# STUDENT HANDBOOK

## TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page #</th>
</tr>
</thead>
<tbody>
<tr>
<td>History</td>
<td>3</td>
</tr>
<tr>
<td>Philosophy</td>
<td>4</td>
</tr>
<tr>
<td>Course Overview</td>
<td>5-10</td>
</tr>
<tr>
<td>General Testing Policies</td>
<td>11-13</td>
</tr>
<tr>
<td>Objectives</td>
<td>14-16</td>
</tr>
<tr>
<td>Faculty</td>
<td>17-25</td>
</tr>
<tr>
<td>Student Responsibilities</td>
<td>26-27</td>
</tr>
<tr>
<td>Conference Location</td>
<td>27</td>
</tr>
<tr>
<td>Student Administrative Policies</td>
<td>28-33</td>
</tr>
</tbody>
</table>

## Appendices

- **Appendix A**: Practical Exam Grading Sheet .......................... 35
- **Appendix B**: Month 1 Syllabus ........................................ 36-37
- **Appendix C**: Month 2 Syllabus ....................................... 38-39
- **Appendix D**: Month 3 Syllabus ....................................... 40-41
- **Appendix E**: Case Study Grading Rubric .......................... 42
- **Appendix F**: Technician Registry ................................. 43
HISTORY

The Nerve Conduction Technician Certification Program was developed about 15 years ago when the founders of this course (Dr. Kellogg and Dr. Nelson) identified a need to standardize the process of education for this specialty area. The course was conceptualized many times during a 15-year period (1987), before the original 4-month session, but it was not until 1998 that the concepts of didactic and practical aspects needed to practice in this specialty area were formalized. Guided by the principles of ethical treatment of all patients subject to clinical electrophysiologic tests, we formulated a course of study that emphasized the human dimension. The course content emphasized and presented in depth: musculoskeletal anatomy, neuroanatomy, neurophysiology, neuropathology, biomedical instrumentation, neuronal conduction techniques (motor and sensory studies), late responses, administration, and other related areas. Additionally, the measurement of proficiency was attained by practical examinations. The didactic knowledge was examined by the use of written examinations. The founders of this program wanted to also surround themselves with other clinical experts who regularly practiced this specialty. The faculty has significant clinical EMG experience, which collectively amount to over 234 years. The use of an evidence-based approach to patient care ensures that the practitioner who takes this course is performing as a true reflective practitioner. Dr. Kellogg and Dr. Nelson are proud of the success of this certificate program. The continued success of this course is primarily attributed to the dedicated faculty that teaches this course.

In 2013, the American Academy of Clinical Electrodiagnosis (AACE) launched the first web-based “on-demand” NCV course. This hybrid-learning platform provides flexibility yet ensures an excellent learning opportunity for students to gain the skills necessary to become practicing technicians. Faculty leading this effort includes Dr. Ernst, Dr. Lescallette, Dr. Nelson, and Mr. Lugo. We anticipate that our new format will enable increased numbers of participants to take our award-winning course.
**PHILOSOPHY STATEMENT**

This educational program fosters clinical and professional excellence in clinical electrophysiology and lifelong pursuit of continued professional development. The program is grounded firmly in a patient-centered approach to care and the ethical practice of this specialty. It is heavily evidence-based in philosophy and the technicians are encouraged to use the evidence to guide their practice throughout this curriculum and in the years following completion of the course (i.e. continued learning).

Members of the faculty embrace the learning process as active participants and are exemplary professional role models. The faculty focuses on enabling the learner to synthesize information and develop problem-solving skills. While recognizing individual differences among technicians in both rate and ability to learn, the faculty adjusts teaching strategies to meet the needs of each technician, whether in the classroom, practical exercises, through online discussions, or tutorial sessions.

Education is an active, continuous, cooperative process between the teacher and learner and must meet both the needs of the learner and the objectives of the teacher. Learning is a developmental process in which the learner is responsible for the acquisition and synthesis of knowledge. To facilitate the learning process, the faculty must guide the development of the technician in a positive and non-threatening manner. Assessments are made in the form of written exams, practical exams, and virtual-classroom problem solving activities within the discussion pages of the e-learning classroom platform, Canvas®. The faculty ensures that the learning process is logical and the material presented is well sequenced, evidence-based, and can be assimilated within a reasonable amount of time. The faculty makes every effort to help each technician succeed. **It is the technician’s responsibility to commit themselves to detailed study and regular hands-on practice to become proficient in this highly specialized field.**
Nerve Conduction Technician Certification Program Overview

Become a Certified Nerve Conduction Technician in 5-days

Day 1 and 2:

In this hybrid learning course, we use both an ‘at-home’ component and an ‘in-class’ component as our educational vehicle. The ‘at-home’ material provides the theoretical basis for the performance of nerve conduction studies including, but not limited to physiology, biomedical instrumentation and specific anatomy/physiology. You study when you want and how much you want.

Day 1 and Day 2 provide the ‘on-site’ educational experience related to the performance of basic upper extremity nerve conduction studies. We use expert faculty to guide you through a series of ‘hands-on’ laboratory experiences.

Day 3 and 4:

The hybrid learning system continues with a 3-week period of home study using the ‘on-line’ lecture material. This ‘on-line’ material covers the advanced upper and lower extremity nerve conduction techniques.

Day 3 and day 4 uses the ‘on-site’ educational material from day 1 & 2 and builds upon the foundation of day 1 & 2 as a platform to complete the advanced laboratory activities. The material in day 3 & 4 provides opportunities to continue to learn and practice both basic lower extremity nerve conduction studies and advanced upper extremity nerve conduction studies

Day 5:

Using a 3-week time period to review the lecture material and laboratory, the student shall have completed four NCV studies at the technicians’ home clinic prior to day 5. During this day the nerve conduction the expert laboratory faculty reviews (using an established rubric (see appendix E). The on-site one-day meeting allows faculty to review graded case studies one-on-one with the student. Additionally, several on-site lectures related to advanced topics in neuronal conduction are presented. During this one-day on-site session the student must pass a written (>70%) and practical examination (>70%) on all topics covered in Days 1,2,3,& 4.

After fulfilling all of the requirements above, a student will earn a "Certificate of Proficiency in Nerve Conduction Studies". After earning the certificate, a technician is qualified to join the AACE Technician Registry and have their name and certification number listed on the AACE Registry website.
Process to complete NCV technician course

At home study

Registration complete and start date 14-days prior to first on-site weekend.

Lectures – on-line
- Orientation
- The Body Electric
- Clinical Application of NCS
- Medical Terminology
- Physiology of Excitable Cells
- Median Nerve Anatomy
- Ulnar Nerve Anatomy
- Radial Nerve Anatomy

Day 1 and 2 – on-site

Lectures
- Biomedical Instrumentation
- Theory of Motor NCS
- Theory of Sensory NCS
- Median NCS
- Ulnar NCS
- Radial NCS
- F-waves

Laboratory (hands-on) –
- Faculty demonstration of nerves covered in day 1 & 2
- Student practice (guided by expert laboratory faculty) of nerves covered in day 1 & 2

Examinations:
- Written examination on both the ‘at home’ and ‘on-site’ lectures
- Practice practical examination

After day 1 & 2

At home study

On-line Lectures
- Tibial & Sural Nerve Anatomy
- Fibular Nerve Anatomy
- Femoral Nerve Anatomy
- Shoulder Girdle Nerve Anatomy
- Martin-Gruber Anastamosis
Day 3 & 4 –on-site

Lectures
• Trouble Shooting in NCS
• Tibial & Sural NCS
• Fibular NCS
• H-reflex
• Femoral NCS
• Shoulder Girdle NCS

Laboratory (hands-on)
• Faculty demonstration of nerves covered in day 1 & 2
• Student practice (guided by expert laboratory faculty) of nerves covered in day 1 & 2

During 3–weeks time period from the end of day 4 and within 14 calendar days of the end of day 4, the student submits (electronically) four case studies.

After day 2 & 4

On-site

Lectures (1/2 day)
• HIPPA
• NCS responses in injured nerves
• Statistics
• Evoked Potentials

Laboratory (hands-on) –
• Faculty review of case studies

Examinations:
• Comprehensive written examination on all lecture material (‘at home’ and ‘on-site’).
• Final practical examination
**Timeline of Courses** – There are four starting times each calendar year.

