DEPARTMENT OF
HIGHER EDUCATION &
WORKFORCE DEVELOPMENT

New Program Report

Date Submitted:
03/15/2022

Institution
Missouri Southern State University

Site Information

Implementation Date:
6/1/2023 12:00:00 AM

Added Site(s):

Selected Site(s):

Missouri Southern State University, 3950 E. Newman Road, Joplin, MO, 64801-1595

CIP Information

CIP Code:
510922

CIP Description:
A program that prepares individuals, under the supervision of physicians, to become neuromonitoring technicians who analyze, monitor, and record nervous system function to promote the effective treatment of pathological conditions. Includes instruction in EEG technology, EMG technology, anatomy, and neuroanatomy.

CIP Program Title:
Intraoperative Neuromonitoring Technology/Technician

Institution Program Title:
Neurodiagnostic Technology

Degree Level/Type

Degree Level:
Master Degree

Degree Type:
Master of Science

Options Added:

Collaborative Program:
N

Mode of Delivery

Current Mode of Delivery

Classroom

Student Preparation

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Special Admissions Procedure or Student Qualifications required:
Possess an earned baccalaureate degree from an institution accredited by agencies recognized by Missouri Southern State University.

Additionally, student must meet the following requirements:
Physics I & II with "C" or better
Chem 120 or higher with "C" or better
MCAT score of 492 or GRE score of 300
Overall GPA 3.0 or higher, with a science GPA of 3.25 or higher

Specific Population Characteristics to be served:
Baccalaureate-prepared students who have earned both the Intraoperative Neuromonitoring (IONM) Graduate Certificate and the Electroencephalography (EEG) Graduate Certificate from MSSU.

Faculty Characteristics

Special Requirements for Assignment of Teaching for this Degree/Certificate:
All full-time and part-time faculty will meet or exceed the HLC's faculty qualifications. In addition to faculty and instructional staff, the degree requires a designated program director and a medical director.
Program Director: min. bachelors degree PLUS 5 years of clinical & teaching experience
Medical Director: licensed in US with relevant experience in neurophysiology and/or IONM

Estimate Percentage of Credit Hours that will be assigned to full time faculty:
50% full time faculty

Expectations for professional activities, special student contact, teaching/learning innovation:
Standard faculty teaching, service, and scholarship requirements;
Expectations for professional activities includes professional development (conferences, skills learning, etc.) sufficient to maintain the CNIM and R EEG T. certifications. This should be feasible through attendance at one state or national conference annually. Special student contact will be required at various points throughout the program. Students will come to campus for residency to complete skills competencies prior to the start of clinical placements. This requires approximately one week (7 days) for each lab class. Additionally, faculty will meet with students throughout the semester to discuss clinical learning and evaluate student needs. Should issues arise with clinical sites, faculty may need to travel to the site for review.

Student Enrollment Projections Year One-Five

Year 1	**Full Time:** 12	**Part Time:** 0	
Year 2	**Full Time:** 12	**Part Time:** 0	
Year 3	**Full Time:** 16	**Part Time:** 0	**Number of Graduates:** 16
Year 4	**Full Time:** 16	**Part Time:** 0	
Year 5	**Full Time:** 20	**Part Time:** 0	**Number of Graduates:** 20

Percentage Statement:
100.00

Program Accreditation

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New Program Report

Institutional Plans for Accreditation:
Seeking CAAHEP accreditation for each certificate program denotes dedication to high-quality educational offerings. MSSU cannot seek initial accreditation until the first cohort is seated. CAAHEP charges fees for the 2-person site visit but no other initial accreditation costs. Once accreditation is secured, the annual fee is $550. We anticipate achieving CAAHEP accreditation by 2025 following the completion of the first cohort.

Program Structure

Total Credits:
34

Residency Requirements:
All credit hours for the Master of Science in Neurodiagnostic technology must be earned at MSSU

General Education Total Credits:
0

Major Requirements Total Credits:
34

Course(s) Added

COURSE NUMBER	CREDITS	COURSE TITLE
NDT 527	1	EEG Clinical Practice I
NDT 603	4	Clinical Practice II
NDT 624	2	Advanced Electroneurodiagnostics Lab
NDT 520	3	Introduction to EEG
NDT 509	2	Clinical Practice I
NDT 501	2	IONM Foundations
NDT 523	2	Basic Electroneurodiagnostics Lab
NDT 503	2	Spinal Monitoring Modalities
NDT 608	2	Clinical Practice III
NDT 606	2	Advanced Monitoring Modalities
NDT 621	3	Advanced EEG Concepts
NDT 602	2	Change Factors & Spinal Pathology
NDT 604	2	Advanced Procedures Lab
NDT 628	1	EEG Clinical Practice II
NDT 505	2	Procedures Lab

Free Elective Credits:
0

Internship or other Capstone Experience:
Program includes four (4) one-week sessions specifically focused on laboratory skill acquisition

Assurances

DEPARTMENT OF
HIGHER EDUCATION &
WORKFORCE DEVELOPMENT

New Program Report

I certify that the program is clearly within the institution's CBHE-approved mission. The proposed new program must be consistent with the institutional mission, as well as the principal planning priorities of the public institution, as set forth in the public institution's approved plan or plan update.

I certify that the program will be offered within the proposing institution's main campus or CBHE-approved off-site location.

I certify that the program will not unnecessarily duplicate an existing program of another Missouri institution in accordance with 6 CSR 10-4.010, subsection (9)(C) Submission of Academic Information, Data and New Programs.

I certify that the program will build upon existing programs and faculty expertise.

I certify that the program can be launched with minimal expense and falls within the institution's current operating budget.

I certify that the institution has conducted research on the feasibility of the proposal and it is likely the program will be successful. Institutions' decision to implement a program shall be based upon demand and/or need for the program in terms of meeting present and future needs of the locale, state, and nation based upon societal needs, and/or student needs.

Contact Information

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Missouri Southern State University
Required Syllabus Elements for:

Online Routing, Academic Policies Committee, College Curriculum Oversight Committees, General Education Committee, Graduate Council & Honors Committee

SCHOOL:	College of Health Sciences
DEPARTMENT:	Respiratory Therapy
COURSE TITLE:	NDT 501: IONM Foundations
COURSE CIP CODE:	51.0922
CREDIT HOURS:	2 credit hours
PREPARED BY:	Sherry Whiteman
DATE APPROVED BY DEPT.:	9/2/2021
DEPT. CHAIR:	Sherry Whiteman

BRIEF COURSE DESCRIPTION FOR CATALOG

Intraoperative Neuromonitoring Foundations introduces the student to the functions of an IONM technologist, career pathways, national competencies, and basic medical concepts. This course reviews the relevant anatomical structures and functions, introduce spinal monitoring modalities and the surgical procedures employing these modalities. Additionally, the student will learn methods to optimize physiologic signals and minimize electrical noise in the operating room. Prerequisites: Admission to the IONM program; Physics 270; Physics 290; Chem 120 or higher

LEARNING OBJECTIVES

- Knows the function of an IONM technologist and understands the career and certification pathways available to a technologist.
- Understand the certification process that an IONM technologist must complete, national competencies, guidelines, and standards.
- Review the instrumentation and other parameters used to optimize intraoperative recordings
- Recognize the layout of the OR and essential personnel roles and responsibilities, as well as the key phases of the patient flow process.
- Be familiar with proper OR etiquette, dress, behavior, and hygiene.
- Knows the standard procedures for sterile field, sterile technique, sharps management, and other relevant safety precautions in the OR.
- Know safe electrical operating parameters and what to do in the event of an electrical safety problem.

