**Sleep Technology (Polysomnography) Program**

**Associate in Applied Science Degree**

***Updated December 2014***

**Purpose:** This program educates students to work as sleep technologists under the supervision of sleepspecialists, performing polysomnography and other testing to assist physicians in the diagnosis and evaluation of disorders ofsleep and wakefulness. Polysomnography (PSG) is the simultaneous recording of physiological parametersfrom multiple organ systems with non-invasive monitoring equipment. The technologist simultaneously monitors EEG (electroencephalography), EOG (electro-occulography), EMG (electromyography), ECG(electrocardiography), indices of multiple respiratory flow efforts, position sensors and blood oxygen andcarbon dioxide levels during sleep. Interpretive knowledge is required to provide sufficient monitoringdiligence of the recorded activity from the lungs, brain, muscle and heart and the clinical events observedduring sleep. The sleep technologist must be able to analyze real-time data making certain that it is valid and interpretable, and intervening appropriately to initiate therapy and safety measures.

Polysomnographic studies are performed in a sleep facility or using portable monitoring in the patient’s home. The practice of sleep technology includes diagnosing and treating as well as assisting with long term care for patients with a host of sleep-related disorders identified in theInternational Classification of Sleep Disorders-3 (ICSD-3), such as narcolepsy, REM and non-REM parasomnias, sleeprelated movement disorders, circadian rhythm sleep disorders and sleep apnea under the supervision of a sleep physician.

**Program Entrance Requirements:** A high school diploma and proof of completion of a current Basic Cardiac Life Support (BCLS) certification arerequired prior to beginning PSG clinical practicum courses. The BCLS course must be through the AmericanHeart Association Cardiopulmonary Resuscitation & Emergency Cardiac Care for Health Care Providers or theRed Cross Basic Life Support Course. Clinical practicum sleep facility clinical requirements may include drugtesting, vaccination titers, tuberculosis (TB) skin testing, Health Insurance Portability and Accountability Act(HIPAA) competency, and/or criminal background check.

**Registration and Sequence of Courses:** Sleep Technology **(**Polysomnography) is a 60 credit hour associate degree program thatincludes classes in polysomnography as well as basic anatomy, medical terminology, writing, mathematics, andintroductions to electricity and computers, and the practice of sleep medicine. The courses for the sleep technology curriculum are designed sothat each semester’s requirements must be met before proceeding into the next semester. During the first twosemesters, students may take general education courses as well as PSG courses. Students acquire hands-onexperiences with a focus on polysomnographic technology and clinical practice. This includes a rigorouscurriculum of lectures, labs, and clinical experiences. Students will gain clinical experience in thesleep technology field prior to graduation during the clinical practice experience and have an opportunity togain skills in performing polysomnography while supervised by a clinical instructor.After successful completion of the program, graduates will have met the educational requirements necessary totake the national comprehensive registry examination for polysomnographic technologists administered by theBoard of Registered Polysomnographic Technologists (RPSGT) and/or American Board of Sleep Medicine(RST).

**I. Curriculum General Education/Studies Requirements**

*Courses Credits*

Written and Oral Communication (CM)

Critical Thinking (CT)

Biological/Natural Sciences (NS)

History and the Social and Behavioral Sciences (SS)

The Humanities – the Arts, Literature, and Philosophy (HA)

Computer Course (to include database, electronic medical records, Microsoft Office™)

Computational Mathematics 3-6

**II. Course Specific**

***1st & 2nd Semesters***

**Introduction to Sleep Medicine**

Medical Terminology

History of Sleep Medicine

ICSD-10

Overview of Sleep Medicine - Diagnosis and Treatment

Role of the Sleep Technologist

Role of Sleep Facilitator/Sleep Care Manager

Normal Sleep and Sleep Architecture

Evaluation of Sleep Complaints & Patient History

oAssessment of Daytime Sleepiness

oQuestionnaires

oAssessment tools

oAssessing vitals

Documentation-Patient Charting

Basic Waveforms of Sleep

Billing and Authorization Processes

**Anatomy & Physiology of Sleep Medicine**

Cardiovascular System

Respiratory Anatomy & Physiology

Neuroanatomy

Sleep Pharmacology

**Patient Interaction and Safety**

edical Ethics and Law, Professionalism in the Sleep Lab

Infection Control

Employee and Patient Safety (Basic patient care, comfort and safety)