<table>
<thead>
<tr>
<th>Semester Name</th>
<th>Days 1 &amp; 2</th>
<th>Days 3 &amp; 4</th>
<th>Day 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall Semester</td>
<td>September 2014</td>
<td>October 2014</td>
<td>November 2014</td>
</tr>
<tr>
<td>Winter Semester</td>
<td>December 2014</td>
<td>January 2015</td>
<td>February 2015</td>
</tr>
<tr>
<td>Spring Semester</td>
<td>March 2015</td>
<td>April 2015</td>
<td>May 2015</td>
</tr>
<tr>
<td>Summer Semester</td>
<td>June 2015</td>
<td>July 2015</td>
<td>August 2015</td>
</tr>
</tbody>
</table>

To be able to attend the ‘on-site’ lecture/laboratory of the first month, the student must register 14-calendary days prior to the first weekend course work.

**Hourly Breakdown of Coursework for Each Stage:**

<table>
<thead>
<tr>
<th>Days</th>
<th>Neurophysiology</th>
<th>Neuroscience</th>
<th>Anatomy</th>
<th>Electrophysiologic Testing</th>
<th>Exams</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Online In-Class</td>
<td>Online In-Class</td>
<td>Online In-Class</td>
<td>Exams</td>
<td>Total</td>
<td></td>
</tr>
<tr>
<td>1  &amp; 2</td>
<td>1.2</td>
<td>1.1</td>
<td>.25</td>
<td>16</td>
<td></td>
<td>18.55</td>
</tr>
<tr>
<td>3  &amp; 4</td>
<td>1.1</td>
<td>1.1</td>
<td>12</td>
<td>4</td>
<td>17.1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>1.5</td>
<td>5.5*</td>
<td>4</td>
<td>11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Hours</td>
<td>1.2</td>
<td>1.5</td>
<td>2.2</td>
<td>.25</td>
<td>33.5</td>
<td>8</td>
</tr>
</tbody>
</table>

* – Includes performance of 4 complete nerve conduction studies at home clinic.
Textbooks:

a. Required


b. Recommended


Details of Days 1 & 2

Entry into Stage One is offered four times per year, see AACE website for available dates.

- Enrollment for each starting date is set at a minimum of 14 days prior to the first weekend to allow for the student to cover all at-home lectures and readings.
- After registration and payment (through the AACE website), the student is issued access credentials that allow the individual entry to the ‘E-learning platform’ called Canvas®. This educational platform is the portal to which students will have access to all AACE lectures, assigned readings, and online discussions. The lectures are the student’s to use exclusively online or to download to paper according to individual preference. To maximize the learning experience, the student MUST review lectures prior to the first required lab weekend (Days 1 & 2). The complete syllabus with objectives and other information is in Appendix B.
- A quiz will be administered at the start of the Saturday session *Day 1). The quiz will consist of multiple-choice questions on the material presented in the on-line lectures. A passing score is greater than 70% correct answers.
- It is highly recommended that the student download the PDF versions of the lectures that will be presented on-site (Days 1 & 2) and bring the handouts to class in either a paper or electronic format to take additional notes. Students will be allowed to use laptops or tablets during on-site lectures.

Requirement Specifics – One weekend

All students are required to attend Days 1 AND 2 (both days) to proceed to Days 3 & 4. The two-day weekend consists of the performance of basic upper extremity nerve conduction studies (see syllabus). AACE expert laboratory faculty will be on-site throughout each laboratory day to assist and guide the student as they develop and sharpen their hands-on skills. NCV/EMG machines and appropriate electrodes are available for students to use and practice learned nerve conduction testing.

See Day 1 & 2 Syllabus - Appendix B

Details of Day 3 & 4

Entry into Days 3 & 4 class requires completion of Days 1 & 2.

- A class schedule for days 3 & 4 (appendix C) contains all assigned lectures and readings. The at-home portion of the lectures must be reviewed prior to the required lab weekend for
the student to maximize the learning experience. The complete syllabus with objectives and other information is in Appendix C.

- A quiz is administered at the start of the Saturday session (Day 3). The quiz consists of multiple-choice questions on the material presented in the on-line lectures.
- It is highly recommended that the student download the PDF versions of the lectures that will be presented on-site (Days 3 & 4) and bring the handouts to class in either a paper or electronic format to take additional notes. Students will be allowed to use laptops or tablets during on-site lectures.

Requirement Specifics – Month Two
All students will be required to attend a 2-day weekend session (both days) AND pass a written and practical exam on the material covered in Month One to progress to Month Three.

Days 3 & 4 consists of the instruction and practice of basic lower extremity and advanced nerve conduction studies. AACE expert laboratory faculty is present throughout the laboratory day to assist and guide the student to develop and sharpen ‘hands-on’ skills of administering a nerve conduction study. NCV/EMG machines are available for students to use to practice learned nerve conduction tests.

See Month Two Syllabus - Appendix C

Details of Month Three

Entry into Day 5 class requires completion of Days 1, 2, 3 & 4
- This day introduces advanced topics in clinical electrophysiology.
- Prior to attending the final Day 5 of the course, the student must transmit 4 de-identified NCV studies (two upper extremity studies and two lower extremity studies). These studies may be completed on unimpaired individuals (not patients) or on patients. These studies will be sent via email to an AACE faculty member for review. Each study will be graded using the case study rubric included in Appendix E.
- During day 5 the student will take a comprehensive final examination (written) and a final practical examination. Both examinations must be passed at the greater than 70% grade.
- It is highly recommended that the student download the PDF versions of the lectures that will be presented on-site (Days 1 & 2) and bring the handouts to class in either a paper or electronic format to take additional notes. Students will be allowed to use laptops or tablets during on-site lectures.

To earn a ‘Certificate of Proficiency’ the student must:

1. Attend all 5 days of the course on-site.
2. Pass all written examinations at a greater than 70% level
3. Pass all practical examinations at a greater than 70% level.
4. Pass the four NCS studies at a greater than 70% level.

See Day 5 Syllabus - Appendix D
After fulfilling all of the requirements above, a student will earn a "Certificate of Proficiency in Nerve Conduction Studies". After earning the certificate, a technician is qualified to join the AACE Technician Registry and have their name and certification number listed on the AACE Registry Website. See Appendix F for application process.

**GENERAL TESTING PROCEDURES**

**First Written Exam**
The first written examination will cover the material from month 1, including on-line and on-site lectures. The first written exam can be taken as up to 3 times as needed until a passing grade is achieved. Any written test score below 70% is considered a failure and needs to be re-taken. The student is awarded three opportunities to take and pass the first written exam.

There is a minimum of one month between written test retakes to go back and review the lectures.

If the student fails the first written examination the third time, three members of the current faculty will review the student’s results. Three faculty members must agree that a fourth examination is possible. Three faculty members will define for the student the weakness areas and suggest an option to arrange for extensive remediation sessions at the clinician’s expense (this remediation may or may not be with the current AACE faculty). All three-faculty members must independently agree that a fourth re-take examination is possible. At the end of this remediation session, the clinician may re-take the first written exam once again for the fee of $100.00.

**Second Written Exam**
The second written examination will cover the material from month 2, including on-line and on-site lectures. The second written exam can be taken as up to 3 times as needed until a passing grade is achieved. Any written test score below 70% is considered a failure and needs to be re-taken. The student is awarded three opportunities to take and pass the second written exam.

There is a minimum of one month between written test retakes to go back and review the lectures.

If the student fails the second written examination the third time, three members of the current faculty will review the student’s results. Three faculty members must agree that a fourth examination is possible. Three faculty members will define for the student the weakness areas and suggest an option to arrange for extensive remediation sessions at the clinician’s expense (this remediation may or may not be with the current AACE faculty). All three-faculty members must independently agree that a fourth re-take examination is possible. At the end of this remediation session, the clinician may re-take the second written exam once again for the fee of $100.00.
First Practical Examination
The first practical examination is a test in which the student will perform learned nerve conduction tests on a fellow student or volunteer. AACE expert laboratory faculty will be at the site and NCV/EMG machines will be available for each student. The first practical examination will cover all learned nerve conduction studies techniques from month 1. For nerve conduction studies, this includes: correct electrode and machine set-up, correct measurements, correct performance of stimulation, correct notation of latency, amplitude, and nerve conduction velocity. See Appendix A to review the grading rubric.