Missouri Southern State University
Required Syllabus Elements for:

Online Routing, Academic Policies Committee, College Curriculum Oversight Committees, General Education Committee, Graduate Council & Honors Committee

- Understands the importance of infection control, PPDs, and the IONM technologist's role in limiting the spread of infection in the OR environment.
- Identifies the importance of Material Safety Data Sheets (MSDS), Occupational Safety and Health Administration (OSHA) and Office of the Inspector General (OIG) standards.
- Know the IONM technologist's responsibilities regarding HIPAA, patient rights, and the expectations established by the ABRET Code of Ethics.
- Recognize the basic anatomical structures and their functions relevant for intraoperative monitoring.
- Have a basic understanding of the spinal monitoring modalities used by the IONM technologist and the surgical procedures employing these modalities.
- Understand the components of the IONM monitoring system and techniques utilized to optimize signal to noise ratio.

TIME ON TASK / ASSURANCE OF LEARNING

- Students should expect to spend 3 hours a week for each hour of lecture/content provided.

Missouri Southern State University
Required Syllabus Elements for:

Online Routing, Academic Policies Committee, College Curriculum Oversight Committees, General Education Committee, Graduate Council & Honors Committee

SCHOOL:	College of Health Sciences
DEPARTMENT:	Respiratory Therapy
COURSE TITLE:	NDT 503: Spinal Monitoring Modalities
COURSE CIP CODE:	51.0922
CREDIT HOURS:	2 credit hours
PREPARED BY:	Sherry Whiteman
DATE APPROVED BY DEPT.:	9/2/2021
DEPT. CHAIR:	Sherry Whiteman

BRIEF COURSE DESCRIPTION FOR CATALOG

In this course, students learn somatosensory evoked potentials, transcranial motor evoked potentials, spontaneous and triggered electromyography, and each modality's application to monitoring spinal procedures. Students will understand the various spinal procedures requiring IONM, structures at risk, change criteria, and factors that impact data quality. Additionally, students will understand published literature surrounding IONM, recommended anesthetic protocols, and recommendations for obtaining optimal monitoring data.
Prerequisites: Admission to the IONM program; concurrent enrollment in NDT 501

LEARNING OBJECTIVES

- Understand the neuroanatomy, relevant vascular structures, pathways, and generators contributing to the SSEP waveforms.
- Understand the neuroanatomy, relevant vascular structures, pathways, and generators contributing to the EMG and TcMEP waveforms.
- Understand the basics of SSEPs, TCMEPs and spontaneous/triggered EMG; data acquisition and optimization; troubleshooting; benefits/limitations and safety factors; and how each is used during spinal procedures to continuously assess functional integrity of neural pathways.
- Understand SSEP, TcMEP and EMG change criteria.
- Understand the benefits of pedicle screw stimulation, performance requirements, and technical factors effecting data quality.
- Know guidelines parameters for obtaining SSEP, TCMEP, and spontaneous and triggered EMG recordings.
- Understands various spinal procedures, structures at risk, and appropriate monitoring modalities to effectively assess function throughout the procedure.

Missouri Southern State University
Required Syllabus Elements for:

Online Routing, Academic Policies Committee, College Curriculum Oversight Committees, General Education Committee, Graduate Council & Honors Committee

- Based on published literature, know recommended anesthetic protocols for obtaining optimal monitoring data.

TIME ON TASK / ASSSURANCE OF LEARNING

- Students should expect to spend 3 hours a week for each hour of lecture/content provided.

Missouri Southern State University
Required Syllabus Elements for:

Online Routing, Academic Policies Committee, College Curriculum Oversight Committees, General Education Committee, Graduate Council & Honors Committee

SCHOOL:	College of Health Sciences
DEPARTMENT:	Respiratory Therapy
COURSE TITLE:	NDT 505: Procedures Lab I
COURSE CIP CODE:	51.0922
CREDIT HOURS:	2 credit hours
PREPARED BY:	Sherry Whiteman
DATE APPROVED BY DEPT.:	9/2/2021
DEPT. CHAIR:	Sherry Whiteman

BRIEF COURSE DESCRIPTION FOR CATALOG

In this course, students receive hands-on training related to the pre-operative, intraoperative, and post-operative phases of patient care and intraoperative neuromonitoring. Students will practice conducting patient interviews, obtaining relevant patient history, and understand how to conduct a basic neurological examination. Students will understand how to function in the operating room, equipment setup and how to obtain noise free recordings. Additionally, students will learn how to conduct a post-operative neurologic assessment, how to properly disinfect monitoring equipment, and proper procedure documentation.
Prerequisites: Admission to the IONM program; concurrent enrollment in NDT 501 and NDT 503

LEARNING OBJECTIVES

- Pre-Operative Patient History and Communication
  - Be familiar with how to interact with patients of various age ranges
  - Is able to perform a basic neurological examination and conduct a patient history of symptoms
- Intra-Operative Monitoring Set-Up, Data Acquisition, Documentation and Communication
  - Know the general layout of the OR and basic pre-op/intra-op/post-op phases of the patient flow process
  - Be familiar with OR etiquette and proper OR dress, behavior, and hygiene
  - Understand the sterile field and proper sterile technique
  - Be familiar with infection control, PPDs, and the IONM technologist's role in limiting the spread of infection in the OR environment
  - Be familiar with the proper handling/disposal methods for sharps and contaminated materials

- Proficiently demonstrate learned competencies
- Know how to setup for and obtain noise free SSEP baselines in a timely manner
- Know how to set patient appropriate stimulation levels
- Be able to produce and record technically accurate SSEPs
- Understand what EMG monitoring is and the benefits/limitations that it can provide during spinal procedures
- Know the difference between spontaneous and triggered EMG and understand the benefits and limitations of each
- Be familiar with the methods of recording EMG and the relative sensitivities of each method
- Know how to identify the various types of artifact
- Be familiar with troubleshooting strategies to eliminate artifact from the SSEP and EMG recordings
- Know guideline parameters for obtaining SSEP and EMG recordings
- Understand how to properly communicate with the anesthetic provider
- Understand how to properly communicate monitoring changes to the surgeon and other members of the surgical team
- Familiar with commonly used spinal instrumentation systems and implants used in spinal procedures
- Knows the appropriate patient position for each procedure and the possible effects on the patient's nervous system
- Knows how to setup for and obtain noise free intraoperative recordings
- Be able to setup and turn on the intraoperative monitoring system hardware and software
- Understand how to modify test settings
- Be able to program a SSEP and EMG test from a blank test file
- Know how to set patient appropriate stimulation levels

- Post-Operative Patient Evaluation

TIME ON TASK / ASSSURANCE OF LEARNING

- Students should expect to spend 3 hours of study/work time for each hour of lecture/content provided.
- Students are required to come to campus for an in-person lab session (residency) at a time established by the Program Director, for a duration of 7 days. Student will be required to complete additional online learning prior to the residency, equal to eight hours of instruction.

