NDT A110: BASIC ELECTROENCEPHALOGRAPHY

Item	Value
Curriculum Committee Approval Date	11/15/2023
Top Code	121200 - Electro-Neurodiagnostic Technology
Units	5 Total Units
Hours	162 Total Hours (Lecture Hours 54; Lab Hours 108)
Total Outside of Class Hours	0
Course Credit Status	Credit: Degree Applicable (D)
Material Fee	Yes
Basic Skills	Not Basic Skills (N)
Repeatable	No
Grading Policy	Standard Letter (S)

Course Description

Fundamentals of EEG, including application of electrodes, basic wave forms, artifacts, and introduction to the EEG machine. All enrollees must be accepted into the Neurodiagnostic program. PREREQUISITE: Acceptance into the Neurodiagnostic Technology program. Transfer Credit: CSU.

Course Level Student Learning Outcome(s)

1. Identify and define observed basic EEG rhythms, activity, artifacts, and instrument setting effects on the EEG recording.
2. Prepare a patient for an EEG recording using the International 10/20 system to accurately measure and apply standard EEG electrodes to a mannequin head according to ACNS guidelines.

Course Objectives

- 1. Measure and apply the 21 standard EEG electrodes using the International 10/20 system of electrode placement on a mannequin head accurately (to within 5 mm) and within 45 minutes.
- 2. Define and identify on the EEG recording the basic EEG rhythms, activity, and artifacts.
- 3. Describe, define, and perform the standard EEG activations used in an EEG routine recording.
- 4. Define, describe, and utilize the major instrument controls such as high and low filters, sensitivity, and calibration.
- 5. Describe, list, and set up all of the recommended montages used in routine EEG.
- 6. Take an accurate and complete patient history.
- 7. Apply electrodes using collodion in an acceptable manner to emulate the application process for recording EEG activity for 24 hour recordings or ambulatory EEG studies.
- 8. Accurately calibrate an EEG instrument and be able to trouble shoot basic equipment issues.
- 9. Describe and perform proper cleaning/disinfection techniques of electrodes and equipment.
- I *Scans Competencies
- II +Scans Foundations

Lecture Content

Introduction What is EEG. When is an EEG done. Responsibilities of an EEG technologist Terms Basic EEG terminology Neurological terms Basic Rhythms of EEG Configuration Normal wake patterns Normal sleep patterns Abnormal patterns Polarity and Localization Bipolar Referential Waveform Measurements Amplitude Duration Frequency Types of Montages Bipolar Referential Common Average Reference Electrode Application and Types of Electrodes Paste Discs Collodion Needles Other Electrode Equipment Care Proper Cleaning Technique Disinfection Technique Care of Electrodes Types of Artifacts Physiological Nonphysiological Instrumental Environmental Monitoring Parts of the EEG Machine Amplifiers Display Power supply Electrode board and Montage Selection Digital EEG (Analog/Digital Conversion, Digital Filtering) Types of Activations Hyperventilation Photic stimulation Sleep How to Take a Patient History Present illness Past history Reports Observations EEG Controls Gain Sensitivity Display/Paperspeed Filters High frequency filter Low frequency filter Active filters Digital filtering Frequency Response Curves ACNS Guidelines Minimal standards of EEG Electrical Safety

Lab Content

1. The International 10-20 System of Electrode Placement A. Practice electrode measurements on Foam head B. Practice electrode measurements on short hair mannequin head C. Practice electrode measurements on long hair mannequin head D. Practice electrode measurements and electrode application on long hair mannequin head. 2. Collodian application technique and practice 3. Disinfection, Cleaning, and Care of EEG Electrodes A. Proper Cleaning Technique B. Disinfection Technique C. Care of Electrodes 4. Introduction to EEG Equipment A. Parts of the EEG Instrument 1. Computer/Monitor 2. Amplifier/Input Box 3. Photic Lamp 4. Electrodes B. EEG Program 1. Montage 2. Impedance Meter 3. Acquisition 4. Intermittent Photic Stimulation 5. Hyperventilation Stimulation C. Amplifier 1. High Frequency Filter 2. Low Frequency Filter 3. Notch Filter 4. Sensitivity and Gain 5. Electrical baseline 6. Lead/Electrode Impedance C. Calibration 1. Square Wave Calibration 2. Bio-Calibration D. Activations 1. Hyperventilation 2. Photic Stimulation 3. Sleep E. ACNS Guidelines 1. Minimal Standards of EEG 2. Electrical Safety

Method(s) of Instruction

- Lecture (02)
- DE Live Online Lecture (02S)
- Lab (04)
- DE Live Online Lab (04S)

Instructional Techniques

Lecture, Powerpoint, videos, worksheets, group discussion, in-class assignments, small group exercises, demonstrations, hands-on lab activities.

Reading Assignments

Required Textbook reading (2 hours/week) Required supplemental reading including journal articles and online research. (2 hours/week)

Writing Assignments

Research reports demonstrating writing skill and comprehension of topics researched for improving communication skills. (2 hours/week) Homework assignments: including practice in writing

technical impressions, measuring/recognition of waveforms and EEG instrumentation concepts (1 hour/week)

Out-of-class Assignments

Skills homework - Practice measuring, marking mannequin head. (2 hours/week)

Demonstration of Critical Thinking

Homework assignments. Section exams Comprehensive Midterm exam. Comprehensive Final exam. Written research reports/projects

Required Writing, Problem Solving, Skills Demonstration

Electrode measurement check on mannequin head. Lab practicums for head measurement and/or application of electrodes on mannequin head. Final lab practicum for measurement and application of electrodes on mannequin head. Limited EEG recordings with technologist reporting which includes patient information (name, age, DOB...) and recording parameters.

Eligible Disciplines

Diagnostic medical technology-diagnostic medical sonography, neurodiagnosti...: Any bachelors degree and two years of professional experience, or any associate degree and six years of professional experience.

Textbooks Resources

1. Required Marcuse, L.V., Fields, M. Yoo, J.Y.. Rowans Primer of EEG, 3 ed. Philadelphia: Elsevier, 2024 Rationale: - 2. Required Libenson, M.H.. Practical Approach to Electroencephalography, 2 ed. Philadelphia: Elsevier, 2024 Rationale: Textbook is used as one of the main references for the ABRET EEG examination (the national credentialing examination).

Other Resources

1. Guidelines and Consensus Statements. The American Clinical Neurophysiology Society. 2016 ACNS.org