Security, Disaster, Environmental Emergencies

Medical Emergencies in the Sleep Lab

Handling Difficult Patients

Patient Education

Accreditation processes (i.e. The Joint Commission, AASM)

**Methodology for Polysomnography**

Principles of patient preparation

oSpecial needs of the patient

International 10-20 System of Electrode Placement

Electrodes: Principles of electrical conduction

Montage: Signal derivation and amplification

Applied Concepts

oSignal Processing (filter, sensitivity)

oCalibrations

AC/DC Instrumentation

**Laboratory I**

Orientation to the Sleep Facility –

oPolicies and Procedures

oFederal, State and Institutional Compliance (Personnel)

Patient Interaction

Electrode / sensor application

Initiating the sleep acquisition

Monitoring the acquisition for appropriate interventions

Ending the sleep acquisition

Infection Control

**Clinical Practicum I**

Assess patient and patient information

Impedance checks

Complete electrode / sensor placement

Clinical Objectives

oPatient Arrival, Prep and Electrode Application

oCleaning and Safety

oMontages and Equipment Calibration

***3rd & 4th Semesters***

**Adult Sleep Scoring**

Visual Rules

Arousal Rules

Cardiac Rules

Movement Rules

Respiratory Rules

Data Analysis and Report Generation

Archiving and Data Storage

**Laboratory II**

Patient Interaction

Electrode / sensor application

Initiating the sleep acquisition

Monitoring the acquisition for appropriate interventions

Ending the sleep acquisition

Scoring

**Clinical Practicum II**

Scoring

Report Calculations

Patient Assessment

Patient Monitoring

Documentation

Artifact Recognition & Troubleshooting

Cardiac Arrhythmia Identification

Clinic/Physician’s Office Involvement

**Patient Monitoring**

Assessment of EEG and Sleep Architecture

Assessment of Sleep Disordered Breathing

Assessment of Movement Disorders

Assessment of Parasomnias

Assessment of Psychiatric Disorders & Sleep

Artifact Recognition & Trouble-shooting

Esophageal Manometry

CO2 Monitoring

**Pathophysiology of Sleep Disordered Breathing**

Obstructive Sleep Apnea

Hypopneas, Respiratory Effort Related Arousals (RERA’s)

Obesity Hypoventilation

Central Apnea

Cheyne Stokes Respiration

Complex Sleep Apnea

**Treatment of Sleep Disordered Breathing**

PAP Habituation and Mask Fitting (PAP-NAP)

Performing CPAP, Bi-Level, & ASV Titrations

Auto PAP

Supplemental Oxygen

Dental Devices (titration and compliance)

Surgical Procedures (i.e. T&A, UPPP, Pillars, hypoglossal stimulator)

**Sleep Disorders (non-respiratory)**

Sleep Related Movement Disorders

Narcolepsy

Other Hypersomnias

Parasomnias

Insomnia

Seizures and Epilepsy

Circadian Rhythm Sleep Disorders

Comorbidities

**Other Procedures**

MSLT

MWT

Actigraphy

Home Sleep Testing

oIndications

oTypes of Systems

oAuto PAP

Durable Medical Equipment (DME) and downloads

Databases

Archiving

**Pediatric Polysomnography**

General Pediatric Considerations

Sleep Patterns: Infancy through Adolescence

Pediatric Sleep Disorders

Neuromuscular Disorders in Children

Visual Rules for Children

Respiratory Rules for Children

**Clinical Laboratory III**

Patient Interaction

Electrode/sensor application

Initiating the sleep acquisition

Therapeutic Intervention PAP Titration

Ending the sleep acquisition

CO2 monitoring

HST (Out of Center Sleep Testing)