Missouri Southern State University
Required Syllabus Elements for:

Online Routing, Academic Policies Committee, College Curriculum Oversight Committees, General Education Committee, Graduate Council & Honors Committee

SCHOOL:	College of Health Sciences
DEPARTMENT:	Respiratory Therapy
COURSE TITLE:	NDT 507: Change Factors & Spinal Pathology
COURSE CIP CODE:	51.0922
CREDIT HOURS:	2 Credit Hours
PREPARED BY:	Sherry Whiteman
DATE APPROVED BY DEPT.:	9/8/2021
DEPT. CHAIR:	Sherry Whiteman

BRIEF COURSE DESCRIPTION FOR CATALOG

In this course, we will review spinal anatomy, disease pathologies, relevant treatments, and structures impacted during progression of common spinal diseases. The student will understand the inter-related components of the spinal motion segment and the impact of dysfunction in one component to the entire motion segment. The student will become familiar with the goals of anesthesia, drug classifications, medication effects, and recommend protocols for improved IONM monitoring data. Students will understand the various physiologic factors and the probable impact of physiologic changes on IONM data. Additionally, we will review mechanisms of neurologic change, structures at risk, surgical goals, and recommended intervention strategies.

Prerequisites: Completion of NDT 501, NDT 503, NDT 505, and NDT 509 all with a "C" or better.

LEARNING OBJECTIVES

- Be familiar with the goals and stages of anesthesia, classification and effects of anesthetic medications, and recommended protocols to improve monitoring data.
- Know the basic patient physiologic factors monitored by the surgical team and the probable impact of physiologic changes on the monitoring data.
- Be familiar with IONM change criteria and the impact of technical, physiologic, anesthetic, perfusion related, surgical, and other change factors on the data; and understand recommended intervention strategies for each.
- Be familiar with common spinal procedures, commonly used spinal instrumentation systems, mechanisms of neurologic change, and monitoring and treatment strategies.
- Be familiar with SSEP and EMG change criteria
- Understands the types of spinal pathology and their effects on function

Missouri Southern State University
Required Syllabus Elements for:

Online Routing, Academic Policies Committee, College Curriculum Oversight Committees, General Education Committee, Graduate Council & Honors Committee

- Familiar with the most often monitored spinal surgical procedures, including surgical goals, surgical stages, periods of risk and monitoring strategy
- Understand SSEP change criteria and clinical correlations from surgical injury to the SSEP pathways

TIME ON TASK / ASSSURANCE OF LEARNING

- Students should anticipate spending 3 hours studying each week for each hour of curricular content.

Missouri Southern State University
Required Syllabus Elements for:

Online Routing, Academic Policies Committee, College Curriculum Oversight Committees, General Education Committee, Graduate Council & Honors Committee

SCHOOL:	College of Health Sciences
DEPARTMENT:	Respiratory Therapy
COURSE TITLE:	NDT 509: Clinical Practice I
COURSE CIP CODE:	51.0922
CREDIT HOURS:	2 Credit Hours
PREPARED BY:	Sherry Whiteman
DATE APPROVED BY DEPT.:	9/8/2021
DEPT. CHAIR:	Sherry Whiteman

BRIEF COURSE DESCRIPTION FOR CATALOG

During Clinical 1, students enter the operating room with a registered surgical neurophysiologist to practice the skills learned in Procedures Lab 1. The student will participate in providing patient care, practicing patient setup, obtaining clear monitoring data, using the intraoperative monitoring system and functioning in an operating room environment.
Prerequisites: Admission to the IONM Program. Concurrent enrollment in NDT 507 and NDT 602.

LEARNING OBJECTIVES

- Know how to setup for and obtain noise free SSEP baselines in a timely manner
- Be able to produce and record technically accurate SSEPs
- Understand alternate methods for recording SSEPs based upon patient pathology
- Know techniques and alternate recording sites to optimize signal quality
- Understand what EMG monitoring is and the benefits/limitations that it can provide during spinal procedures
- Know the difference between spontaneous and triggered EMG and understand the benefits/limitations of each
- Be familiar with the methods of recording EMG and the relative sensitivities of each method
- Know how to identify the various types of artifact
- Be familiar with troubleshooting strategies to eliminate artifact from the SSEP and EMG recordings
- Know guidelines parameters for obtaining SSEP and EMG recordings
- Understand how to properly communicate with an anesthetic provider

Missouri Southern State University
Required Syllabus Elements for:

Online Routing, Academic Policies Committee, College Curriculum Oversight Committees, General Education Committee, Graduate Council & Honors Committee

- Understand how to properly communicate monitoring changes to the surgeon and other members of the surgical team
- Knows the appropriate patient position for each procedure and the possible effects on the patient's nervous system
- Knows how to setup for and obtain noise free intraoperative recordings
- Review the instrumentation and other parameters used to optimize cortical mapping recordings
- Understand how to modify test settings (fundamentals of EEG)

TIME ON TASK / ASSSURANCE OF LEARNING

- Students will spend 24 hours in clinical per week for an eight week period (second half of the semester). Students should expect to spend an additional 2 hours each week studying and/or completing clinical documentation.

Missouri Southern State University
Required Syllabus Elements for:

Online Routing, Academic Policies Committee, College Curriculum Oversight Committees, General Education Committee, Graduate Council & Honors Committee

SCHOOL:	College of Health Sciences
DEPARTMENT:	Respiratory Therapy
COURSE TITLE:	NDT 602: Advanced Spinal Monitoring
COURSE CIP CODE:	51.0922
CREDIT HOURS:	2 credit hours
PREPARED BY:	Sherry Whiteman
DATE APPROVED BY DEPT.:	9/8/2021
DEPT. CHAIR:	Sherry Whiteman

BRIEF COURSE DESCRIPTION FOR CATALOG

In this course, the student will learn the components of the spinal cord, cauda equina, and blood flow pathways. The student will understand advanced spinal monitoring techniques such as nerve root monitoring and stimulation of the cauda equina, H-reflex and bulbocavernosa testing, and D-wave monitoring. Additionally, students will learn surgical goals, evaluation criteria, and intervention strategies.

- Prerequisites: NDT 501, 503, 505 & 509 with "C" or better.

LEARNING OBJECTIVES

- Understand various advanced spinal procedures, structures at risk, and appropriate monitoring modalities to effectively assess function throughout the procedure.
- Understands the types of spinal pathology and their effects on function
- Be familiar with cauda equina sensory and motor nerve root testing
- Understand how to monitor the H-reflex and Bulbocavernosa reflex and likely benefits and limitations of each monitoring technique
- Be familiar with surgical procedures requiring D-wave monitoring
- Understand how to setup and assess the D-wave, intervention criteria, and like change factors
- Familiar with the types and severity of spinal deformities, monitoring strategies during surgical correction and intervention criteria

TIME ON TASK / ASSSURANCE OF LEARNING

- Students should expect to spend 3 hours studying/learning per week for each hour of instructional content provided.

Missouri Southern State University
Required Syllabus Elements for:

Online Routing, Academic Policies Committee, College Curriculum Oversight Committees, General Education Committee, Graduate Council & Honors Committee

SCHOOL:	College of Health Sciences
DEPARTMENT:	Respiratory Therapy
COURSE TITLE:	NDT 603: Clinical Practice II
COURSE CIP CODE:	51.0922
CREDIT HOURS:	4 Credit Hours
PREPARED BY:	Sherry Whiteman
DATE APPROVED BY DEPT.:	9/8/2021
DEPT. CHAIR:	Sherry Whiteman

BRIEF COURSE DESCRIPTION FOR CATALOG

- During Clinical 2, the student will enter the operating room with a registered surgical neurophysiologist to practice the skills learned in Procedures Lab 1 and Advanced Procedures Lab. The student will participate in providing patient care, practicing patient setup, obtaining clear monitoring data, using the intraoperative monitoring system and functioning in an operating room environment. As available surgeries dictate, the student will employ skills obtained in Procedures Lab I.
- Prerequisites: NDT 501, NDT 503, NDT 505, and NDT 509 with a "C" or better; Concurrent enrollment in NDT 602 and NDT 507.

