மனோன்மணியம் சுந்தரனார் பல்கலைக்கழகம்

MANONMANIAM SUNDARANAR UNIVERSITY

SYLLABUS FOR DIPLOMA IN NEURO TECHNICIAN PROGRAMME OFFERED THROUGH DIRECTORATE OF VOCATIONAL EDUCATION (COMMUNITY COLLEGES AND VOCATIONAL SKILL DEVELOPMENT CENTRES) FROM 2024 - 2025

Programme Code: 5282

DIPLOMA IN NEURO TECHNICIAN -5282

நரம்பியல் தொழில்நுட்பவியலாளர் பட்டயம்

SCHEME OF EXAMINATION

Course Code	Title of The Course	Credit	Hours	Passing Minimum
Semester I				
C24NT11 / E24NT01	Anatomy & physiology	6	90	40/100
C24NT12 / E24NT02	Basics of EEG	6	90	40/100
C24NT13 / E24NT03	EMG & NCS	6	90	40/100
C19CE10 / E19CE10	Communicative English	6	90	40/100
C24NTP1 / E24NTP1	Practical I – Basic EEG/EMG Techniques	4	120	40/100
Semester II				
C24NT21 / E24NT04	Diagnostic Studies of EEG/EMG	6	90	40/100
C24NT22 / E24NT05	First Aid & CPR, Biomedical Waste Management	6	90	40/100
C19LS23 / E19LS05	Life Skill	6	90	40/100
C24NTP2 /E24NTP2	Practical II – Advanced EEG/EMG Techniques	4	120	40/100
C24NTIP/E24NTIP	Internship	10	150	40/100

Eligibility for admission: Pass in 10thstd examination conducted by the Govt. of Tamil Nadu Board of Secondary Education, Government of Tamil Nadu or any otherequivalentexamination.

Examination: Passing Minimum for each Course is 40%. Classification will be done on the basis of percentage marks of the total marks obtained in all the Courses and as given below:

40% but lessthan 50% - Third class
50% but lessthan 60% - Second class
60% and above - First class

Theory Paper

InternalMarks-25

ExternalMarks-75

SYLLABUS

Semester I

CourseI	:	AnatomyandPhysiology
CourseII	:	Basics of EEG
CourseIII	:	EMG and NCS
CourseIV	:	CommunicativeEnglish
CourseV	:	PracticalI-Basic EEG/EMG Techniques

SemesterII

CourseVI	:	Diagnostic Studies of EMG/EEG
CourseVII	:	First Aid & CPR, Biomedical Waste Management
CourseVIII	:	Life Skills
CourseIX	:	PracticalII-Advanced EEG/EMG Techniques
CourseX	:	Internship

***(Semester Pattern for Community College Only)**

SEMESTER I
COURSE I

(C24NT11 / E24NT01) ANATOMY AND PHYSIOLOGY

OBJECTIVES

To understand the basics of human body system, to understand the cardio vascular system & Respiratory system and to understand the nervous system and each type of nervous system that is central nervous system, peripheral nervous system and autonomous nervous system, neuronal activity and EEG.

UNIT I **18 HRS**

Introduction to human body - Anatomical positions - Directions - Regions Body movements - Medical terminology.

UNIT II **18 HRS**

Different systems – Overview of each system - Cardiovascular system - Introduction - Heart - Structure - Valves - Blood vessels - Aorta - Superior and Inferior vena cava - Arteries, veins, Capillaries - Blood circulation - Types of circulation - Functions of heart.Respiratory system - Introduction - Structure and functions - Abnormalities of respiration.

UNIT III **18 HRS**

Nervous system - Introduction - Structure and functions –Central, Peripheral & Autonomic;Central nervous system –Lobes & Functions of brain, Gyri, Sulci, Cortical areas in brain - Association commissural areas – Brain stem & cerebellum in brains - Ventricles and Cerebrospinal fluid - Flow and Functions

UNIT IV **18 HRS**

Peripheral nervous system – Cranial nerves – Spinal cord & spinal nerves – Muscles – Concept of myotomes& dermatomes; Autonomic Nervous System - nerve, nerve root, and plexus innervations of the commonly tested upper and lower extremity muscles

UNIT V **18 HRS**

The Action potential and neuronal transmission - Transmission at the synapse Excitation and Inhibition - The Relationship between neuronal activity and EEG – Physiology of nerve conduction and muscle contraction – Motor & sensory tracts – Sensory receptors

Reference:

1) Ross and Wilson Annie Waugh, Allison Grant - 2022, Anatomy & Physiology in Health and Illness, 14th Edition, Oswaal Publisher, Haryana, India.
2) Dr.S.Senthilkumar, 2022, Anatomy & Physiology, 3rd Edition, Shanlax Publication Madurai, Tamilnadu.
3) A.K. Jain, 2020, Anatomy & Physiology, 4th Edition, Arya Publications, New Delhi.

