NDT A115: ADVANCED ELECTROENCEPHALOGRAPHY

Item	Value
Curriculum Committee Approval Date	02/23/2022
Top Code	121200 - Electro-Neurodiagnostic Technology
Units	4 Total Units
Hours	108 Total Hours (Lecture Hours 54; Lab Hours 54)
Total Outside of Class Hours	0
Course Credit Status	Credit: Degree Applicable (D)
Material Fee	No
Basic Skills	Not Basic Skills (N)
Repeatable	No
Open Entry/Open Exit	No
Grading Policy	Standard Letter (S)

Course Description

Introduction to the abnormal electroencephalogram (EEG), maturational changes, and the basic electronic principles upon which successful electroencephalographic techniques are based. PREREQUISITE: NDT A110. Transfer Credit: CSU.

Course Level Student Learning Outcome(s)

1. Perform accurate and interpretable EEG recordings according to ACNS minimal guidelines on human volunteers in the classroom lab settings.
2. List and identify the normal EEG patterns associated with maturation in the neonatal, term infant, and pediatric (1-16 years) age groups, major EEG abnormal patterns, and EEG effects from most commonly encountered drugs.

Course Objectives

- 1. Perform accurate and interpretable EEG recordings on human volunteers in the classroom lab setting. These EEGs are to conform to the ACNS minimal guidelines.
- 2. Perform accurate PSG patient setup, system patient calibration, and record a 15 minute baseline study.
- 3. Practice and understand electrical safety so as never to risk harm to patient or self.
- 4. List and identify the EEG patterns associated with maturation in the neonatal, term infant, and pediatric (1 to 16 years) age groups.
- 5. List and identify the major abnormal EEG patterns.
- 6. Define basic electronic terminology and correctly calculate voltage, current, and resistance in parallel and series circuits.
- 7. Describe and utilize all of the operational components of the EEG instrument and utilize basic troubleshooting techniques.
- 8. List and define the common uses and EEG effects from the major drugs seen as an EEG technologist.
- 9. List the major historical contributions made to the scientific field of neurodiagnostics.
- 10. Report on an NDT related topic both orally and in writing in a clear and concise manner.

Lecture Content

History of EEG Before the 20th Century Recent history EEG Normal Overview ACNS Guidelines in EEG Recording (minimum standards) Technical performances of Clinical EEG's EEG Instrumentation and Digital Concepts Differential Amplifier Properties Filter Effects Input Impedance Common Mode Rejection Ratio Field Plotting Sensitivity versus Gain Sample Rates and Aliasing Calibration Square Wave Time Axis Baseline Calibration Voltage Biocalibration Monitoring Techniques Respiration Pulse and EKG Eye movement Tremor/Movement ACNS Guidelines for Pediatric EEG Recording Pediatric Recording Protocols Special Considerations Maturation of the EEG Premature/Neonate Term Infant Pediatric (One to Ten years of age) Adolescence ACNS Guidelines in Suspected Cerebral Death Recording Electrocerebral Silence (ECS) Protocols Special Considerations Recording Outside the Clinical NDT/EEG Lab Intensive/Critical Care Unit Cortical Recording Safety Protocols Infection Control/Safety Measures EEG Equipment Disinfection Procedure Electrical Safety Isolation Precaution Safety procedures inside the clinical EEG laboratory Safety procedures outside the clinical EEG laboratory EEG Equipment Maintenance Abnormal EEG patterns and their significance Theta/Delta Slowing Epileptiform Activity Periodic Complexes Epilepsy Syndromes Seizure Classification Focal Generalized Idiopathic Electronics Related to EEG Ohms Law Series and parallel circuits Principles of Management Record keeping Scheduling Record storage EEG Supplies Pharmacology in Neurology Drug Classifications Drug Characteristics Drug Effects on the EEG

Lab Content

EEG Instrumentation Filter Effects Sensitivity Gain Time Display Electrode Impedance Ancillary Equipment Digital Concepts Common Mode Rejection Input Impedance Calibration Square Wave Biocalibration Monitoring Modalities Respiration Monitoring Pulse and EKG Monitoring Eye Movement Monitoring Electromyogram Monitoring Safety Procedures Infection Control Safety Measures Isolation Precautions Safety Procedures in the Clinical EEG Laboratory Safety Procedures in the hospital setting Equipment Maintenance Equipment Disinfection Procedures Electrical Safety Technical Performance of EEG Examination International 10-20 System of Electrode Placement ACNS Guidelines for Routine EEG Examinations Identification and Elimination of Artifact Troubleshooting Techniques Demonstration of Instrumentation Knowledge and Application Perform the International 10-20 System of Electrode Placement on human subjects Perform routine EEG examinations on human subjects according to the ACNS Guidelines

Method(s) of Instruction

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

Instructional Techniques

This is an advanced course for the Neurodiagnostic student, designed to bring students with the skills and knowledge gained in Basic EEG (NDT A110) to a point where they have increased practical knowledge to further their success in clinical practice. Lecture presentations, short videos, group discussions/concept review, hands-on practice, demonstrations, instructor review, and feedback for skill assessments of EEG's.

Reading Assignments

The following reading assignments will require 2-3 hrs/wk: Textbook readings Supplemental NDT articles ACNS Guidelines

Writing Assignments

Two reports are to be completed in writing and given orally in summarized fashion. 1. Drug Research Report and 2. NDT Journal Article Review EEG Discussion Threads

Out-of-class Assignments

The following assignments will require 3-4 hrs/wk: Research report and article review report EEG electrode application practice EEG Discussion Threads

Demonstration of Critical Thinking

Students must complete two formal reports in APA format, and present a concise and comprehensive summary of findings on both topics. Exams covering material from reading and lectures. Comprehensive Midterm exam. Comprehensive Final exam Timed electrode application exam. Four complete Electroencephalographs: All EEG's must conform to the minimal guidelines including activation and troubleshooting techniques Timed Final Lab Exam including hookup and completion of a full routine EEG examination

Required Writing, Problem Solving, Skills Demonstration

Two reports are to be completed in writing and given orally in summarized fashion. The oral reporting will be evaluated on completeness and the ability to transmit technical information clearly and concisely. The written reports are expected to be typed and the grammar, spelling, and content will be considered. Writing must prove that there is understanding of the topic and are not merely turning in someone else's words. Discussion Threads Timed EEG electrode application practicum Completion of routine EEG examinations following ACNS guidelines

Eligible Disciplines

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

Textbooks Resources

1. Required Libenson, M. Practical Guide to Electroencephalography, 2nd ed. Philadephia, PA: Elsevier, 2009 Rationale: This is the latest edition for this text. This textbook is utlized as a reference for the American Board of Registered Electroencephalographic and Evoked Potential Technologist (ABRET) national registry board exam. 2. Required Marcuse, L., Fields, M., Yoo, J.. Rowan's Primer of EEG, 2 ed. Philadelphia: Elsevier Health Sciences, 2015 Rationale: This textbook is used as a reference source for the American Board of Electroencephalographic and Evoked Potential Technologist (ABRET) national registry examination. This is the most recent edition. 3. Required Yamada, T. and Meng, E.. Practical Guide for Clinical Neurophysiologic Testing: EEG, 2 ed. Philadelphia: Wolters Kluwer, 2017 Rationale: This is the most recent edition.

Periodicals Resources

1. . American Journal of Electroencephalographic Technologists (AJET), American Society of Electroencephalographic Technologists (ASET) Volume 2020