LEARNING OBJECTIVES

- Understands how to identify and map the eloquent motor and language areas of the cortex utilizing the Penfield and Tanaguchi stimulation paradigms
- Knows the types of procedures requiring cortical mapping, phases of each procedure and the benefit of mapping
- Understand the benefits and limitations of cortical mapping and monitoring
- Review the instrumentation and other parameters used to optimize cortical mapping recordings
- Understand how anesthetic changes will affect standard and processed EEG
- Understand change criteria and clinical correlations
- Understand the Circle of Willis, relevant neural structures and effects of ischemia to each artery within the Circle of Willis
- Understands the difference between standard and processed EEG and the benefits and drawbacks of each
- Understand the stages of a carotid endarterectomy surgery, structures at risk, relevant monitoring protocols and change criteria

Missouri Southern State University
Required Syllabus Elements for:

Online Routing, Academic Policies Committee, College Curriculum Oversight Committees, General Education Committee, Graduate Council & Honors Committee

- Understand how anesthetic changes will effect standard and processed EEG
- Understand change criteria and clinical correlations
- Knows anesthetic considerations and impact to recordings
- Understands burst suppression and the impact to monitoring
- Knows modalities to utilize as a supplement to EEG and the benefits, drawbacks and change criteria
- Understands intraoperative EEG monitoring during aortic aneurysm procedures, stages of procedure, relevant monitoring modalities and change criteria
- Know how to setup for and obtain noise free spontaneous and triggered EMG data
- Know how to test cranial nerve function and continuity
- Understand the various types of stimulation and stimulators and how each impacts MCN testing and location
- Understand change criteria and clinical correlations from surgical injury to the motor cranial nerves
- Knows anesthetic considerations and impact to recordings.
- Know how to setup for and obtain noise free spontaneous and triggered EMG data
- Know how test cranial nerve function and continuity
- Review the instrumentation and other parameters used to optimize motor cranial nerve EMG recordings
- Understand the various types of stimulation and stimulators and how each impacts MCN testing and location
- Understand what BAERs are and how they are used during brainstem procedures
- Know how to setup for and obtain noise free BAER baselines in a timely manner
- Know how to set patient appropriate stimulation levels
- Be able to produce and record technically accurate BAERs
- Understand how to perform TM and Direct nerve recordings
- Understand the various types of stimulation and how each impacts the BAER
- Be familiar with the cochlear microphonic and summating potential
- Understand the effects that hearing loss and various lesions in the auditory pathway have on the BAER

TIME ON TASK / ASSSURANCE OF LEARNING

- Students should expect to spend 24 hours per week at clinical and an additional 2 hours per week studying and/or completing documentation for clinical rotations.

Missouri Southern State University
Required Syllabus Elements for:

Online Routing, Academic Policies Committee, College Curriculum Oversight Committees, General Education Committee, Graduate Council & Honors Committee

SCHOOL:	College of Health Sciences
DEPARTMENT:	Respiratory Therapy
COURSE TITLE:	NDT 604: Advanced Procedures Lab
COURSE CIP CODE:	51.0922
CREDIT HOURS:	2 Credit Hours
PREPARED BY:	Sherry Whiteman
DATE APPROVED BY DEPT.:	9/8/2021
DEPT. CHAIR:	Sherry Whiteman

BRIEF COURSE DESCRIPTION FOR CATALOG

- Advanced Procedures Lab builds on the skills obtained in Procedures Lab 1 by giving the student hands-on exposure to advanced intraoperative modalities such as motor cranial nerve monitoring, EEG monitoring, cortical mapping, auditory brainstem evoked potential monitoring. Students will practice the modality setup, data acquisition and optimization, and gain the ability to recognize changes in the monitoring data.
- Prerequisites: NDT 507, NDT 509, and NDT 602 with a "C" or better; Concurrent enrollment in NDT 606 and NDT 608.

LEARNING OBJECTIVES

- Knows how to setup for and obtain noise free intraoperative recordings
- Review the instrumentation and other parameters used to optimize cortical mapping recordings
- Understands the basics of EEG and how general anesthesia impacts patient EEG
- Understand the benefits and limitations of EEG monitoring
- Knows how to setup for and obtain noise free intraoperative EEG recordings
- Review the instrumentation and other parameters used to optimize EEG recordings
- Understand change criteria and clinical correlations
- Know how to setup for and obtain noise free spontaneous and triggered cranial EMG data
- Review the instrumentation and other parameters used to optimize motor cranial nerve EMG recordings
- Know how test cranial nerve function and continuity
- Review the instrumentation and other parameters used to optimize motor cranial nerve EMG recordings

Missouri Southern State University
Required Syllabus Elements for:

Online Routing, Academic Policies Committee, College Curriculum Oversight Committees, General Education Committee, Graduate Council & Honors Committee

- Understand what BAERs are and how they are used during brainstem procedures
- Know how to setup for and obtain noise free BAER baselines in a timely manner
- Know how to set patient appropriate stimulation levels
- Review the instrumentation and other parameters used to optimize BAER recordings
- Be able to produce and record technically accurate BAERs
- Understand how to perform TM and Direct nerve recordings
- Understand the various types of stimulation and how each impacts the BAER
- Be familiar with the cochlear microphonic and summating potential
- Understand the effects that hearing loss and various lesions in the auditory pathway have on the BAER

TIME ON TASK / ASSSURANCE OF LEARNING

- Students should expect to spend 2 hours studying/learning for each hour of content provided.
- Students are required to come to campus for an in-person lab session (residency) at a time established by the Program Director, for a duration of 7 days. Student will be required to complete additional online learning prior to the residency, equal to eight hours of instruction.

Missouri Southern State University
Required Syllabus Elements for:

Online Routing, Academic Policies Committee, College Curriculum Oversight Committees, General Education Committee, Graduate Council & Honors Committee

SCHOOL:	College of Health Sciences
DEPARTMENT:	Respiratory Therapy
COURSE TITLE:	NDT 606: Advanced Monitoring Modalities
COURSE CIP CODE:	51.0922
CREDIT HOURS:	2 Credit Hours
PREPARED BY:	Sherry Whiteman
DATE APPROVED BY DEPT.:	9/8/2021
DEPT. CHAIR:	Sherry Whiteman

BRIEF COURSE DESCRIPTION FOR CATALOG

Students will learn advanced monitoring modalities necessary for monitoring components of the upper central nervous system. Relevant modalities will include brainstem auditory evoked potentials, electroencephalography, motor cranial nerve monitoring and cortical mapping. Students will understand related surgical procedures, structures are risk, appropriate monitoring modalities, change criteria and how to optimize monitoring data. Students will understand technical, physiologic and surgical factors impacting advanced modality data acquisition. Additionally, students will understand the scope of practice for a surgical neurophysiologist during each surgical procedure.
Prerequisites: NDT 602, NDT 507, and NDT 603 with a "C" or better.

