END 101 Introduction to Neurodiagnostic Technology

Required Text
The foundation of our curriculum is based on the courses developed by ASET- the national society representing the neurodiagnostic profession. Tuition covers the cost of the courses.

ASET courses EEG 101-EEG 104

Course Description
This course is designed to give the student a theoretical and practical understanding of the END field and prepare the student to initiate an EEG recording.

Goals
Students will learn the basics of patient care and in particular the basics of the neurodiagnostic field and how it relates to other allied health professions. They will be given information about the professional societies and credentialing boards.

Students will learn the foundations of performing electroencephalography including the anatomical structures of the brain, patterns and waveforms, neurological disorders and the 10-20 system.

Objectives
The student will be able to do the following:

• Communicate effectively with other health care professionals using the appropriate EEG terminology.
• Measure a mannequin head according to the International 10-20 System of Electrode Placement in 20 minutes.
• Apply electrodes to the pre-measured mannequin head in 45 minutes using paste technique.
• Demonstrate use of the polarity convention in montage design and localization techniques.

Course Outline

I. The Neurodiagnostic Technologist
a. Role and responsibilities  
b. Professional Ethics  
c. Scope of Practice

II. Neurodiagnostic history  
a. Key contributors  
b. Name changes

II. EEG Terminology  
a. Anatomical terms  
b. Nervous System terms

IV. Anatomical Structures of the brain

V. Patterns and Waveforms

VI. Signs and Symptoms

VII. Neurological Disorders

VI. Instrumentation and Procedure Terms

VII. Anatomical Structures of the Brain

VIII. International 10-20 System of Electrode Placement  
a. Modification to the 10-20 System  
b. Double checking  
c. Patient preparation  
d. Pony Tail Method  
e. Application Types  
f. Types of Electrodes  
g. Pediatric Measurements  
h. Pitfalls and Common Errors  
i. Sam and the Exam

IX. Polarity Convention and Localization

X. Digital EEG Concepts

*Head measurement must be passed using the 10-20 system within 1 cm of accuracy in 30 minutes or less. Failure will result in remedial training. Students may not advance to clinical rotations until head measurement is passed.
**END 102 introduction to Neuroscience**

**Course Description**
This course will provide the student with foundational neuroanatomy and neurophysiology necessary for working in the diverse field of neurodiagnostics.

**Goals**
Students who want to advance in the field of neurodiagnostics must have a good comprehensive understanding of the nervous system which they will be able to apply to the clinical settings in which they work.

**Objectives**
The student will be able to:

- Identify and label anatomical structures in the brain and central nervous system
- Identify different imaging techniques
- Demonstrate a good comprehensive understanding of the nervous system
- Describe inhibitory post synaptic potentials and excitatory post synaptic potentials
- Describe the “all or none” law

**Course Outline**

I. Lectures on DVD by Dr. Jeanette Norden, Vanderbilt University School of Medicine

   II. Neuroanatomy taught by

   II. Lectures by Medical Faculty
       a. Neurophysiology
       b. Physiological Basis of EEG

**END 103 Instrumentation and Recording**

**Required Text**
ASET courses EEG 106, EEG 107 and EEG 108

**Course Description**
Introduction to recording concepts for performing electroencephalography.

**Objectives**
The student will be able to:

- Discuss and explain electrical concepts
- Explain basic montages and choose appropriate ones according to clinical need
- Give both written and oral descriptions of EEG activity
- List and explain activation procedures
- Demonstrate patient rapport
• Take a patient history
• Identify artifacts and be able to correct or monitor them
• Demonstrate knowledge of handling medical emergencies

Goals
Students will learn about the origin of EEG activity, how to obtain interpretable EEG data and give descriptive terms of the EEG activity.

Course Outline

I. EEG Instrumentation
   a. Basic Electrical Concepts
   b. The Electroencephalograph
   c. Basic Montages
   d. Digital EEG
   e. Technical Descriptions
   f. Electrical Safety

II. Technical Skills
   a. Methods of Application and Electrode Types
   b. Activation Procedures
   c. Record Documentation
   d. Patient Rapport
   e. Technical Description
   f. Patient History and Expected Results
   g. Electrocerebral Inactivity
   h. Bedside Recordings
   i. Medical Emergencies
   j. Infection Control
   k. Neurodiagnostic Lab Management

III. Artifact and Troubleshooting
   a. Artifact Recognition
   b. Troubleshooting

IV. Observations in Neurodiagnostic Lab
   a. Observing techs in action
      1. Patient history
      2. Patient rapport
   b. Head measurement
   c. Electrode application
   d. Collecting EEG data
   e. Writing technical descriptions
IV. Equipment Labs
   a. Calibration
   b. Bio-cal
   c. Practice initiating EEGs

V. Reading Labs
   a. Reviews of EEGs in class
   b. Reviews of EEGs with faculty

VI. Mock Labs
   a. Measuring human heads
   b. Taking patient history
   c. Writing technical descriptions

IV. Lectures by Medical faculty

END 104 EEG Clinical Correlations

Required Text
ASET courses EEG 105, EEG 109, EEG 110, EEG 111

Course Description
This course introduces the student to the basis of EEG activity and correlations with neurological disorders and other disease processes.