The student must receive a cumulative average score of 70% on the first practical exam. A student may fail the practical exam in two manners:
1. By making many small mistakes and not achieving 70% of the available points.
2. By committing a "fatal flaw."
   a. A fatal flaw is an error that will lead the referring clinician to a wrong diagnosis.
   b. A fatal flaw may also occur if the subject's safety is at risk.
   c. A fatal flaw may also occur if the student is not able to obtain a response that an AACE instructor is able to obtain on the same subject during the same exam session.
   d. A fatal flaw is scored as a “Zero” for the practical exam.

All portions (motor NCS, sensory NCS, late responses) of the first practical examination must be passed (70% or greater) to receive a passing score.

The first practical exam can be taken as up to 3 times as needed until a passing grade is achieved. The student is awarded three opportunities to take and pass the first practical examination.

There is a minimum of one month between practical test retakes to go back and review the nerve conduction techniques.

If the student fails the first practical the three times, three members of the current faculty will review the student’s results. All three faculty members must agree that a fourth examination attempt is possible. The three faculty members will define for the student the weakness areas and suggest an option to arrange for extensive remediation sessions at the clinician’s expense (this remediation may or may not be with the current AACE faculty). All three-faculty members must independently agree that a fourth examination attempt is possible. At the end of this remediation session, the student may re-take the first practical exam once again for the fee of $200.00.

Second Practical Examination
The second practical examination is a test in which the student will perform learned nerve conduction tests on a fellow student or volunteer. AACE expert laboratory faculty will be at the site and NCV/EMG machines will be available for each student. The second practical examination will cover all learned nerve conduction studies techniques from month 2. For nerve conduction studies, this includes: correct electrode and machine set-up, correct measurements, correct performance of
stimulation, correct notation of latency, amplitude, and nerve conduction velocity. See Appendix A to review the grading rubric.

The student must receive a cumulative average score of 70% on the second practical exam. A student may fail the practical exam in two manners:

1. By making many small mistakes and not achieving 70% of the available points.
2. By committing a "fatal flaw."
   e. A fatal flaw is an error that will lead the referring clinician to a wrong diagnosis.
   f. A fatal flaw may also occur if the subject's safety is at risk.
   g. A fatal flaw may also occur if the student is not able to obtain a response that an AACE instructor is able to obtain on the same subject during the same exam session.
   h. A fatal flaw is scored as a “Zero” for the practical exam.

All portions (motor NCS, sensory NCS, late responses) of the second practical examination must be passed (70% or greater) to receive a passing score.

The second practical exam can be taken as up to 3 times as needed until a passing grade is achieved. The student is awarded three opportunities to take and pass the second practical examination.

If the student fails the second practical the three times, three members of the current faculty will review the student’s results. All three-faculty members must agree that a fourth examination attempt is possible. The three faculty members will define for the student the weakness areas and suggest an option to arrange for extensive remediation sessions at the clinician’s expense (this remediation may or may not be with the current AACE faculty). All three-faculty members must independently agree that a fourth examination attempt is possible. At the end of this remediation session, the student may re-take the second practical exam once again for the fee of $200.00.

Case Study Submissions
Students must submit four case studies as part of day 5. Each case will be reviewed by an AACE faculty member and graded for competency using the rubric included in Appendix E. For each case that does not achieve a satisfactory grade of 70%, a student will be able to submit another case for review. A maximum of four re-submissions is permitted. A student may submit additional cases for review beyond the 8 total case submissions for an additional fee of $25 per case until four cases achieve a passing score of 70%.

A letter of attendance is available for those students who did not pass all of the written and practical examinations.
OBJECTIVES

Terminal Learning Objectives
The overall objective of the program is to produce competent, ethical technicians for the practice of clinical electrophysiology. The course is designed to meet this objective through a sequenced approach. To successfully complete this course of instruction, the technician must meet didactic standards and demonstrate clinical competencies commensurate with established criteria. Technicians are expected to meet the following terminal objectives in the basic cognitive, affective, and psychomotor domains.

Cognitive Domain
The technician must possess the cognitive abilities necessary to integrate information from the basic sciences in order to perform and problem-solve effectively during a nerve conduction study. In order to achieve entry-level proficiency, technicians must progress from the basic skills of memorization, comprehension, and application to the advanced skills of analysis, synthesis, and evaluation.

Psychomotor Domain
The technician must possess the psychomotor abilities, including gross motor and fine motor skills, to perform the nerve conduction study in a reasonable amount of time.

Affective Domain
It is expected that all technicians will be committed to learning and will behave in a professional manner throughout the course. The technician must understand and model the characteristics defined by the 10 Professional Abilities (see Affective Domain below).
Terminal Learning Objectives  
Cognitive and Psychomotor Domain

Below are the terminal objectives the faculty set for the program. For each part of the course, the objectives enabling the technician to meet the terminal objectives will be listed to guide the technician in reaching these terminal objectives.

1. Demonstrates a patient-centered and ethical approach in conducting the NCS examination.
2. Explain the electrophysiologic basis for electrical NCS testing.
3. Identify the applications and limitations for NCS testing.
4. Demonstrate knowledge and application of instrumentation used for monitoring, recording, and measuring electrophysiologic properties of nerve and muscle.
5. Identify safety considerations in the practice of clinical electrophysiology to include: precautions and contraindications, electrical safety, and infection control procedures.
6. Given unexpected or unusual findings, demonstrate the ability to trouble shoot, explain sources of error, and differentiate technical errors from pathology.
7. Recognize normal and abnormal potentials.

Final Outcome Objective: Given patients with a neurological or neuromuscular condition, organize and perform the NCS exam in an ethical, safe, efficient, and accurate manner.

*NCS (Nerve conduction study): the assessment of the peripheral nervous system’s ability to conduct an electrical impulse, measuring the speed of impulse propagation and the ensuing evoked response’s magnitude, to make inferences about the peripheral nervous system’s health. From : Dumitru D, et al. Electrodiagnostic Medicine, Philadelphia, 2002.

“Electromyography does not give a clinical diagnosis of the patient’s illness. There are no waveforms which are pathognomonic of specific disease entities. Electromyography aids in diagnosis, so far as the evidence of abnormality of the motor unit, which it provides, is or is not compatible with the clinical diagnosis under consideration. The electromyographic results must be integrated with the results of other tests.” (Clinical Examinations in Neurology, Mayo Clinic and Mayo Foundation, 4th edition, WB Saunders Co, 1976 pp 299).
Terminal Learning Objectives

Affective Domain

These ten professional abilities are expectations of our technicians. These abilities are taught in the curriculum both explicitly (course work) and implicitly (ex. modeled by your faculty). The technician’s performance in the below professional abilities will be assessed throughout the course as well as during the final laboratory practical.

1. Commitment to Learning:
   The ability to self-assess, self-correct, and self-direct to identify needs and sources of Learning, and to continually seek new knowledge and understanding.

2. Interpersonal Skills (History):
   The ability to interact effectively with patients, families, colleagues, other health care professionals, and the community to deal effectively with cultural and ethnic diversity issues.

3. Communication Skills:
   The ability to communicate effectively (i.e. speaking, body language, reading, writing, listening) for varied audiences and purposes.

4. Effective Use of Time (Performs Efficiently):
   The ability to obtain the maximum benefit from a minimum investment in time and resources.

5. Use of constructive feedback:
   Takes responsibility for performance. Effectively identify information sources, seek out feedback, and to effectively use and provide feedback for improving skills and personal interaction.

6. Problem Solving:
   The ability to recognize and define problems, analyzes data, develop and implement solutions, and evaluate outcomes.

7. Professionalism:
   The ability to exhibit appropriate professional conduct and to represent the profession effectively.

8. Responsibility:
   The ability to fulfill commitments and to be accountable for actions and outcomes.

9. Critical Thinking: (Critical Thinking)
   The ability to question logically; to identify, generate, and evaluate elements of logical argument; to recognize and differentiate facts, illusions, assumptions, and hidden assumptions; and to distinguish the relevant from the irrelevant.