LEARNING OBJECTIVES

- Understand the basics of BAERs, generators, waveforms, and stimulation types and how they are impacted by various disease states.
- Understands the benefits and limitations of BAER monitoring, impacts of hearing loss and lesions, and surgical change criteria.
- Be familiar with the cochlear microphonic and summating potential.
- Understands the basics of standard and processed EEG, how anesthesia impacts readings, and the benefits/limitations of each.
- Know the guideline parameters for EEG, EMG, cortical mapping, and BAER recordings.
- Know the risks, benefits, limitations, and change criteria of cranial nerve monitoring during intracranial and extracranial procedures.

Missouri Southern State University
Required Syllabus Elements for:

Online Routing, Academic Policies Committee, College Curriculum Oversight Committees, General Education Committee, Graduate Council & Honors Committee

- Understand the various types of stimulation and stimulators and how each impacts MCN testing and location
- Understands the basics of phase reversal, how to identify and map the eloquent motor and language areas, and procedure types requiring cortical mapping.

TIME ON TASK / ASSSURANCE OF LEARNING

- Students should expect to spend 2 hours each week studying for each hour of curricular content.

Missouri Southern State University
Required Syllabus Elements for:

Online Routing, Academic Policies Committee, College Curriculum Oversight Committees, General Education Committee, Graduate Council & Honors Committee

SCHOOL:	College of Health Sciences
DEPARTMENT:	Respiratory Therapy
COURSE TITLE:	NDT 608: Clinical Practice III
COURSE CIP CODE:	51.0922
CREDIT HOURS:	2 Credit Hours
PREPARED BY:	Sherry Whiteman
DATE APPROVED BY DEPT.:	9/8/2021
DEPT. CHAIR:	Sherry Whiteman

BRIEF COURSE DESCRIPTION FOR CATALOG

- During Clinical 2, the student will enter the operating room with a registered surgical neurophysiologist to practice the skills learned in Procedures Lab 1 and Advanced Procedures Lab. The student will participate in providing patient care, practicing patient setup, obtaining clear monitoring data, using the intraoperative monitoring system and functioning in an operating room environment. As available surgeries dictate, the student will employ skills obtained in Advanced Procedures Lab.
- Prerequisites: NDT 507, NDT 602, and NDT 603 with a "C" or better; Concurrent enrollment in NDT 604, and NDT 606.

LEARNING OBJECTIVES

- Knows how to setup for and obtain noise free intraoperative recordings
- Review the instrumentation and other parameters used to optimize cortical mapping recordings
- Understands the basics of EEG and how general anesthesia impacts patient EEG
- Understand the benefits and limitations of EEG monitoring
- Knows how to setup for and obtain noise free intraoperative EEG recordings
- Review the instrumentation and other parameters used to optimize EEG recordings
- Understand change criteria and clinical correlations
- Know how to setup for and obtain noise free spontaneous and triggered cranial EMG data
- Review the instrumentation and other parameters used to optimize motor cranial nerve EMG recordings
- Know how test cranial nerve function and continuity

Missouri Southern State University
Required Syllabus Elements for:

Online Routing, Academic Policies Committee, College Curriculum Oversight Committees, General Education Committee, Graduate Council & Honors Committee

- Review the instrumentation and other parameters used to optimize motor cranial nerve EMG recordings
- Understand what BAERs are and how they are used during brainstem procedures
- Know how to setup for and obtain noise free BAER baselines in a timely manner
- Know how to set patient appropriate stimulation levels
- Review the instrumentation and other parameters used to optimize BAER recordings
- Be able to produce and record technically accurate BAERs
- Understand how to perform TM and Direct nerve recordings
- Understand the various types of stimulation and how each impacts the BAER
- Be familiar with the cochlear microphonic and summating potential
- Understand the effects that hearing loss and various lesions in the auditory pathway have on the BAER

TIME ON TASK / ASSSURANCE OF LEARNING

- Students should expect to spend 24 hours per week at clinical and an additional 2 hours per week studying and/or completing documentation for clinical rotations.

Missouri Southern State University
Required Syllabus Elements for:

Online Routing, Academic Policies Committee, College Curriculum Oversight Committees, General Education Committee, Graduate Council & Honors Committee

SCHOOL:	College of Health Sciences
DEPARTMENT:	Respiratory Therapy
COURSE TITLE:	NDT 520: Introduction to EEG
COURSE CIP CODE;	51.0922
CREDIT HOURS:	3 Credit Hours
PREPARED BY:	Sherry Whiteman
DATE APPROVED BY DEPT.:	9/14/2021
DEPT. CHAIR:	Sherry Whiteman

BRIEF COURSE DESCRIPTION FOR CATALOG

- In this course the student will be introduced to EEG technology. Concepts covered include technologist responsibilities, head measurement system, electrode application, development and programming of montages, EEG terminology, localization and polarity, identification of basic waveforms of the normal adult EEG, the most common artifacts, measuring waveforms, and how the EEG instrument is used in the recording of brain activity.
- Prerequisite: Admission to the EEG certificate program; Concurrent enrollment in NDT 523 and NDT 527; Physics 270; Physics 290; Chem 120 or higher

LEARNING OBJECTIVES

- Understand the role and responsibility of the EEG technologist,
- Understand the role of the national technologist organization (ASET),
- Understand the role and the various registry/certifications examinations of the national credentialing board (ABRET),
- Know the national competencies for EEG technologists
- Understand the 10-20 nomenclature & electrode site determination system,
- Measure and mark using the 10-20 system with accuracy,
- Apply electrodes; understand different electrode application methods
- Possess a working knowledge of the different types of montages and how EEG activity is displayed on each,
- Program montages,
- Understand localization techniques specific to each type of montage,
- Understand how to determine polarity of a focus
- Define and recognize the resting background rhythm of the adult EEG,
- Define, recognize basic artifacts seen on an EEG (eye movement, muscle, EKG)
- Measure waveform sensitivity, voltage, amplitude, and duration

Missouri Southern State University
Required Syllabus Elements for:

Online Routing, Academic Policies Committee, College Curriculum Oversight Committees, General Education Committee, Graduate Council & Honors Committee

- Understand the various controls of the EEG instrument.

TIME ON TASK / ASSURANCE OF LEARNING

- Students should expect 2 hours studying each week for every 1 hour of curricular content presented.

Missouri Southern State University
Required Syllabus Elements for:

Online Routing, Academic Policies Committee, College Curriculum Oversight Committees, General Education Committee, Graduate Council & Honors Committee

SCHOOL:	College of Health Sciences
DEPARTMENT:	Respiratory Therapy
COURSE TITLE:	NDT 523: Basic Electroneurodiagnostics Lab
COURSE CIP CODE:	51.0922
CREDIT HOURS:	2 credit hours
PREPARED BY:	Sherry Whiteman
DATE APPROVED BY DEPT.:	9/14/2021
DEPT. CHAIR:	Sherry Whiteman

BRIEF COURSE DESCRIPTION FOR CATALOG

Students will practice and meet minimal accuracy competencies of measuring and marking on a mannequin and human head. Students will practice designing and programming montages, performing EEG setups, and develop localization techniques and polarity skills. Review of the EEG instrument will help the student become proficient at operating the instrument in the performance of EEG. Students will also create common artifacts while performing EEG on each other. Additionally, students will practice and meet minimal accuracy competencies of measuring and marking a human head within 15 minutes. Students will perform EEG including explaining the procedure, taking a patient history, conducting the test including activation procedures, and cleaning the patient within 70 minutes.
Prerequisites: Admission to the EEG Certificate Program; Concurrent enrollment in NDT 520 and NDT 527.