COURSE -II

(C24NT12 / E24NT02) BASICS OF EEG

OBJECTIVES

To learn the foundations of performing electrophysiology and investigation including the patterns and waveforms, neurological disorders and the 10-20 system as basics of EEG, to learn about the origin of EEG activity, how to obtain interpretable EEG data and give descriptive items of the EEG activity.

UNIT I **18 HRS**

Introduction to EEG – Electrodes – Types, materials & characterization – Modes of application – Impedance – Effects of EEG

UNIT I **18 HRS**

Recording Technique - The Differential Amplifier - Filters, Sensitivity, Calibration - Electrodes - The 10-20 System - Paper Speed/ Writing Mechanisms.

UNIT III **18 HRS**

Polarity and Localisation - Montages -Patient grounding and Electrical safety - Fault finding and Maintenance. Measurement and EEG concepts.

UNIT I **18 HRS**

Fundamentals of EEG recording - Generation of EEG wave forms - EEG electrode placement - Electrodes amplifier - Mechanism of EEG

UNIT V **18 HRS**

Advantages and Disadvantages of EEG - Preparation and responsibilities before and after doing EEG.

Reference:

1. Tyner FS, Knott JR, W Brem Mayer. *Fundamentals of EEG Technology. Vol. 2 Clinical Correlates*. Raven Press; 1989.

2. Tatum WO. *Handbook of EEG Interpretation*. Demos Medical Publishing; 2014.

3. Fisch BJ, Rainer Spehlmann. *Fisch and Spehlmann's EEG Primer : Basic Principles of Digital and Analog EEG*. Elsevier, Cop; 2009.

COURSE III

(C24NT13 / E24NT03) EMG & NCS

OBJECTIVES

To learn the physiological basis of EMG and be able to describe the patterns seen. To understand about the nerve conduction studies, to identify normal, normal variants and abnormal patterns in adult, paediatric and neonatal patients.

UNIT I **18 HRS**

EMG wave form – Insertion activity – Spontaneous activity – Interference pattern – Motor units

UNIT II **18 HRS**

Different types of Neurogenic &myopathic patterns, root simulation study, single fibres EMG

UNIT III **18 HRS**

Principles of nerve conduction study (NCS) - Introduction - Elements- Preparation and procedure of conduction - Techniques of motor and sensory NCS - Normal nerve conduction parameters.

UNIT IV **18 HRS**

The action potential and neuronal transmission -Excitation and Inhibition – H reflex & F wave – Repetitive stimulation with high and low frequency – Mac. Mani's test for periodic paralysis – Proximal conduction – MUNE Motor unit estimation study – SSR Sympathetic skin response

UNIT V **18 HRS**

Evoked Potential Definition – Different types of studies – BAER – VEP – SSEP – Blink reflex – Intraoperative monitoring for spinal cord surgeries & Motor evoked potential in brain stem surgeries/thalamic surgeries.

Reference:

1. Weiss J, Weiss LD, Silver JK. *Easy EMG : A Guide to Performing Nerve Conduction Studies and Electromyography*. Elsevier; 2022.
2. Dumitru D, Amato AA, Zwarts MJ. *Electrodiagnostic Medicine*. Hanley &Belfus, Cop; 2002.
3. Aminoff MJ. *Electrodiagnosis in Clinical Neurology*. Churchill Livingstone; 2005.

COURSE IV

(C19CE10/E19CE10) COMMUNICATIVE ENGLISH

OBJECTIVES **90HRS**

To expose students to the fundamentals of academic and professional communication in order to develop professionals who can effectively apply communication Skills, theories and best practices to meet their academic, professional and career communication need

1. Basic Grammar:

a. Review of grammar
b. Remedial study of grammar
c. Simple sentence
d. Word passive voice etc.

2. Bubbling Vocabulary:

a. Synonyms
b. Antonyms
c. One – work Institution

3. Reading and Understanding English

a. Comprehension passage
b. Précis – writing
c. Developing a story from hints.