10. Stress Management:
    The ability to identify sources of stress and to develop effective coping behaviors.
CORE FACULTY BIOGRAPHIES

(Alphabetic order)

Greg Ernst, PT, PhD, ECS, SCS
Dean of Programs
Director of Residency Programs

Education
• Masters in Physical Therapy, US Army-Baylor University Graduate Program in Physical Therapy, 1984
• PhD in Education/Sports Medicine, University of Virginia

Professional Experience
• Current faculty member at the University of Texas Health Center, San Antonio
• Has performed electrophysiologic tests since 1988
• Various positions in Army and Navy Physical Therapy clinics throughout the United States and Japan
• Associate professor at the Army-Baylor University Graduate Program in Physical Therapy, 1997-2001
• Associate professor at the US Army-Brooke Army Medical Center Orthopedic Clinical Residency Program, 1997-2001
• Retired Captain in the US Navy and head of physical therapy and its electrophysiologic testing lab at Naval Medical Center Portsmouth, Virginia

Professional Memberships, Awards and Publications
• Member of the APTA Specialization Academy of Content Experts, a Reviewer for Physical Therapy
• Author of several manuscripts and book chapters on various topics in orthopedic and electrophysiologic physical therapy

David Hutchinson, PT, MS, ScD
Senior Faculty

Education
• Bachelors in Physical Therapy, Temple University, 1989
• Masters specializing in Orthopedic Physical Therapy, Hahnemann University, 1998
• Doctorate of Science Degree in Clinical Electrophysiology at Rocky Mountain University of Health Professions, Provo, UT

Professional Experience
• Director Motion Analysis Department and Intraoperative Monitoring Program at Shriners’ Hospital for Children, Present
• Electromyographer, Philadelphia Hand Center, Present
Professional Memberships, Awards and Publications

- Published in the Journal of Spinal Cord Medicine,
- Presented nationally
- Awarded grant funding in the area of Brachial Plexus Birth Palsy

Robert M Kellogg, PT, PhD, ECS
Senior Faculty

Education

- Bachelors in Physical Therapy, Mayo Clinic, 1980
- Masters with an emphasis in Biomechanics, University of Kentucky
- PhD in Exercise and Sports Sciences, University of Florida, 1996
- Board Certified in Clinical Electroneuromyography (ECS)

Professional Experience

- Active duty with the United States Navy since 1980
- 20+ years’ experience in the clinical practice of EMG
- Taught numerous EMG courses throughout the country
- Past academic and clinical director of the year-long ‘Certificate in Electrophysiologic Evaluation’ course for the over four years
- Retired after 30 years of exemplary service in the US Navy

Michael C Lescallette, MSPT, ECS, DPT, RNCST#630
Senior Faculty and Manager of Residency Programs

Education

- Masters in Physical Therapy, Widener University, 2001
- Completed didactic and practical examinations through AAET, Registered Nerve Conduction Study Technician, 2005
- Electrophysiological Certified Specialist (ECS), sponsored by the American Board of Physical Therapy Specialties, 2008
- Doctorate in Physical Therapy, Temple University

Professional Experience

- Performs electrophysiological evaluations for the PinnacleHealth System in Central Pennsylvania as well as several independent surgical groups in the area
- Adjunct faculty member for Lebanon Valley College Physical Therapy School providing lecture and laboratory expertise for FCE’s and electrophysiologic testing stages
Professional Memberships, Awards and Publications

- American Physical Therapy Association (APTA)
- Section of Clinical Electrophysiology (APTA)
- Co-authored Master’s Thesis published in JOSPT, 2001
- Member Golden Key International Honor Society 2010
- Awarded the Robert E. Kellogg distinguished lecture certificate on the topic of Conduction Block Data Analysis

John Lugo, PT, ECS, MS
Senior Faculty and Director of Technician Programs

Education

- Masters in Physical Therapy, College of Staten Island, 2003
- Electrophysiological Certified Specialist (ECS), sponsored by the American Board of Physical Therapy Specialties, 2010
- PhD student at Rutgers University School of Health Related Professions, enrolled 2013

Professional Experience

- Director of Rehabilitation at Eger Health Care & Rehabilitation Center 2008-2012
- Director of Physical Therapy at Northeast Spine & Wellness Center 2006-2008
- Staff Physical Therapist at Staten Island University Hospital 2003-2006
- Performs EMG/NCS studies in various locations in the NY metropolitan area
- Adjunct Instructor at College of Staten Island Physical Therapy Program 2008-present, Teaching assistant at Rutgers University School of Health Related Professions 2013-present

Professional Memberships, Awards and Publications

- Co-author of two peer-reviewed publications in the field of nerve conduction studies
- American Physical Therapy Association (APTA), Education Section
- American Physical Therapy Association (APTA), Health Policy & Administration Section
- American Physical Therapy Association (APTA), Electrophysiologic Section
- Pre-doctoral Fellowship Award Rutgers University School of Health Related Professions

Ralph Mangels, DC, DACAN, REDT
Senior Faculty

Education

- Doctor in Chiropractic, New York Chiropractic College, 1990
- Post-doctorate program in Chiropractic Neurology, 1993

Professional Experience

- Staff Chiropractor for a regional multidisciplinary chronic pain/neurology center that performs EMG evaluations, present
- He is a nationally registered electrodiagnostic technician
James T Mills, III, PT, MS, ECS, OCS
Senior Faculty

Education
- Bachelors of Health Science in Physical Therapy, University of Kentucky, 1994
- Bachelors of Science in Psychobiology, Centre College, Danville, Kentucky
- Advanced Masters in Physical Therapy, Rocky Mountain University of Health Profession, Provo, UT, 2001
- He is board certified by the American Board of Physical Therapy Specialists in both Clinical Electrophysiology (ECS) and in Orthopedics (OCS)

Professional Experience
- Major in the US Army and Chief Physical Therapist, Ft Eustis, Virginia, Present
- Various positions in the Unites States Army
  - Physical therapist, Ft Benning, Georgia
  - Chief, Physical Therapist, Ft Lee, Virginia
  - Assistant to the Chief, Army Medical Specialist Corps
- Has performed electrophysiologic tests since 1998
- Adjunct faculty to the Army-Baylor University Graduate Program in Physical Therapy
- Guest lecturer to several other university physical therapy programs and professional organizations

Professional Memberships, Awards and Publications
- American Physical Therapy Association (APTA)
- Previously held offices in the Section on Clinical Electrophysiology of the APTA
- He has been published in peer-reviewed journals

Denise E Milton, PT, ECS, CSCS
Senior Faculty

Education
- Bachelors in Physical Therapy, Old Dominion University, 1993
- Commissioned as an officer in the United States Navy, 1993
- Specialty Board Certification in Clinical Electrophysiologic testing
- Certified Strength and Conditioning Specialist

Professional Experience
- Physical therapist aboard a US Naval Ship in the Persian Gulf, Present
- Has held various positions in physical therapy clinics at three large Naval Hospitals
- Invited lecturer on upper extremity neuroanatomy and clinical electrophysiology at Neumann College
- Invited laboratory instructor for clinical electrophysiology at Old Dominion University
- Has performed electrophysiologic tests since 1998
- Has trained and served as a hospital corpsman, advanced laboratory technician, and an emergency medical technician
- Began career in healthcare by enlisting in the Navy, 1986
Roger M Nelson, PT, PhD, FAPTA
President and Senior Faculty

Education
- Bachelors in Physical Therapy, New York University, 1965
- Masters in Physical Therapy, Boston College, 1972
- PhD of Philosophy, University of Iowa, 1981
- Began EMG training in 1966 and has continued his growth in EMG testing

Professional Experience
- One of the first individuals to organize special courses in clinical electromyography, 1972
- He has taught many electromyography courses in the USA and internationally, 1972-present

Professional Memberships, Awards and Publications
- Published in 45 publications in peer-reviewed journals, two books
- Presented internationally and within the United States
- He is a Catherine Worthingham Fellow of the American Physical Therapy Association

Arthur J Nelson, PT, PhD, FAPTA- Honorary Emeritus (Deceased)

Education
- Bachelors, cum laude, New York University, 1954
- Master of Arts in physical therapy, New York University, 1958
- PhD in Neurophysiology, New York University

Professional Experience
- His interest in electromyography dates from 1960
- Developed an Electromyographic laboratory (Gateway Electrodiagnostic Laboratory) at St Vincent's Medical Center, Staten Island, NY
- Examined a wide range of neuromuscular disorders from infants to the elderly for more than 45 years
- Taught EMG to physicians and physical therapists since 1973
- Taught EMG at the graduate level to doctoral clinicians in Pathokinesiology at NYU since 1975

Professional Memberships, Awards and Publications
- Charter member of the National Association of Clinical Neurophysiology since 1970
- Founding member of the Section on Clinical Electrophysiology, APTA
- Publications on Electromyography are found in Desmedt, Ed Electromyographic evaluation of lower leg muscles during Isokinetic dorsiflexion and plantarflexion at a variety of speeds
- Honorary member of the Belgian Electromyographic Association in 1973
- Authored two chapters on the Clinical Interpretation of Electromyography for hand surgeons, edited by Dr Hunter in 1976 and 1980
- Dr Nelson passed away in 2010
Christos Vasakiris, DC, DACAN, REDT
Senior Faculty

Education
• Stony Brook University 1983-1986
• Doctor of Chiropractic, New York Chiropractic College, 1989
• Diplomate in Chiropractic Neurology in 1993
• Registered nerve conduction studies technologist R.NCS through the AAET, 1996
• Certificate of proficiency in electrophysiology, Expert Clinical Benchmarks, LLC,

Professional Experience
• Active private practice in a multi-specialty center 1990-present
• Post-graduate faculty member, New York Chiropractic College and lead instructor for Graston Technique under the auspices of Therapy Care Resources
• Taught and developed post-graduate courses around the United States and in Canada on topics concerning neurology, musculo-skeletal rehabilitation and treatment of soft tissue conditions.
• Has performed electrophysiological evaluations for more than 18 years. Currently provides his clinical and technical experience alongside a medical neurologist and well respected neuro-surgical practice.

