Polysomnography Course
Session: September, 2014

General Information

Polysomnography course will be held at

SLEEP AND ALERTNESS CLINIC
Med-West Medical centre
750 Dundas St. W., Suite 2-259 (Conference Room)
Toronto ON M6J 3S3

Conducted by:
Pintu Bhuiya, MBBS, RPSGT, RST
Nada Huterer, MD (Not licensed in Canada), RPSGT

Instructors:
Dr. Colin M. Shapiro, BSc, MBBCh, PhD, MRCPsych, FRCP(C)
Inna Voloh, MD (Not licensed in Canada), RPSGT
Naheed K. Hossain, MBBS, RPSGT
Dragana Jovanovic, BSc, RPSGT
Yulia Kaushansky, BSc, RPSGT
Sharon Chung, PhD

CEC Credits: “This CEC Program Application has been submitted for approval by the Canadian Sleep Society”.

(note: Continuing Education Credits – CEC was approved for all the previously conducted program)

Course Time: A total of 17 session course, each session in duration of 2 hours. The sessions are conducted at 10 a.m. on Fridays and 9:00 a.m. on Saturdays (except holidays).

The schedule date/time is subject to change based on other educational activities, seminars, APSS, CSS meetings or holidays.
There are two sections of the course. The technical component and PSG scoring. Some candidates may be interested in only one of these components. We are happy to accommodate their interest and will reduce payment accordingly.

**COURSE OUTLINE**

1. **An Introduction to Sleep and Sleep Disorders**  
   **Instructor: Sharon Chung**  
   **Session Date: 26th Sept, 2014 from 10 a.m. to 12:30 p.m.**

   A. Principals of polysomnography: history and technical advances

   This session will review the history of polysomnography, provide a summary of the regulation and function of sleep.

   a. History of polysomnography: an account of the rationale behind the development of the recording montage and a brief description of the history of the development of polysomnography technology.

   b. Regulation of sleep: a description of normal sleep and sleep architecture across the lifespan, an overview of sleep-wake regulation and a summary of the function of sleep.

   B. Brief overview of common primary sleep/wake disorders.

   Overview of the most commonly encountered primary sleep/wake disorders incorporating: insomnia, hypersomnia, narcolepsy, sleep breathing disorders, periodic limb movements in sleep/restless legs syndrome, parasomnia, circadian rhythm disorders.

2. **Sleep Centre Organization and Standards in Ontario (including pediatric sleep study)**  
   **Instructor: Dragana Jovanovic**  
   **Session Date: 27th Sept 2014 from 9:00 a.m. to 11:00 a.m.**

   a. Role of CPSO, AASM, BRPT, AAST

   b. CPSO Guidelines for the sleep clinics (including workflow) and prerequisites for the position of sleep technologist.

3. **Principles of Polysomnography Recording**
In this session participants will be explained the following topics

a. EEG, EOG, EMG, ECG recordings (bioelectrical potentials, principle of non-invasive electrodes)
b. Signal pathway, use of filters, equipment calibration, impedances (good and bad signal)
c. Sensors for monitoring breathing and non-invasive measurement of oxygen saturation

4. **Conducting Overnight Sleep Study**  
**Instructor: Pintu Bhuiya**  
**Session Date: 04th Oct, 2014 from 9:00 a.m. to 11:00 a.m.**

The participants will be explained in detail the role of the technologist and the step by step procurers during overnight sleep study as follows.

a. admitting patients and orientation  
b. pre-sleep and post-sleep questionnaires  
c. set-up procedure (preparation and the use of 10-20 system)  
d. checking of equipment calibration and physiological calibration  
e. lights off/lights on procedure  
f. sleep log and interventions during the night  
g. summary of the study

5. **Safety Considerations**  
**Instructor: Naheed Hossain**  
**Session Date: 10th Oct, 2014 from 10:00 a.m. to 12:00 p.m.**

All following topics will be incorporated and explained in this session:

a. ethical and confidentiality issues  
b. safety and security of the environment  
c. infection control  
d. WHIMS/MSDS  
e. fire safety procedure  
f. medical emergencies

6. **Special Montages: PAP Montage/Dental**
Appliance/Supplemental Oxygen/Extended EEG
Instructor: Pintu Bhuiya
Session Date: 17th Oct, 2014 from 10:00 a.m. to 12:00 p.m.

Candidates will be demonstrated

a. about the principles and verities of CPAP/BiPAP/Auto-PAP/VPAP machines and their operation techniques
b. different interfaces and their properties
c. CPAP/BiPAP titration protocols
d. dental appliances (adjustable/non-adjustable), fitting procedures, mechanism of function, titration
e. the use of supplemental oxygen (protocols), operation of oxygen canister/Jar/concentrator
f. extended EEG recording (parasomnias/seizure disorders etc)

7. Sleep Staging Concepts
Instructor: Pintu Bhuiya
Session Date: 18th Oct 2014 from 09:00 a.m. to 11:00 a.m.

A comprehensive introduction of normal sleep architecture will be followed by a presentation of the characteristics of the various sleep stages. The participants will learn how brain (EEG), eye movement (EOG), and mental/sub-mental muscle (EMG) signals are used to define Non-REM and REM sleep. Individual epoch examples will illustrate how these variables, viewed collectively, provide diagnostic information regarding normal and/or abnormal sleep. The new AASM scoring guidelines will be discussed in depth.

8. Arousals and Artifacts
Instructor: Pintu Bhuiya
Session Date: 24th Oct, 2014 from 10:00 a.m. to 12:00 p.m.

Arousal will be defined and illustrated helping in understanding how to identify these disturbances of sleep.