LEARNING OBJECTIVES

- Measure and mark bald mannequin and human head for accuracy,
- Design montages on the EEG instrument,
- Perform EEG on fellow students,
- Understand when and how to use the EEG instrument to aid in the collection of the EEG signal,
- Recognize common artifacts and monitor or eliminate them
- Measure and mark human head for accuracy within 15 minutes,
- Perform EEG on fellow students within 70 minutes,
- Understand when and how to use the EEG instrument to aid in the collection of the EEG signal,
- Recognize common artifacts and monitor or eliminate them,

Missouri Southern State University
Required Syllabus Elements for:

Online Routing, Academic Policies Committee, College Curriculum Oversight Committees, General Education Committee, Graduate Council & Honors Committee

- Perform Activation Procedures

TIME ON TASK / ASSSURANCE OF LEARNING

- Students should expect to spend 2 hours studying/learning for each hour of content provided.
- Students are required to come to campus for an in-person lab session (residency) at a time established by the Program Director, for a duration of 7 days. Student will be required to complete additional online learning prior to the residency, equal to eight hours of instruction.

Missouri Southern State University
Required Syllabus Elements for:

Online Routing, Academic Policies Committee, College Curriculum Oversight Committees, General Education Committee, Graduate Council & Honors Committee

SCHOOL:	College of Health Sciences
DEPARTMENT:	Respiratory Therapy
COURSE TITLE:	NDT 527: EEG Clinical Practice I
COURSE CIP CODE;	51.0922
CREDIT HOURS:	1 Credit Hour
PREPARED BY:	Sherry Whiteman
DATE APPROVED BY DEPT.:	9/17/2021
DEPT. CHAIR:	Sherry Whiteman

BRIEF COURSE DESCRIPTION FOR CATALOG

In this course students apply classroom learning in the clinical setting. This is a clinical instruction course that requires students to demonstrate competency of learned skills and complete and document clinical cases.
Prerequisites: Concurrent enrollment in NDT 520 and NDT 527

LEARNING OBJECTIVES

- Demonstrate a minimum competency level for an entry level EEG technologist in the hospital setting.
- Log and describe completed cases by weekly deadlines.
- Perform appropriate pre- and post-procedure communication with patient
- Perform appropriate pre- and post-procedure communication with care team.
- Complete documentation of patient case in the EHR daily.

TIME ON TASK / ASSSURANCE OF LEARNING

- Students should expect to spend at least 2 hours studying for each hour of curricular content presented. Students will also spend 8 hours per week in the clinical setting.

Missouri Southern State University
Required Syllabus Elements for:

Online Routing, Academic Policies Committee, College Curriculum Oversight Committees, General Education Committee, Graduate Council & Honors Committee

SCHOOL:	College of Health Sciences
DEPARTMENT:	Respiratory Therapy
COURSE TITLE:	NDT 621: Advanced EEG Concepts
COURSE CIP CODE:	51.0922
CREDIT HOURS:	3 credit hours
PREPARED BY:	Sherry Whiteman
DATE APPROVED BY DEPT.:	9/14/2021
DEPT. CHAIR:	Sherry Whiteman

BRIEF COURSE DESCRIPTION FOR CATALOG

Students will learn abnormal EEG, post-recording cleaning of the patient, and troubleshooting techniques. Additionally, students will learn Seizures, seizure types and management, nervous system disorders, pediatric and neonatal EEG, Analog-Digital Conversion, electrode types, medication effects on the EEG recording, and troubleshooting techniques.
Prerequisites: NDT 520, NDT 523, and NDT 527 all with a "C" or higher

LEARNING OBJECTIVES

- Understand the characteristics of abnormal patterns,
- Learn post-recording cleaning of the patient,
- Learn troubleshooting techniques,
- Understand the seizures, seizure types and management,
- Understand nervous system disorders,
- Understand pediatric and neonatal EEG,
- Understand analog-digital conversion,
- Understand electrode types,
- Understand medication effects on the EEG,
- Learn post-recording cleaning of the patient,
- Learn troubleshooting techniques

TIME ON TASK / ASSSURANCE OF LEARNING

- Students should expect to spend 2 hours studying/learning for every 1 hour of content delivered.

Missouri Southern State University
Required Syllabus Elements for:

Online Routing, Academic Policies Committee, College Curriculum Oversight Committees, General Education Committee, Graduate Council & Honors Committee

SCHOOL:	College of Health Sciences
DEPARTMENT:	Respiratory Therapy
COURSE TITLE:	NDT 624: Advanced Electroneurodiagnostics Lab
COURSE CIP CODE:	51.0922
CREDIT HOURS:	2 Credit Hours
PREPARED BY:	Sherry Whiteman
DATE APPROVED BY DEPT.;	9/14/2021
DEPT. CHAIR:	Sherry Whiteman

BRIEF COURSE DESCRIPTION FOR CATALOG

Students will program a longitudinal, transverse, referential (Ipsilateral Ear & Cz), and circumferential montage. Students will practice and meet minimal accuracy competencies of performing EEG.
Prerequisites: Concurrent enrollment in NDT 621 and NDT 628

LEARNING OBJECTIVES

- Adequately take a patient history (role play with fellow students),
- Adequately explain the EEG procedure to patient (role play with fellow students),
- Measuring and marking the head and electrode application with accuracy within 20 minutes,
- Perform 20 minutes of EEG recording,
- Perform entire EEG within 70 minutes including cleanup and patient dismissal
- Explain electrode cleaning procedures

TIME ON TASK / ASSSURANCE OF LEARNING

- Students should expect to spend 2 hours studying/learning for each hour of content provided.
- Students are required to come to campus for an in-person lab session (residency) at a time established by the Program Director, for a duration of 7 days. Student will be required to complete additional online learning prior to the residency, equal to eight hours of instruction.

Missouri Southern State University
Required Syllabus Elements for:

Online Routing, Academic Policies Committee, College Curriculum Oversight Committees, General Education Committee, Graduate Council & Honors Committee

SCHOOL:	College of Health Sciences
DEPARTMENT:	Respiratory Care
COURSE TITLE:	NDT 628: EEG Clinical Practice II
COURSE CIP CODE:	51.0922
CREDIT HOURS:	1 Credit Hour
PREPARED BY:	Sherry Whiteman
DATE APPROVED BY DEPT.:	9/17/2021
DEPT. CHAIR:	Sherry Whiteman

BRIEF COURSE DESCRIPTION FOR CATALOG

In this course students apply classroom learning in the clinical setting. This is a clinical instruction course that requires students to demonstrate competency of learned skills and complete and document clinical cases.
Prerequisites: Concurrent enrollment in NDT 621 and NDT 624

LEARNING OBJECTIVES

- Demonstrate a minimum competency level for an established EEG technologist in the hospital setting.
- Log and describe completed cases by weekly deadlines.
- Perform appropriate pre- and post-procedure communication with patient
- Perform appropriate pre- and post-procedure communication with care team.
- Complete documentation of patient case in the EHR daily.

TIME ON TASK / ASSSURANCE OF LEARNING

- Students should expect to spend at least 2 hours studying for each hour of curricular content presented. Students will also spend 8 hours per week in the clinical setting.