Professional Memberships
• Member New York State Chiropractic Association
• Awarded the Robert E. Kellogg distinguished lecture certificate on median nerve entrapment.

Faculty

Peter A Bonadonna, PT, DPT

Education
• Certificate of Proficiency in Electrophysiologic Evaluation, Expert Clinical Benchmarks, LLC, 2011
• Doctorate in Physical Therapy, College of Staten Island, 2011

Professional Experience
• Has performed Nerve Conduction Studies throughout the state of NJ for physicians, neurologists, and other health care professionals since 2006
• Performs EMG studies at the Manhattan Center for Headaches and Neurology, Present
• Physical Therapist at Sports Training Physical Therapy, Present
• Current Resident in the program

Professional Memberships, Awards and Publications
• American Physical Therapy Association (APTA)
Anthony J. Esposito, D.C.

Education
- Bachelors in Biology, College of Mount Vincent, 1992
- Doctorate in Chiropractic, Life Chiropractic College, 1996
- Electrodiagnostic Certification, New York Chiropractic College, 1997
- Post-doctorate program in Chiropractic Neurology, Logan Chiropractic College, 2001
- Certificate in Electrophysiologic Evaluation, Expert Clinical Benchmarks, LLC & University of Bridgeport, 2010

Professional Experience
- Owner of active private practice 1996—present
- Has performed electrodiagnostic evaluations for more than 10-years
- On-site Educator / Lecturer of various Fortune 500 companies on Ergonomics, Spinal Health and Repetitive Stress Injuries

Cory Taglianetti, MSPT

Education
- State University of New York, Binghamton University, Binghamton NY Biology Major 1996-1999
- City University of New York, College of Staten Island, Staten Island NY Associate of Science in Biology 2003
- City University of New York, College of Staten Island, Staten Island NY Combined B.S. and M.S. in Physical Therapy 2005

Professional Experience
- Staten Island University Hospital, New York Senior Physical Therapist 2005-2010
- Performed nerve conduction studies since 2007 and electromyography since 2010 for Lugo Comprehensive PT Services, Staten Island, NY
- Laboratory instructor and lecturer for Expert Clinical Benchmarks and the American Academy of Clinical Electrodiagnosis, LLC in the area of NCS and EMG since 2008
- Graduate Center CUNY, City University of New York, College of Staten Island, Staten Island NY, Adjunct Instructor, DPT Program – PHT 88500 Electroneuromyography and Motion Analysis, 2008 to present
- Eger Healthcare and Rehabilitation Center, Staten Island, NY Physical Therapist since 2010
- Current Resident in the program, scheduled to sit for the E.C.S. exam in 2013
Professional Memberships, Awards and Publications


• College of Staten Island Department of Biology Faculty Award in the Physical Therapy Program, 2005

• New York Physical Therapy Association Brooklyn-Staten Island District Award for Meritorious Clinician Achievement, 2005

• Winner of five Service Excellence Awards from Staten Island University Hospital, 2005-2010

• Current member of the American Physical Therapy Association, Electrophysiology Section

SENIOR LABORATORY FACULTY

Toby Bortner, MS, PT, ECS

Education

• Masters in Physical Therapy, Philadelphia College of Pharmacy and Science, 1994

• Certificate of Proficiency in Electrophysiology, Expert Clinical Benchmarks, LLC, 2003

• Electrophysiological Certified Specialist test (ECS), sponsored by the American Board of Physical Therapy Specialties, 2009

• Doctoral Candidate, Rocky Mountain University of Health Professions, 2008-Present

Professional Experience

• Provides EMG/NCV studies for the Gettysburg Hospital and also completes studies on a contract basis for private physician offices including podiatry, orthopedic and general practitioners

• Staff Physical Therapist, Gettysburg Hospital Rehabilitation Outpatient Department, 2002-present

• Staff Physical Therapist, 1994-2002

Babu Moses, PT, DSc, ECS, MTC, BCH

Education

• Masters in Physical Therapy, Bergen University, Bergen, Norway, 1984

• PhD in Electrophysiology, Rocky Mountain University of Health Sciences, Provo, UT, 2004

• Certificate of Proficiency in Electrophysiologic Evaluations, Expert Clinical Benchmarks, LLC, 1999

• Certification in Manual Therapy, University of St Augustine, 2001

• Board Certification in Electrophysiological Physical Therapy (ECS), 2003

• Board Certified Hypno-therapist

Professional Experience

• Owns a private practice, Body Power Physical Therapy

• Guest lecturer, teaching EMG/NCV in NY area physical therapy schools
• Published articles in peer-reviewed publications in various health-related subjects including one in the field of nerve conduction studies that he co-authored with Dr. Roger Nelson and Dr. Arthur Nelson
• He is also a writing hypnosis related books and teaching hypnosis course for instructors

Laboratory Faculty
Stanley Delva, NCT-C (10-1001)
Michael Monroe, NCT-C (10-1002)
Robert Sundback, NCT-C (8-1001)
STUDENT RESPONSIBILITIES

Schedules
A syllabus with objectives, required readings, and assignments will accompany each part of the course. *Students are expected to have listened to and studied the lectures in each month prior to taking the written examinations. Practice in the Laboratory is essential before taking practical examinations.*

The acquired knowledge and skills will take a tremendous effort on the part of the student. *Spending time during the laboratory days with the faculty is not enough time to master the psychomotor skills and the knowledge needed to become proficient in electrophysiologic testing.*

To maximize this educational experience and get the most out of the program, the student must practice the techniques; study the material at home and in your clinic. The student shall also attend weekend sessions. The expert laboratory faculty is dedicated to assist in every way they can, but it is the student who must spend the time preparing between sessions. Below are specifics about student responsibilities:

**Attendance:**
The student is expected to be present for each 2-day weekend. If special circumstances arise and the student cannot attend a weekend session, the student shall:

1. Email an AACE laboratory faculty member a minimum of four (4) business days prior to the laboratory day.

There are two basic options to make up missed session:
1. Student can arrange a private session with an AACE faculty member at a cost of $1000 per day.
2. Wait three months for the next cycle of classes at no cost

**Additional assistance with the guided ‘on-site’ laboratory ‘hands-on’ experiences.**
If a student wishes to have guided ‘hand-on’ laboratory experiences beyond the assigned weekends they are encouraged to contact AACE faculty to make arrangements for private sessions.

Laboratory hours are from 09:00 to 5:00 (1700) hours each for Saturday and for Sunday (unless otherwise indicated)

**Internet access**
It is **absolutely imperative** that every student has a functioning e-mail account and access to the internet. Important information about the course is often passed through e-mail and testing will be accomplished through an internet site.

**Attire:**
The student should wear or bring appropriate laboratory attire. Laboratory attire includes short-sleeve shirts when covering the upper limb and shorts when covering the lower limb. Clothing should be non-offensive to other classmates. Remember, that each student is a representative for their profession and the American Academy of Clinical Electrodiagnosis.
**Honor Code:**

The student is expected to adhere to the highest standards of ethical behavior which means that he/she shall not give or receive assistance from one another during testing procedures (written or practical).