Goals
The student will learn the physiological basis of EEG and be able to describe the patterns seen. They will be able to identify normal, normal variants and abnormal patterns in adult patients. They will learn the normal and abnormal pediatric patterns and learn about neonatal patterns. The students will learn first aid for seizures and how to classify the types of seizures.

Objectives
The student will be able to:
   - Explain what generates EEG activity
   - Discuss frequency bands
   - Identify normal adult patterns both wake and sleep
   - Define normal variants
   - Describe EEG activity relating to neurological disorders
   - Define epilepsy
   - Discuss seizure classifications
   - Identify normal child patterns both wake and sleep
   - Identify normal neonatal patterns
   - Discuss technical aspects of pediatric EEG
Course Outline

I. Normal Adult EEG and Normal Variants
   a. Introduction and descriptive terms
   b. Frequency Bands in EEG
   c. Adult Sleep Patterns
   d. Normal Variants
   e. Pattern Recognition

II. EEG in Epilepsy
   a. Defining epilepsy
   b. International Classification of Seizures
   c. Neurological Disorders and Syndromes Associated with Epilepsy
   d. Treatment of Epilepsy
   e. Seizure First Aid
   f. Medication Effects
   g. Long-Term Monitoring

III. EEG in Neurological Disorders
   a. Part I
   b. Part II
   c. Part III

IV. Pediatric and Neonatal EEG
   A. Pediatric EEG
      1. Normal Waking EEG of a Child
      2. Normal Sleep EEG of a Chile
      3. Abnormal Pediatric EEG-Epilepsy
      4. Abnormal Pediatric EEG-Neurological Disorders
      5. Working with Pediatric Patients
      6. Terminology and Conditions in the Nursery
   B. Neonatal EEG
      1. Terminology and Conditions in the Nursery
      2. Technical Aspects of Neonatal EEG
   C. Normal Neonatal EEG Patterns: Premature and Post-term Infants
   D. Abnormal Neonatal EEG
      1. Neonatal Neurological Disorders
      2. Neonatal Seizures
   E. Pediatric Case Studies
   F. Pediatric Video Monitoring
   G. Sedation in Pediatric Patients

V. Lectures by Medical Faculty
   A. Classification- Epilepsy and Seizure
   B. Normal Adult
   C. Epilepsy
D. Pediatric Epilepsy Syndromes
   1. Part I
   2. Part II
E. Neurological Emergencies
F. Neonatal EEG

END 105 through END109

These courses are designed to be an overview of the additional modalities in the neurodiagnostic field with a goal of helping the students achieve a basic understanding of how the procedures are performed. For the Evoked Potential course, students will also learn to record the basic procedures.

END 105 Introduction to IOM

Course Description
An introduction to the common indications for intraoperative neurophysiological monitoring.

Objectives
Student will be able to:
- List indications for IOM utilizing EEG
- List indications for IOM utilizing EP
- List indications for utilizing Neuromuscular IOM
- Discuss principles of stimulation
- Determine electrode placement for all procedures
- Discuss common anesthetic agents and effects of physiological variables on monitoring results.

END 106 Introduction to EP

A course on common indications for auditory, visual and somatosensory evoked potentials.

Objectives
Student will be able to:
- List indications for auditory evoked potentials (aka brainstem auditory evoked response BAER)
- List indications for visual evoked potential (aka as visual evoked response VER)
- List indications for somatosensory evoked potentials (SSEP)
- Define near and far field potentials

END 107 Introduction to PSG
An introduction to polysomnography, sleep disorders and treatment options.
Objectives
The student will be able to:
  • Identify sleep stages on the PSG
  • Discuss common sleep disorders
  • List treatment options
  • Demonstrate an understanding of the technical aspects of the multiple sleep latency test
  • Demonstrate an understanding of the wakefulness test

END 108 Introduction to LTM
This course introduces the student to long term EEG monitoring.

Objectives
The student will be able to:
  • List indications for long-term monitoring
  • Discuss basic LTM procedures including ambulatory EEG, video EEG and continuous EEG in the intensive care setting

END 109 Introduction to NCS
Introductory course to neuromuscular disorders and routine nerve conduction studies.

Objectives
The student will be able to:
  • Discuss technical aspects of stimulation
  • Determine accurate placement of recording electrodes for routine studies
  • Measure waveforms

FINAL EXAM INFORMATION
The Final Exam will be given after completion of clinical rotations. Students may begin preparation by participating in ASET EEG 112 Board Preparation for EEG Technologists. This course includes a practice exam which may be taken multiple times over one year.