PAP Titration/APAP

Pulse Oximetry

Oxygen Titration

Dental devices

Clinical sleep practice

**Clinical Practicum III**

Mask fitting

Expanded montages

Case review

CO2 monitoring

PAP Titration

Pulse Oximetry

Oxygen Titration

HST scoring and reporting

Dental device titration

Patient interactions

DME downloads

Compliance monitoring

Long term follow up/database

AAST Curriculum References / Reading List:

**ESSENTIAL READING:**

Mattice C, Brooks R, Lee-Chiong T, editors. *Fundamentals of Sleep Technology*, 2nd ed. Philadelphia: Lippincott Williams and Wilkins; 2012.

Berry RB, Brooks R, Gamaldo CE, Harding SM, Lloyd RM, Marcus CL and Vaughn BV for the American Academy of Sleep Medicine. *The AASM Manual for the Scoring of Sleep and Associated Events: Rules, Terminology and Technical Specifications,* Version 2.1. www.aasmnet.org. Darien, IL: American Academy of Sleep Medicine, 2014.

American Academy of Sleep Medicine.*International Classification of Sleep Disorders*, 3rd ed. Darien, IL: American Academy of Sleep Medicine; 2014.

American Association of Sleep Technologists.*A Technologist’s Guide to Performing Sleep Studies,* 2nded*.* Darien, IL: American Association of Sleep Technologists; 2014.

Epstein LJ, Kristo D, Strollo PJ, et al. Clinical guide for the evaluation, management and long-term care of obstructive sleep apnea in adults. Journal of Clinical Sleep Medicine, 2009;5(3):263- 76.

Kushida CA, Chediak A, Berry RB, et al. Clinical guidelines for the manual titration of positive airway pressure in patients with obstructive sleep apnea. Journal of Clinical Sleep Medicine, 2008;4(2):157-71.

Littner MR, Kushida C, Wise M, et al. Practice parameters for clinical use of the multiple sleep latency test and the maintenance of wakefulness test. Sleep, 2005;28(1):113-21.

Collop NA; Tracy SL; Kapur V; Mehra R; Kuhlmann D; Fleishman SA; Ojile JM.Obstructive sleep apnea devicesfor out-of-center (OOC) testing: Technology evaluation. Journal of Clinical Sleep Medicine, 2011;7(5):531-548.

**AAST Technical Guidelines**

Available at: <http://www.aastweb.org/technicalguidelines.aspx>

American Association of Sleep Technologists. Standard polysomnography. Darien, IL: American Association of Sleep Technologists; 2012.

American Association of Sleep Technologists.Summary of AASM clinical guidelines for the manual titration of positive airway pressures in patients with obstructive sleep apnea. Darien, IL: American Association of Sleep Technologists; 2012.

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American Association of Sleep Technologists. Out of center sleep testing (OCST). Darien, IL: American Association of Sleep Technologists; 2012.

**ADDITIONAL READING / REFERENCES:**

**Textbooks & Manuals:**

Brooks R, Mattice C, Lee-Chiong T, editors. *Fundamentals of Sleep Technology Workbook: A Companion to the Fundamentals of Sleep Technology, 2nd Edition.* Philadelphia: Lippincott Williams and Wilkins; 2015.

American Academy of Sleep Medicine.*A Technologist’s Handbook for Understanding and Implementing the AASM Manual for the Scoring of Sleep and Associated Events: Rules, Terminology and Technical Specifications.* Darien, IL: American Academy of Sleep Medicine; 2013.

American Association of Sleep Technologists.*Sleep Technologist’s Toolbox: A Companion to A Technologist’s Guide to Performing Sleep Studies.* Darien, IL: American Association of Sleep Technologists; 2013.