**Miscellaneous Policies and Expectations:**

1. Own or have regular access to a NCV/EMG machine and related supplies.
   a. NCV/EMG machines will be supplied for all clinicians for weekend sessions.
2. Surface electrodes (tab, ground, and ring) and leads will be available for use during the weekend sessions ONLY.
3. Have working Internet access and a working/current e-mail account.
4. Maintain a current email address with the faculty.
5. Obtain the required text prior to starting Month 1.
6. Practice between meetings. Students cannot expect to do well in this course without hours of practice between sessions.
7. Maintain courteous behavior
8. Maintain involvement in Canvas discussions.
9. Maintain laboratory rooms: No food or drinks allowed.
10. Maintain timeliness for the weekend sessions
    a. Be on time for weekend sessions
    b. Return from breaks on time
11. Employ the generic professional abilities as a model for professional behavior.
12. Maintain communication with the faculty as they are committed to each student learning the course material. *Please ask questions.*

**Preparation for Monthly Meetings:**

Before each meeting the student should do the following:

1. Review the syllabus and lecture objectives; become oriented to the upcoming topics.
2. Read the reading assignments for each part; study the relevant anatomy
3. Bring appropriate lab clothes (shorts and t-shirts) each laboratory day
4. **PRACTICE FOR THE PRACTICAL EXAM**

**LABORATORY LOCATIONS**

Greater New York metropolitan area
Mt. Saint Mary’s College Los Angeles
Other locations per Program Director
Student Administrative Policies

Safety Issues – 1.0

Confidentiality of Student Information – 1.1
All information concerning a student’s personal data including but not limited to name, address, phone number, E-mail address, credit card data/check information is property of AACE and as such will be kept strictly confidential. This information will be temporarily stored on the hard drive of one central, secure computer that utilizes “Cloud Computing” security measures. Access to secure information storage is limited only to the Program Administrator.

Each student’s written and practical test scores will be stored on a secure hard drive and then backed up to Cloud Computing security measures mentioned above. Tests or practical examinations that are scored during a class can be shown to each individual clinician in a private area if requested by the student.

Confidentiality of Student Health Information – 1.2
Throughout the course of the program, students will be randomly paired with other students to practice nerve conduction techniques. During this process, there will be some classmates who demonstrate results that are consistent with entrapment neuropathies or other conditions that are seen within the general population. As with all medical test results, the collected data will be treated confidentially according to HIPPA Guidelines. However, the purpose of the class is to learn and part of the process of learning involves discerning normal results from abnormal results. A classmate who demonstrates an abnormality has the option of releasing this information to the class or requesting that the tester keep the information confidential. Information released to the class will remain confidential outside of the classroom. A class member who becomes concerned about the results of testing on their own limb(s) is encouraged to seek the advice of their own physician. AACE is not held responsible, in any way, for the information that may be gathered during the laboratory time and used as part of a medical record.

Safety of Student and Program Property – 1.3
The ‘hands on’ portion of this program is conducted on-site, in facilities to be announced. Each student is expected to use reasonable judgment regarding the display of personal property in his or her respective vehicles and in the laboratory. Although there will be AACE faculty in the vicinity, the security at an on-site location cannot be guaranteed and therefore personal belongings should be secure. There will be AACE faculty in the laboratory or in the hallways at all times to help safeguard the belongings of all class members and the program. Laboratory doors will be locked if there is a period of time in which a room with equipment i.e., computers, clothing, keys, will be vacant. Laboratory doors will be locked at night.

Obviously, theft, vulgar/offensive language and threatening behavior between classmates or between classmates and faculty will not be tolerated and are grounds for termination from the course. Any member of the class who has personal property stolen, been threatened or feels as if they are being threatened are asked to report this to a program faculty member. The faculty member will take immediate action if that faculty member deems this course of action to be appropriate. Any occurrence of this nature will be reported on an Incident Report Form (see below) and the
occurrence will be brought directly to the attention of the Academic Director and Program Administrator to decide the appropriate course of action.

**Safety during a catastrophic event – 1.4**
A catastrophic event is defined as, but not limited to, the following: Fire, weather, bomb threat, and hostile intruder(s). Instructions as to how to respond to these types of events may be posted at various on-site facilities. At all times, these instructions are to be followed.

**Fire – 1.4a**
In the event of a fire, the class and faculty will act according the procedures as put forth by the on-site facility. The faculty members will lead any evacuation of the building in an orderly fashion and the class will gather in a safe place as one group. The last person to exit the building will be the lead instructor for that session at which point attendance will be taken to ensure that all class members have exited. The lead instructor is also responsible for closing all doors and windows. Once the fire threat has been eliminated, the class members and faculty can re-enter the building when the all-clear is issued by the on-site security staff.

**Bomb Threat – 1.4b**
In the event of a bomb threat, the class and faculty will act according the procedures as put forth by the on-site facility. The faculty members will lead any evacuation of the building in an orderly fashion and the class will gather in a safe place as one group. The last person to exit the building will be the lead instructor for that session at which point attendance will be taken to ensure that all class members have exited. The lead instructor is also responsible for closing all doors and windows. Once the bomb threat has been eliminated, the class members and faculty can re-enter the building when the all-clear is issued by the on-site security staff.

**Hostile Intruder(s) – 1.4c**
In the event of a hostile intruder incident, the class and faculty will act according the procedures as put forth by the on-site facility. The intent is to ensure the safety of all class members and faculty at all times. The demands of the intruder(s) will be met if possible with minimal attempts at negotiation. In the event that a faculty member is able to safely notify on-site security and/or police, without jeopardizing the safety of others, notification will occur. The faculty members will lead any evacuation of the building in an orderly fashion and the class will gather in a safe place as one group. The last person to exit the building will be the lead instructor for that session at which point attendance will be taken to ensure that all class members have exited. Once the intruder threat has been eliminated, the class members and faculty can re-enter the building when the all-clear is issued by on-site security staff.

**Weather – 1.4d**
It is the responsibility of the student to monitor potential weather threats in the days leading up to a scheduled laboratory day(s). The Program Administrator is the only person that can cancel a laboratory day(s) due to an emanate weather threat, i.e. hurricane, blizzard, ice storm. Any cancellation of a laboratory day will be posted on Canvas® by noon on the Friday before the scheduled day(s). It is the responsibility of the clinician to check Canvas® for the status of the course.

In the event there is a cancellation the following will serve as the Cancellation Make-up Policy:

1) In the week following the cancellation, a posting of a new weekend session date will be posted in a timely manner.
Safety of Students in Electrophysiologic Laboratory – 1.5

Human Safety – 1.5a
Each student will sign and date a Human Subjects Consent Form prior to participating in program laboratory activities. Students enrolled in the program will be randomly paired with another class member (who may or may not be enrolled in the Technician Course) for participation in laboratory practice sessions. The pairs will be changed each session in order to practice on different body sizes and body types. Faculty members must clear any objection to pairings or participation in the laboratory practice sessions.

The safety of the program participant is always considered prior to any NCS testing. Nerve conduction tests and needle EMG testing may cause minor discomfort to human subjects. The laboratory faculty will demonstrate and instruct the class in techniques to minimize discomfort, but for some, there may be discomfort with the test. If a class member feels as if they cannot tolerate the test, they should inform laboratory faculty who will assess the situations on an individual basis. It is possible that human subjects will develop a hematoma after a needle insertion. The hematoma is painless and will resolve without complications.

There are few contraindications for electrophysiologic testing. The program will adhere to same precautions/contraindications for human subjects as are applied in a clinical laboratory setting according to the literature and summarized within the following review article by Al-Shekhlee A., Shapiro, B.E., Preston, D.C., Muscle and Nerve, 2003. All program participants are advised to notify the Program Administrator upon application to the program if they have a pacemaker/AICD unit, are pregnant or have a high likelihood of being currently pregnant, or if they are on anticoagulation therapy as these constitute precautions. Likewise, if a class member develops an open wound, pitting edema or is put on blood thinners by their physician, they are directed to inform the faculty.

A First Aid Kit is kept and maintained in the laboratory at all times in the event a minor injury occurs during the course of a laboratory day. The laboratory manager takes an inventory of the kit contents prior to each session and supplies are replenished as needed. There is usually an A.E.D. (Automatic External Defibrillator) unit available in public buildings and medical facilities in the event of a cardiac emergency. All faculty members have been trained how to use the A.E.D. unit as required by their respective state practice acts.