Master's of Neurodiagnostics Proposal

Introduction

Neurodiagnostics is an emerging field designed to serve patients and physicians in the operating room. These highly trained technologists require specialty training typically offered by hospitals and independent organizations. Missouri Southern State University has a unique opportunity to leverage current resources in an innovative way to provide neurodiagnostic training to meet workforce demands both locally and nationally.

About the Profession

Neurodiagnostics is an umbrella term for specialized educational tracks focused on the monitoring and evaluation of brain waves and action potentials. The two most common tracks are Electroencephalography (EEG) and Intraoperative Neurological Monitoring (IONM). The American Board of Registration of Electroencephalographic and Evoked Potential Technologists (ABRET) manages the specialty credentials required for technologists to practice in the field.

Electroencephalography

EEG technologists (also called END) measure and record the electrical activity of the brain to assist physicians as they diagnose patients with disorders like epilepsy or sleep disorders. These practitioners may receive on the job training and are typically recommended to earn the Registered EEG Technologist (R. EEG T.) credential. ABRET outlines four pathways to the R. EEG T. credential:

EEG Pathway I CAAHEP Accredited NDT Program	EEG Pathway II Non-CAAHEP Formal NDT Program	EEG Pathway III Associate degree/RPSGT	EEG Pathway IV New Practice Track
Graduate of Program	Certificate of Completion from ABRET recognized program *current listing on ABRET.org	Associate degree or higher OR RPSGT certificate	5 years clinical EEG experience
Current CPR/BLS certification	Documentation of 100 EEGs	1 year clinical EEG experience	Measurement Assessment Document
Documentation of 50 EEGs	Current CPR/BLS Certification	Measurement Assessment Document	Documentation of 150 EEGs
		Documentation of 150 EEGs	60 EEG ASET Credits
		30 EEG ASET Credits	Current CPR/BLS certification
		Current CPR/BLS certification	

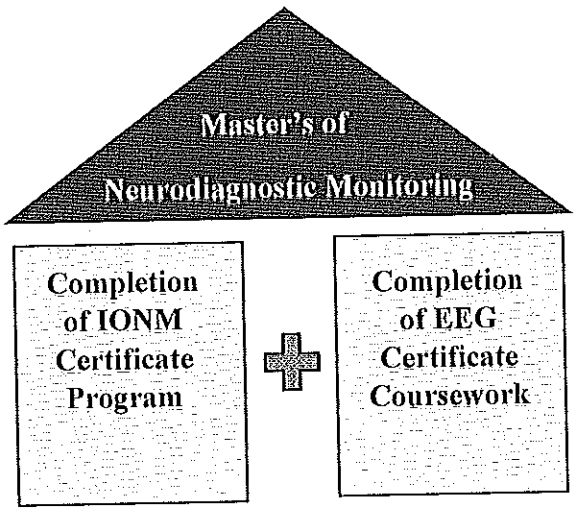
Intraoperative Neurological Monitoring

IONM technologists monitor brain waves and action potentials during surgical procedures to mitigate complications and assist physicians as they make decisions. These practitioners must earn the Certified Neurophysiologic Intraoperative Monitoring (CNIM) credential to practice. ABRET outlines 4 pathways to eligibility for the CNIM:

CNIM Pathway I (CAAHEP NIOM Program)	CNIM Pathway II (R. EEG T. or R. EP T.)	CNIM Pathway III (Bachelors degree)	CNIM Pathway IV (Non-CAAHEP Formal NIOM Program)
CAAHEP Diploma	Current R. EEG T or R. EP T.	Bachelors degree or higher	Certificate of Completion from ABRET recognized program *current listing on ABRET.org
Documentation of 100 NIOM Cases	Documentation of 150 NIOM cases	Documentation of 150 NIOM cases	Documentation of 150 NIOM cases
Current CPR/BLS certification	Current CPR/BLS certification	30 IOM educational hours	Current CPR/BLS certification
		Current CPR/ BLS certification	

Program Proposal

The creation of a neurodiagnostics program at Missouri Southern State University serves to meet workforce demands locally and nationally. ONet projects job growth at 9% for the next ten years, with more than 27,800 job openings in the same time period. Students will have the opportunity to earn either the IONM or EEG certificate at the Master's Level. Students earning both certificates will be awarded a Master's of Neurodiagnostic Monitoring.



Curriculum Component I: The IONM Program

Beginning in the Summer semester each year, students can complete the IONM program in three semesters and graduate prepared to pass the CNIM credentialing exam. Coursework will be delivered primarily online, with two 8-day residencies in the summer and spring semesters to for skills competency training. Students complete 22 credits hours to earn the IONM certificate. These credits may also count toward the Masters of Neurodiagnostics Monitoring. The curriculum schedule is as follows:

Summer Semester	
Course Name	Credit Hours
IONM Foundations	2
Spinal Monitoring Modalities	2
Procedures Lab I	2
Total Credits during Summer Semester = 6	
Fall Semester	
Advanced Spinal Monitoring	2
Change Factors & Spinal Pathology	2
Clinical Practice I	4
Total Credits during Fall Semester = 8	
Spring Semester	
Advanced Procedures Lab	2
Advanced Monitoring Modalities	2
Clinical Practice II	4
Total Credits during Spring Semester = 8	

Curriculum Component II: The EEG Program

Offered during the Fall and Spring semester, students can complete the EEG certificate program alone or alongside the IONM certification. Coursework will be delivered primarily online. Students complete 12 credits hours to earn the EEG certificate and become eligible to take the R. EEG T. exam. The curriculum schedule is as follows:

Fall Semester	
Course Name	Credit Hours
Introduction to EEG	3
Basic Electroneurodiagnostics Lab	2
EEG Clinical Practice I	1
Total Credits during Fall Semester = 6	
Spring Semester	
Advanced EEG Concepts	3
Advanced Electroneurodiagnostics Lab	2
Clinical Practice II	1
Total Credits during Spring Semester = 6	

Curriculum Component III: Pathway to Healthcare Bachelor's/Masters

There is an opportunity to serve those currently in the profession through the creation of a Bachelor's or Master's degree pathway much like those already in existence for Respiratory Therapy, EMS, Radiology, Dental Hygiene, and Nursing. This would be an option for future consideration once the program is established.

Program Considerations

Accreditation

Seeking CAAHEP accreditation for each certificate program denotes dedication to high-quality educational offerings. MSSU cannot seek initial accreditation until the first cohort is seated. CAAHEP charges fees for the 2-person site visit, but no other initial accreditation costs. Once accreditation is secured, the annual fee is $550. You can find the CAAHEP standards for IONM programs here: https://www.caahep.org/CAAHEP/media/CAAHEP-Documents/IONM_Standards_Approve3192021.pdf

You can find the CAAHEP standards for neurodiagnostic technology (EEG) here: https://www.caahep.org/CAAHEP/media/Accreditation-Action-Reports/NDTStandards2017_3.pdf

Faculty and Staff

A co-teaching model will be employed for content delivery. A Biology Faculty Member and a trained Neurodiagnostic professional will collaborate for each class offering. CAAHEP standards require sufficient faculty and staff to fulfill delineated roles, as defined below:

IONM	EEG
Program Director	Program Director
	Curriculum Coordinator (may not be necessary)
Medical Director	Medical Director
Faculty and Instructional Staff	

To meet criteria and provide quality learning experiences for students, 3 part-time or adjunct faculty are needed. The criteria for program personnel is delineated in the CAAHEP accreditation standards. To summarize, program directors must have a bachelor's degree, hold the credentials for what they teach, and have a minimum 5 years clinical and teaching experience. Medical directors must be licensed in the US with relevant experience in neurophysiology and/or IONM. Faculty and instructional staff must be knowledgeable in the subject matter they teach.

