revision of basics of anatomy and physiology of peripheral nerves and muscle	2	-	-
9	Nerve conduction EMG and Evoked potentials	03	04	25
10	Basic principles of Nerve conduction study and EMG- Overview, NMJunction, Nerve conduction basics, EMG basics, Tests of NMJ- repetitive nerve stimulation, single fiber EMG	64	55	111
11	Evaluation of single nerves (Median, Ulnar, radial, Common peroneal and Posterior tibial, Sciatic, Femoral)	16	04	37
12	Evoked potentials- Physiology, VEP, BAER, SSEP, P 300	15	12	107
13	Revision & Tests	17	02	30

Paper – III

Role of technician in CNS disorders, epilepsies, disorders of peripheral nerves, skeletal muscles, tumors of CNS - III

Sr. No	Subject	Hours		
		L	L/D	P
1	The epilepsies	10	10	10
2	Disorders of peripheral nerves and plexuses	5	5	5
3	Disorders of Upper and lower motor neurons	3	3	3
4	Disorders of myoneural transmission	5	5	6
5	Disorders of skeletal muscle	6	4	6
6	Revision & Test	10	09	30



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List of Suggested Books for reading

Sr. No.	Subject / Topic	Author/ Editor	Title of Book	Publisher
1.	Neurology	Shapiro	EMG & Neuromuscular disorder	Elsevier
2.	Neurology	U.K.Misra & J. Kolita	Clinical Neurophysiology	Elsevier
3.	Neurology	Greenfield,Geyer & Carney	Reading EEGs: A Practical Approach	Elsevier
4.	Neurology	Stern	Atlas of EEG Patterns	Wolters Kluwer
5.	Neurology	U.K.Misra	Clinical EEG	Elsevier
6.	Neurology	Karl E.Misulis & Thomas C.Head	Essentials of Clinical Neurophysiology	Elsevier
7.	Neurology	Aminoff	Electrodiagnosis in Clinical Neurology	Elsevier

Lecture notes/Modules to be given to students