All EMG needles utilized for demonstration and practice will be disposed of in appropriate medical waste containers. The needle container will be centrally located in the laboratory. The container will be handed over to a licensed medical waste vendor at the appropriate time either when it is at full capacity or at the end of the course for that year. Four x four Gauze pads are supplied to all class members in the event there is residual bleeding after a needle insertion. These pads will only be disposed of in appropriate red bag trash containers. Standard precautions will be observed when handling EMG needles and medical waste which includes the use of gloves during needle EMG practice/testing.

In the event of an accidental needle stick, it is recommended the student refer to the following website www.hivguidliness.org for guidance. It is recommended that prophylaxis drug treatment be started as quickly as possible as well as an evaluation by a MD-Infectious medicine specialist. Report the accidental needle stick to the laboratory supervisor as quickly as possible, an Incident Report Form needs to be filled out and forwarded to the President of
AACE. The guidelines from the CDC apply to while the student is in the laboratory operated by AACE but also can be helpful when operating independently in the student’s own workplace.

**Equipment Safety – 1.5b**

Typically, the program borrows electrophysiologic testing equipment from Cadwell Laboratories, 909 N. Kellogg St., Kennewick WA, 99336. This equipment is visually examined for defects prior to testing by program laboratory faculty during set-up and takedown of equipment and at the Cadwell Laboratory upon its return. Visual defects include but are not limited to faulty ground prongs, exposed cooper wire, worn insulation, broken wires and loose connectors. Extension cords are not used to plug in Electrophysiologic equipment in the laboratory. Laboratory faculty, prior to the start of a laboratory day, will inspect the electrical outlets. An EMG/NCS machine that is not functioning correctly will be taken out of service and tagged as defective. All faculty, the Academic Director, and Program Administrator review these safety procedures at the end of each year and adjustments are made as appropriate.


**Safety Procedures Review – 1.6**

Any incident that occurs, outside of the normal operating procedures, will be recorded on an Incident Report Form (see below). These forms will be reviewed by the Program Administrator on a monthly basis and by the core faculty, Academic Director and Program Administrator at a yearly review meeting. Adjustments to safety policies will be made if needed due to a safety issue(s) or outside changes in the social/legal environment. Changes to safety policies may be immediate depending on the nature of the incident. Once reviewed, the Incident Report Form will be dated and filed with the Program Administrator for a minimum of 5 years.
Educational policies – 2.0

Non-Discrimination Policy – 2.1
The American Academy of Clinical Electrodiagnosis is committed to providing equal opportunity for all prospective and active students as well as staff without regard to race, creed, religion, color, national origin, age, physical or mental disability, marital status, sex, political belief, sexual orientation or genetic information. The program will provide reasonable accommodations to an otherwise qualified applicant or employee with a known disability that prevents the individual from participating in the application process, competing in the selection process, and performing the essential functions of a clinician/faculty member. The American Academy of Clinical Electrodiagnosis is a provider of educational services and is committed to resolving complaints of unlawful discrimination and complaints of unlawful retaliation in a fair and timely manner.

Clinician Recruitment – 2.2
The American Academy of Clinical Electrodiagnosis website is the primary source of recruitment for the course. Other sources include word of mouth and training requirements by supervising medical professionals.

Admission Requirements – 2.3
1. High school diploma, GED, or other equivalent.

Photo Identification – 2.4
Upon arrival at the laboratory site, all students will be required to show a photo identification, i.e., driver’s license, passport, to AACE laboratory faculty.

Academic Dishonesty – 2.5
Academic dishonesty includes, but is not limited to, copying answers from another student’s tests/homework, reading written notes during exams, coaching a laboratory partner during practical exams, reviewing a copy of a test from a previous year and entering false measurements into the computer when calculating conduction velocities. These types of behaviors will not, in any way, be tolerated and will serve as instant dismissal from the course. The details of an event that constitutes academic dishonesty will be written up on an Incident Report Form and will be reviewed by the Program Administrator. If the final review of the incident determines that the student was dishonest, all fees paid to the course are automatically forfeited. The student has the option of registering for the course the next time it is offered.

Videotaping/Audio – 2.6
Videotaping of lectures or laboratory demonstrations by faculty is not permitted. That includes any video devices such as cameras, cell phones or MP3 devices. Students may videotape each other during laboratory practice time as long as all involved parties have given their express written consent. Audio tape recorders are permitted in the laboratory.

Grievances – 2.7
If, for any reason, the student feels as if they have been treated unfairly or does not agree with the faculty while taking the course, they may file a grievance. The procedure to file a written grievance is to fill out an Incident Report Form (see below). The student should state their case and then either
E-mail the form to the Program Administrator or hand a printed copy to the Academic Director for immediate review. After a review of the facts with all person(s) involved and possible consultation with course faculty, a decision will be rendered on the Incident Report Form that is signed by the Program Administrator.

American Academy of Clinical Electrodiagnosis Refund Policy – 2.8
The following refund policy is in effect until further notice for all courses that are sponsored by the Academy of Clinical Electrodiagnosis, LLC (AACE).

Cancellation
If a course is cancelled by AACE, notification will be provided 20 calendar days before the start date of the course and a full refund will be available to registrants. At the registrant’s option, deposits can also be applied to future AACE courses.

If a registrant cancels 14 calendar days before the start date of the course (notification must be in writing and received by AACE before close of 14 business days before the start date) AACE will refund the registration fee minus a $500 cancellation fee.

If a registrant cancels with less than 14 calendar days before the start date of the course (notification must be in writing and received by AACE before the start date of the course) the registration fee will not be returned. Registrants may, however, apply non-refunded funds - minus the $500 cancellation fee - toward future AACE courses. If the registrant chooses to apply registration funds to future courses the registration rate is protected for one calendar year.

Check Return Policy
If the bank for any reason returns a check, a $50 return and processing fee will be charged.

Installment Policy
A student who registers for the course and decides to pay for the course using the installment plan, understands that if they decide to leave the course at any point, they are responsible for 100% tuition payment.

AACE has the right to change this policy at any time.
INCIDENT REPORT FORM

Date: ________
Time: ________

Provide a description of the incident:

Immediate action taken to resolve the incident:

Outcome of incident:

Action items taken to prevent future occurrence:

Faculty Signature/Date________________________

Student Signature/Date________________________
## Appendix A – Practical Exam Score Sheet

### Nerve Conduction Study

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>Motor Nerves</th>
<th>Sensory Nerves</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient Position</td>
<td>5 %</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recording Electrode Placement</td>
<td><strong>10 %</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negative</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ground</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Machine Settings</td>
<td><strong>10 %</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gain/Sensitivity</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sweep speed</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electro Stimulation Technique</td>
<td><strong>10 %</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Computation Technique</td>
<td><strong>40 %</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Segment distance</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Latency determination</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amplitude</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Velocity-by segments</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Performs efficiently</td>
<td>5%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trouble shoots appropriately</td>
<td>10%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Demonstrates professionalism</td>
<td>10%</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>100%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NCV Comments:**

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

**Fatal Flaw—Failure**—When this box is checked, the examiner must write the reason on reverse side of this form. The student and instructor must sign below.
Appendix B – Day 1 & 2 Syllabus

Month 1: Introduction & Upper Extremity Nerve Conductions Studies

Faculty: Greg Ernst, PT, PhD, ECS, SCS; gregernst@gvtc.com
John Lugo, PT, ECS; jlug01977@aol.com
Michael Lescallette, PT, ECS; mlescallette@pinaclehealth.org
Roger Nelson, PT, PhD, FAPTA; nelson@lvc.edu

Lab Faculty: Peter Bonadonna, PT, DPT; pbonadonna@sportstrainingpt.com
Cory Taglianetti, PT MS; corytag@hotmail.com
Rob Sundback, NCT-C; rwsundback@aol.com
Anthony Esposito, DC; Dresposito@charter.net
Ralph Mangels, DC; rmangelsdc@verizon.net
Chuck Rainey, PT; raineychuck@hotmail.com
Christos Vasakaris; cvas@optonline.net

Course Website: Canvas ®

Course Schedule: On-line lecture: 2 hours, 33 minutes
On-site lecture & laboratory: 16 hours

2. Course Description: This session consists of lecture and laboratory instruction with emphasis on electrophysiology, biomedical instrumentation, an introduction to nerve conduction testing, and specific nerve conduction studies of the median, ulnar, and radial nerves.