4. Writing English

a. Writing Business letters.
b. Paragraph writing
c. Essay writing
d. Dialogue writing

5. Speaking English

a. Expressions used under different circumstances
b. Phonetics

Reference

1. V.H.Baskaran – English Made Easy‖
2. V.H.Baskaran – English Composition Made Easy‖ (Shakespeare Institute of English Studies, Chennai)
3. N.Krishnaswamy – Teaching English Grammar‖ (T.R.Publication, Chennai)
4. Life Skill‖ – P.Ravi, S.Prabakar and T.TamzilChelvam, M.S.University, Tirunelveli.

COURSE V

(C24NTP1 / E24NTP1) PRACTICAL – I BASICS OF EEG/EMG

OBJECTIVES **60 HRS**

Hands-on training in using and maintaining EEG/EMG machines, Practical experience in a clinical setting where students apply their knowledge under supervision, gaining real-world skills.

Clinical and Technical aspects of EEG – Patterns of Recording Techniques

Reference:

1.Husain AM. *Ebersole's Current Practice of Clinical Electroencephalography*.; 2023.
2. Practical Approach to Electroencephalography. Published online 2025.
3.Tōru Yamada, Meng E. *Practical Guide for Clinical Neurophysiologic Testing. EEG*. Wolters Kluwer; 2018.

SEMESTER II

COURSE VI

(C24NT21 / E24NT04) DIAGNOSTIC STUDIES OF EE4 / EMG

OBJECTIVES

To advance in the field of neurodiagnosticsmust have a good comprehensive understanding of the nervous system which will be able to apply to the clinical settings in which they work. To differentiate true seizures from pseudo seizures by means of EEG, to study various changes in EEG in normal sleep & sleep disorders.

UNIT I **18 HRS**

Clinical Neurology – Concepts of disease and outlines of clinical evaluation related to neural sciences – Epilepsies – CNS Infections – Meningitis, Encephalitis – Peripheral neuropathy – Muscle disorders – Neuromuscular junction disorders- Demyelinating disorders - Infectious diseases – Psychiatric disorder – Pediatric condition – Disorders of Sleep

UNIT II **18 HRS**

Introduction and history of Electro encephalogram - Normal awake and asleep - Abnormal awake and asleep.Artifacts - Sources and elimination - Pharmacology and drug effects.Activation and special procedures - Characteristics of Artifacts.

UNIT III **18 HRS**

Identify and interpret normal and abnormal Electromyographicpatterns of resting muscle and voluntary motor activity. Clinical and electro diagnostic features of common polyneuropathies, mononeuropathies, radiculopathies, plexopathies, and myopathies

Unit IV **18 HRS**

Abnormalities in demyelination and axonopathy, Blink Reflex Uncommon NCS, Repetitive nerve stimulation.

Unit V **18 HRS**

Management of Machine - Equipment Care - Safety and maintenance of EMG Machine

Reference:

1. Jun Kimura. *Electrodiagnosis in Diseases of Nerve and Muscle: Principles and Practice*. Oxford University Press; 2013.
2. Misra UK, Kalita J. *Clinical Neurophysiology*. Elsevier Health Sciences; 2019.
3. GrkSarma. *NEUROLOGICAL EXAMINATION: A Structured Approach.* Jaypee Brothers Medical P; 2018.

COURSE VII

(C24NT22 / E24NT05) FIRST AID, CPR, BIOMEDICAL WASTE MANAGEMENT

OBJECTIVES

To learn about first aid, principles, Goals, First aid kit, to know about the first aid for Medical & Respiratory emergencies, to learn Basic cardiac life support and Advance cardiac life support and to know the Biomedical waste management and infection control.

UNIT I **18 HRS**

First Aid - Definition - Objectives of first aid - Principles of First aid Qualifications of first aid - Goals of first aid - First kid tools and its uses Golden rules of First aid -Responsibilities of First aid Provider

UNIT II **18 HRS**

Medical emergencies- Myocardial Infarction- Hyperglycemia - Hypoglycemia -Stroke - Poison - Fractures - Seizures - Convulsions - Burns. Shock & Snake bite - Definition - Types - Causes - Signs and symptoms - Management - Medico Legal cases.

UNIT III **18 HRS**

Respiratory emergencies - **Asphyxia -** Causes, Signs and symptoms, Management, Prevention. **Drowning** - Causes, Signs and symptoms, Management, **Choking -** Causes, Signs and Symptoms, Management Prevention - **Asthma** - Causes, Signs and symptoms, Treatment, Chronic Obstructive Pulmonary Disease - Causes, Clinical features, Management

UNIT IV **18 HRS**

Basic Life support, Introduction, Goal of CPR, -Concept Chain of survival, Purposes of Cardiopulmonary Resuscitation Algorithm of CPR Adult and Children Steps of CPR - Techniques- Qualities of CPR, Complications of CPR - Advanced Cardiac Life Support - Automated External Defibrillation.