American Association of Sleep Technologists.*Artifact & Troubleshooting Guide.* Darien, IL: American Association of Sleep Technologists; 2010.

Tyner F, Knott J, Mayer W. *Fundamentals of EEG technology: Vol. 1: Basic Concepts and Methods.* New York: Raven Press; 1983.

Fisch, BJ. *Fisch&SpehlmannEEG Primer: Basic Principles of Digital and Analog EEG*, 3rd ed. Netherlands: Elsevier; 2007.

Chokroverty S.*Sleep Disorders Medicine: Basic Science, Technical Considerations, and Clinical Aspects*, 3rd ed. Philadelphia: Elsevier Saunders; 2009.

Kryger M, Roth T, Dement WC. *Principles and Practices of Sleep Medicine*, 5th ed. Philadelphia: Elsevier Saunders; 2011.

**AAST Technical Guidelines:**

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**AAST Core Competencies:**

Available at: <http://www.aastweb.org/CoreCompetencies.aspx>

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American Association of Sleep Technologists.Age specific care and evaluation. Darien, IL: American Association of Sleep Technologists; 2012.

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American Association of Sleep Technologists.CO2 monitoring. Darien, IL: American Association of Sleep Technologists; 2012.

American Association of Sleep Technologists.Monitoring pulse oximetry. Darien, IL: American Association of Sleep Technologists; 2012.

American Association of Sleep Technologists.Maintenance, cleaning and safety precautions in polysomnographic technology. Darien, IL: American Association of Sleep Technologists; 2012.

**American Academy of Sleep Medicine (AASM) Practice Parameters and Clinical Guidelines:**

Available at: <http://www.aasmnet.org/practiceguidelines.aspx>

Berry RB; Budhiraja R; Gottlieb DJ; Gozal D; Iber C; Kapur VK; Marcus CL; Mehra R; Parthasarathy S; Quan SF; Redline S; Strohl KP; Ward SLD; Tangredi MM. Rules for scoring respiratory events in sleep: Update of the 2007 AASM Manual for the Scoring of Sleep and Associated Events. Journal of Clinical Sleep Medicine,2012;8(5):597-619.

Collop NA, Anderson WM, Boehlecke B, Claman D, Goldberg R, Gottlieb DJ, Hudgel D, Sateia M, Schwab R. Portable Monitoring Task Force of the American Academy of Sleep Medicine. Clinical guidelines for the use of unattended portable monitors in the diagnosis of obstructive sleep apnea in adult patients.Journal of Clinical Sleep Medicine. 2007;15;3(7):737-47.

Morgenthaler TI, Aurora RN, Brown T, Zak R, Alessi C, Boehlecke B, Chesson AL Jr, Friedman L, Kapur V, Maganti R, Owens J, Pancer J, Swick TJ; Standards of Practice Committee of the AASM.Practice parameters for the use of autotitrating continuous positive airway pressure devices for titrating pressures and treating adult patients with obstructive sleep apnea syndrome: An update for 2007. Sleep, 2008;31(1):141-7.

Aurora N, Chowdhuri S, Ramar K, Bista S, Casey K, Lamm C, Kristo D, Mallea J, Rowley J, Zak R, Tracy S. The treatment of central sleep apnea syndromes in adults: Practice parameters with an evidence-based literature review and meta-analyses. Sleep, 2012;35(1):17-40.

Aurora, RN, Zak, R,Karippot, A,Lamm, C, Morgenthaler, TI, Auerbach, SH,Bista, SR, Casey, KR; Chowdhuri, S, Kristo, DA, Ramar, K.Practice parameters for the respiratory indications for polysomnography in children. SLEEP, 2011;34(3); 379-88.

Aurora RN, Lamm Cl, Zak RS, Kristo DA, Bista SR, Rowley JA, Casey KR. Practice parameters for the non-respiratory indications for polysomnography and multiple sleep latency testing for children. SLEEP, 2012;35(11):1467-1473.