According to the Higher Learning Commission's (HLC) criteria for qualified faculty, and given the current status of Neurodiagnostic educational requirements, it is likely some program faculty will have a Bachelor's degree and must provide sufficient evidence of credentialing, equivalent field experience, and a record of research, scholarship, or achievement.

Cohort Size

Beginning with a cohort of twelve is recommended until the program is established and marketing efforts provide a significant pool of applicants to support an expanded cohort size.

Equipment and Space Needs

One shared faculty office should adequately support the program since curricular delivery occurs primarily online. An office in Health Science will need to be built or identified, or Biology is willing to provide an office space.

Limited lab space is required, and only during residency periods. For the IONM program, residency I (Procedures Lab I) will take place toward the end of the Summer semester or during intersession. The simulation lab or other unused lab spaces in the Health Science Building are available during this time for us by the Neurodiagnostics programs. Residency II (Advanced Procedures Lab) occurs early in the Spring semester and there is more competition for lab space during that time. EEG labs, also offered in a residency format.

Equipment for the program and anticipated costs are as follows:

Item	**Unit Cost**	**Units Needed**	**Total Expense**
Cadwell Cascade IOMAX	61,950.00	4	247,800.00
Computers for Cadwell Cascade	3,000.00	4	12,000.00
NATUS EEG Equipment (System 1)	52,206.00	4	208,824.00
EEG Simulator NeTech 330 (Medical Device Depot)	903.00	4	3,612.00
Other Disposables and equipment (electrodes and cables, paste & gel, caps, alcohol preps, Nuprep,tape measures, manikin heads, etc)	TBD		$6,000.00
CadX Simulator	10,000.00	1	10,0000.00
	Total Anticipated Expense		***$488,236.00***

Other Program Costs (3-year startup)

	Year 1	Year 2	Year 3
Salaries	111,628.00	111, 628.00	111,628.00
Equipment	375,000.00	2,000.00 (disposables)	2,000.00 (disposables)
Marketing	12,000.00	10,000.00	8,000.00

Professional Development	5,000.00	2,500.00	2,500.00
Accreditation fees	6550.00	550.00	550.00
Operational Budget	6,000.00	6,000.00	6,000.00
Total (annual)	141,553.00	132,678.00	130,678.00
		Total Costs Across 3 Years	***404,909.00***

Anticipated Annual Revenue

Annual Expenses	
Part-time Faculty Salaries (3) annual	100,188.00
Classified Staff (0.5 FTE) annual	11,440.00
Operating Budget Annual	6,000.00
Total Annual Expenses	**117,628.00**
Annual Income	
Cost per credit hour	350.00
Number of credit hours/student annually	34
Annual program capacity	12
Total Income*	**142,800.00**
Estimated Overall Revenue (annual)	***$25,172.00***

**income assumes students seek both certificates*

Program Prerequisites

Neuroanatomy (new offering in 2022)

Physics I & II

Chem 120

MCAT score of 492 or GRE score of 300

Overall GPA 3.0 or higher, with a Science GPA of 3.25 or higher

Bachelor's degree

Course Descriptions

IONM Foundations:

Intraoperative Neuromonitoring Foundations will introduce the student to the functions of an IONM technologist, career pathways, national competencies, and basic medical concepts. Foundations will review the relevant anatomical structures and functions, introduce spinal monitoring modalities and the surgical procedures employing these modalities. Additionally, the

student will learn methods to optimize physiologic signals and minimize electrical noise in the operating room.

Spinal Monitoring Modalities:

In this course, the student will learn somatosensory evoked potentials, transcranial motor evoked potentials, spontaneous and triggered electromyography, and each modalities application to monitoring spinal procedures. Students will understand the various spinal procedures requiring IONM, structures at risk, change criteria, and factors that impact data quality. Additionally, students will understand published literature surrounding IONM, recommended anesthetic protocols, and recommendations for obtaining optimal monitoring data.

Change Factors & Spinal Pathology

In IONM Change Factors, the student will become familiar with the goals of anesthesia, drug classifications, medication effects, and recommend protocols to for improved IONM monitoring data. Students will understand the various physiologic factors and the probable impact of physiologic changes on IONM data. Additionally, we will review mechanisms of neurologic change and recommended intervention strategies.

Projected Program Start Rationale

Summer 2023

References

Higher Learning Commission. (2020, September). *Determining qualified faculty through HLC's criteria for accreditation and assumed practices: Guidelines for institutions and peer reviewers.* https://download.hlcommission.org/FacultyGuidelines_OPB.pdf

O*net Online. (2021). *Summary report for: 29-2099.01 – neurodiagnostic technologists.* *https://www.onetonline.org/link/summary/29-2099.01*

NEW MAJOR/CERTIFICATE Proposal No. 21-22:22_____

MISSOURI SOUTHERN STATE UNIVERSITY
School Curriculum Oversight Committee/Academic Policies Committee

Proposal for a NEW MAJOR or CERTIFICATE

1. School: Health Sciences Department: Respiratory Care Date: 9/21/2021

2. Title: Master of Science in Neurodiagnostic Technology CIP Code: _51.0922_____

3. New Major or Certificate: Yes or New Option: _____in _____

4. Date first offered: Fall 2022 (students can begin earning credits immediately).

5. Describe the need for this new certificate including evidence of student demand for the program and market or societal need for the skills being developed.

   See attached documentation. Letter of support from Freeman Health System coming.

6. Is the certificate interdisciplinary? Yes X, No ___. If so, has it been approved by all departments concerned? Yes X, No __ . If Interdisciplinary, how will coordination between the departments be accomplished?

   The degree is housed in the College of Health Sciences, but the biology department will provide office space for faculty. A co-teaching model will be employed to teach the courses. Biology faculty have agreed to this.

7. Are there similar programs offered at other Missouri institutions? Yes , No _X__. If so, how is this program unique or different from existing programs?

8. Describe the curriculum requirements for the certificate.
   See attached documentation. Completion of the IONM and EEG certificate.

9. What are the student learning objectives for the program?

   Students will demonstrate technical proficiency, conceptual understanding, and professional behavior relevant to the role of an IONM professional.

   Students will demonstrate technical proficiency, conceptual understanding, and professional behavior relevant to the role of an EEG professional.

   Students will complete the IONM certificate and the EEG certificate.

10. How will the objectives be assessed?

    Courses will assess student behaviors, skills, and knowledge through written testing, laboratory skills competency completion, clinical skill completion, and behavioral performance in the clinical setting.

11. If this certificate is approved –
    a. Will additional staff be needed? Yes _X_ , No \. If yes, describe. See documentation
    b. Will additional space, equipment, special library materials, or any major expense be involved? Yes X_____, No . If yes, specify program needs. See documentation

12. Include any additional information about the program that would be helpful.
    I have already submitted grant requests to assist with equipment purchasing.

APPROVED

_____ Date: _____ _____ Date: _____
Department Chair School Dean

For office use only. Dates Approved:	School Curriculum Oversight Committee _____
Academic Policies _____ Faculty Senate _____	Board of Governors _____