Artifact Recognition: Participants will learn how to recognize various artifacts encountered on the polysomnogram. Examples will be presented familiarizing with the specific characteristics of each type.

9. Scoring of Respiratory Events
Instructor: Nada Huterer
Session Date: 25th Oct, 2014 from 10 a.m. to 12:00 p.m.
Candidates will be explained detection of respiratory events.

Definition and classification of apneas (obstructive, central, mixed) and definition(s) of hypopneas.

Previous and current AASM/CPSO standards for scoring of apneas and hypopneas.

Rules for scoring Respiratory Effort Related Arousals (RERAs).

Rules for scoring hypoventilation.

Cheyne-Stokes breathing pattern.

10. **Interpretation of ECG; NPT**

   **Instructor: Nada Huterer**
   **Session Date: 31st Oct, 2014 from 10 a.m. to 12 p.m.**

Optimal placement of electrodes for recording of one lead ECG.

Interpretation of one lead ECG with respect to normal heart rhythm and arrhythmias. Definition of bradycardia and tachycardia in sleep. Recognition of different types of cardiac arrhythmias is rehearsed and severity of arrhythmias is discussed.

Nocturnal Penile Tumescence using the ‘Rigiscan’

11. **A. Interface between sleep studies and clinical practice**

   **Instructor: Dr. Colin M. Shapiro,**
   **Session Date: 01st Nov, 2014 from 09 a.m. to 10:00 a.m.**

   **B. Parasomnias and Nocturnal Seizures**
   **Instructor: Nada Huterer**
   **Session Date: 01st Nov, 2014 from 10 a.m. to 12:00 p.m.**

Classification and characteristics of NREM and REM parasomnias.

Characteristics of nocturnal seizures including associated EEG changes. Examples will be shown and a simple test of proficiency will be conducted.

12. **Sleep Related Movements Disorders (SRMD)**

   **Instructor: Inna Voloh**
SRMD include Restless Legs Syndrome (RLS), Periodic Limb Movements in Sleep (PLMS), Sleep Related Bruxism, Sleep Related Rhythmic Movement Disorder (body rocking, head banging head rolling, others), Excessive Fragmentary Myoclonus (EFM), Hypnagogic Foot tremor (HFT) and Alternating Leg Muscle Activation (ALMA). Participants will learn definitions and scoring rules for all aforementioned conditions.

13. **Daytime Tests: Multiple Sleep Latency test (MSLT) & Maintenance of Wakefulness Test (MWT)**  
   **Instructor: Yulia Kaushansky**  
   **Session Date: 08th Nov, 2014 from 09 a.m. to 11:00 a.m.**

Measuring of Excessive daytime sleepiness (EDS); History of development of the MSLT and MWT; Clinical and Research protocols; AASM recommendation for MSLT and MWT protocols; Actual scoring of MSLT and MWT (examples of PSG recording, calculations of sleep onset, session termination time and results); Discussion on factors that can affect MSLT and MWT results (i.e. sleep deprivation, medications, etc).

   **Actigraphy**  
   **Instructor: Sharon Chung**  
   **Session Date: 08th Nov, 2014 from 09:00 a.m. to 11 a.m.**

Actigraph principals, indications for use and interpretation of data

14. **Dim Light Melatonin Onset (DLMO); Driving simulator; Scoring of REM density**  
   **Instructor: Naheed Hossain**  
   **Session Date: 14th Nov 2014 from 10:00 a.m. to 12:00 p.m.**

Melatonin as a biological marker of circadian rhythm is discussed. The relevance of melatonin assessment in the sleep clinic is elucidated. The procedure for DLMO in full is reviewed.

Driving Simulator: Driving simulator as a tool for measurement of alertness is discussed and demonstrated with other performance devices.

Scoring of REM density: Significance of REM sleep and REM density in depressed patients is discussed
15. **Specifics of Pediatric Scoring**  
**Instructor: Dragana Jovanovic**  
**Session Date: 15th Nov, 2014 from 9:00 a.m. to 11:00 a.m.**

Characteristics of sleep pattern in children: general considerations; Specifics of sleep architecture from infancy through adolescence; Developmental changes in sleep-wake patterns in children and adolescence; Review of scoring rules and normative values.

16. **Hands on Scoring of PSG Record Supervised by Instructors:**  
**Pintu Bhuiya, Nada Huterer and Inna Voloh**  
**Session Date: 21st Nov, 2014 from 10:00 a.m. to 12:00 p.m.**

This is practical session during which each participant is given a task to score a real raw PSG data. This is considered to be a continuation of a learning process and application of a theoretical knowledge the candidates gained during the course.

Candidates are asked to:
- Recognize the technical quality of signals
- Recognize sleep stages
- Recognize arousals, respiratory events and movements in sleep
- Interpret ECG trace, normal or abnormal rhythms
- Recognize possible parasomnia events
- Recognize EEG abnormalities if present

During this session instructors: Nada Huterer, Pintu Bhuiya and Inna Voloh will be available to assist candidates in use of PSG software, and analysis and marking data.

17. **Review of the Scored Data with Instructors:**  
**Pintu Bhuiya, Nada Huterer and Inna Voloh**  
**Session Date: 28th Nov, 2014 from 10:00 a.m. to 12:00 9.m.**

The same instructors will review with candidates all records scored, epoch by epoch, and discuss the accuracy of scoring. Correct and incorrect scoring will be clarified and explained.