UNIT V **18 HRS**

Biomedical Waste Management: Introduction, Definition, Sources, Properties, Routes of disease transmission. Safety measures – Protective devices, Measures. Provision of the law. Biomedical and chemical wastes - Types handling – control of biomedical wastes - Disposal methods. Treatment and disposal techniques – Physical, chemical and biological processes – Health and environmental effects.

Reference:

1. TNHSP, Handbook on Biomedical Waste Management, 2008.
2. KPP Abhilash. *CMC Vellore Handbook of Emergency Medicine*. Jaypee Brothers Medical Publishers; 2021.
3. *Handbook of Emergency Medicine, 8/E*. Elsevier India

COURSE VIII

(C19LS05/E19LS23) LIFE SKILL

OBJECTIVES **90 HRS**

To educate about Life skills includes on Life Coping or adjustment, Attitude, Problem solving and basic computer Knowledge with internets

I Life Coping or adjustment

(a) External and internal influence in one's life
(b) Process of coping or adjustment
(c) Coping with physical change and sexuality
(d) Coping with stress, shyness, fear, anger far live and criticism.

II Attitude

(a) Attitude
(b) Self-acceptance, self – esteem and self-actualization
(c) Positive Thinking

III Problem Solving

(a) Goal Setting
(b) Decision Making
(c) Time Management and stress Management;

IV Computers

(a) Introduction to Computers
(b) M.S Office
(c) Power Point

V Internet

(a) Introduction to internet
(b) E – Mail
(c) Browsing

Reference:

1) Life Skill Programme course I & II by Dr.XavierAlphona MCRDE Publications. R.K.Mutta Road, Chennai -2
2) Life Skill P.Ravi, S.Prabahar&T.TamilChelvam, M.S.University, Tirunelveli

COURSE IX

(C24NTP2 / E24NTP2) PRACTICAL II – CLINICAL APPLICATION OF ADVANCED NCS, EMG, EEG

OBJECTIVES

To familiarize oneself in recent advances in EEG, Ambulatory EEG, Video EEG, Intraoperative EEG, Polysomnography, Nerve conduction studies, Techniques of Electromyography

Reference:

1. Jun Kimura. *Electro diagnosis in Diseases of Nerve and Muscle: Principles and Practice*. Oxford University Press; 2013.
2. Misra UK, Kalita J. *Clinical Neurophysiology*. Elsevier Health Sciences; 2019.
3. GrkSarma. *NEUROLOGICAL EXAMINATION: A Structured Approach.* Jaypee Brothers Medical P; 2018.

COURSE X

(C24NTIP / E24NTIP) INTERNSHIP

OBJECTIVES OF INTERNSHIP **150 HRS**

- Demonstrate the application and functioning of medical electronic devices in diagnosing, monitoring and treating neurological diseases
- Perform EEGs on patients, get acquainted with neuro-diagnostic department's protocols.
- Measure patient's heads, apply electrodes and collect the EEG data
- Conduct and interpret a basic Electroencephalogram (EEG) and record common neurological bnormalities
- Demonstrate Electrocardiographic techniques, including Video electroencephalography, Intraoperative records, Quantitative Electroencephalography, Brain mapping, Polysomnogram, Sleep EEG and others.
- Electroencephalograph's reporting & Record keeping
- Basic understanding of different wave forms in EMG & common interpretation, measures to be taken before, after and during EMG procedure, explain the positions of transducers while assisting neurologist during EMG

Reference Books:

1. UK Misra / J Kalita, 2020 Clinical Neurophysiology, 4th Edition, Elsevier publication, Haryana, India.
2. KurupathRadhakrishnan, Jagariapudi M, 2018, EEG Clinical Practice, First edition, Elseiver publications, Manipal Universal press.
3. David C.Preston/ Barbara E.Shapiro, 2021, Electromyography and Neuromuscular Disorders 4th Edition, Elsevier publications.
4. Dr. S.Senthilkumar 2022, Anatomy & Physiology, 3rd Edition, Shanlax Publications Madurai, Tamilnadu.
5. Ross and Wilson, Annie Waugh, Allison Grant- 2022, Anatomy & Physiology in Health and Illness 14th Edition, Oswaal Publisher, Haryana.

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