3. Textbooks and Journal Readings:
   a. Required - Textbooks
   b. Recommended – Textbooks

4. Day 1 & 2 Objectives
   a. Terminal Learning Objective (TLO) with enabling objectives (EO):
      TLO #1: Demonstrate a patient-centered and ethical approach in conducting the NCS exam
      TLO #2: Explain the anatomic and electrophysiologic basis for electrical NCS testing.
TLO #3: Identify the applications and limitations of NCS

TLO #4: Demonstrate knowledge and application of instrumentation used for monitoring, recording, and measuring electrophysiologic properties of nerve and muscle.

TLO #5: Identify safety considerations in the practice of clinical electrophysiology to include: precautions and contraindications, electrical safety, and infection control procedures.

TLO #6: Identify and describe common pathologic conditions for which NCS evaluation is indicated and recognize the need for referral for testing

TLO #7: Recognize normal and abnormal potentials and explain their significance.

TLO #8: Given unexpected or unusual findings, demonstrate the ability to trouble shoot, explain sources of error, and differentiate technical errors from pathology.

Final Outcome Objective: Given a patient with a neuromuscular condition, organize, perform, and document an NCS exam in an ethical, safe and accurate manner.

5. Requirements for successful completion of Day 1 & 2:
   a. Completion of on-line lectures and reading assignments
   b. Attendance of 16 hours of on-site lectures and laboratory sessions

6. Schedule of on-line lectures and reading assignments:

<table>
<thead>
<tr>
<th>Lecture</th>
<th>Lecture number</th>
<th>Duration of lecture</th>
<th>Faculty</th>
<th>Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orientation</td>
<td>101-T</td>
<td>10 minutes</td>
<td>Lescallette</td>
<td></td>
</tr>
<tr>
<td>The Body Electric</td>
<td>102-T</td>
<td>21 minutes</td>
<td>Lescallette</td>
<td></td>
</tr>
<tr>
<td>Clinical Application of NCS</td>
<td>103-T</td>
<td>15 minutes</td>
<td>Lugo</td>
<td>Delisa Chp 1</td>
</tr>
<tr>
<td>Medical Terminology &amp; Musculoskeletal Anatomy</td>
<td>104-T</td>
<td>17 minutes</td>
<td>Lugo</td>
<td></td>
</tr>
<tr>
<td>Physiology of Excitable Cells</td>
<td>105-T</td>
<td>43 minutes</td>
<td>Lugo</td>
<td></td>
</tr>
<tr>
<td>Median Nerve Anatomy</td>
<td>106-T</td>
<td>21 minutes</td>
<td>Lugo</td>
<td>Delisa Chp 4 (pgs 25-45)</td>
</tr>
<tr>
<td>Ulnar Nerve Anatomy</td>
<td>107-T</td>
<td>14 minutes</td>
<td>Lugo</td>
<td>Delisa Chp 4 (pgs 45-55)</td>
</tr>
<tr>
<td>Radial Nerve Anatomy</td>
<td>108-T</td>
<td>11 minutes</td>
<td>Bonadonna</td>
<td>Delisa Chp 4 (pgs 55-62)</td>
</tr>
</tbody>
</table>
Appendix C – Day 3 & 4 Syllabus
Month 2: Lower Extremity & Advanced Nerve Conduction Studies

Faculty: Greg Ernst, PT, PhD, ECS, SCS; gregernst@gvtc.com
John Lugo, PT, ECS; jlugo1977@aol.com
Michael Lescallette, PT, ECS; mlescallette@pinnaclehealth.org
Roger Nelson, PT, PhD, FAPTA; nelson@lvc.edu

Lab Faculty: Peter Bonadonna, PT, DPT; pbonadonna@sportstrainingpt.com
Cory Taglianetti, PT MS; corytag@hotmail.com
Rob Sundback, NCT-C; rwsundback@aol.com
Anthony Esposito, DC; Dresposito@charter.net
Ralph Mangels, DC; rmangelsdc@verizon.net
Chuck Rainey, PT; raineychuck@hotmail.com
Christos Vasakaris; cvas@optonline.net

Course Website: Canvas®

Course Schedule: On-line lectures: 1 hour, 16 minutes
On-site lectures & laboratory: 16 hours

1. Prerequisite: Successful completion of Day 1 & 2 material (including at home material).

2. Course Description: This session consists of lecture and laboratory instruction with emphasis on electrophysiology, biomedical instrumentation, and specific nerve conduction studies of the fibular, tibial, sural, femoral, and shoulder girdle nerves.

3. Textbooks and Journal Readings:
   a. Required - Textbooks
   b. Recommended – Textbooks

4. Day 3 & 4 Objectives
   a. Terminal Learning Objective (TLO) with enabling objectives (EO):
      TLO #1: Demonstrate a patient-centered and ethical approach in conducting the NCS exam
      TLO #2: Explain the anatomic and electrophysiologic basis for electrical NCS testing.
      TLO #3: Identify the applications and limitations of NCS
TLO #4: Demonstrate knowledge and application of instrumentation used for monitoring, recording, and measuring electrophysiologic properties of nerve and muscle.

TLO #5: Identify safety considerations in the practice of clinical electrophysiology to include: precautions and contraindications, electrical safety, and infection control procedures.

TLO #6: Identify and describe common pathologic conditions for which EMG/NCS evaluation is indicated and recognize the need for referral for testing.

TLO #7: Recognize normal and abnormal potentials and explain their significance.

TLO #8: Given unexpected or unusual findings, demonstrate the ability to trouble shoot, explain sources of error, and differentiate technical errors from pathology.

Final Outcome Objective: Given a patient with a neuromuscular condition, organize, perform, and document an NCS exam in an ethical, safe and accurate manner.

5. Requirements for successful completion of Day 3 & 4:
   a. Completion of lectures and reading assignments
   b. Attendance of 16 hours of on-site lectures & laboratory sessions
   c. Score of 70% on both the written and practical examinations

6. Schedule of on-line lectures and reading assignments:

<table>
<thead>
<tr>
<th>Lecture</th>
<th>Lecture number</th>
<th>Duration of lecture</th>
<th>Faculty</th>
<th>Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tibial &amp; Sural Nerve Anatomy</td>
<td>201-T</td>
<td>9 minutes</td>
<td>Taglianetti</td>
<td>Delisa Ch4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(pgs 80-86)</td>
</tr>
<tr>
<td>Fibular (Peroneal) Nerve</td>
<td>202-T</td>
<td>8 minutes</td>
<td>Taglianetti</td>
<td>Delisa Ch 4</td>
</tr>
<tr>
<td>Anatomy</td>
<td></td>
<td></td>
<td></td>
<td>(pgs 67-76)</td>
</tr>
<tr>
<td>Femoral Nerve Anatomy</td>
<td>203-T</td>
<td>8 minutes</td>
<td>Lugo</td>
<td>Delisa Chp 4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(pgs 88-94)</td>
</tr>
<tr>
<td>Shoulder Girdle Nerve</td>
<td>204-T</td>
<td>13 minutes</td>
<td>Bonadonna</td>
<td>Delisa Chp 5</td>
</tr>
<tr>
<td>Anatomy</td>
<td></td>
<td></td>
<td></td>
<td>(pgs 104-106)</td>
</tr>
<tr>
<td>Martin-Gruber Anastomosis</td>
<td>205-T</td>
<td>30 minutes</td>
<td>Lugo</td>
<td></td>
</tr>
</tbody>
</table>
Appendix D – Day 5 Syllabus

**Day 5: Case Studies & Special Topics in Electrophysiology**

**Faculty:**
- Greg Ernst, PT, PhD, ECS, SCS; gregernst@gvtc.com
- John Lugo, PT, ECS; jlug1977@aol.com
- Michael Lescallette, PT, ECS; mlescallette@pinaclehealth.org
- Roger Nelson, PT, PhD, FAPTA; nelson@lvc.edu

**Lab Faculty:**
- Peter Bonadonna, PT, DPT; pbonadonna@sportstrainingpt.com
- Cory Taglianetti, PT MS; corytag@hotmail.com
- Rob Sundback, NCT-C; rwsundback@aol.com
- Anthony Esposito, DC; dresposito@charter.net
- Ralph Mangels, DC; rmangelsdc@verizon.net
- Chuck Rainey, PT; raineychuck@hotmail.com
- Christos Vasakaris; cvas@optonline.net

**Course Website:** Canvas ®

**Course Schedule:**
- Homework: 4 case studies
- On-site lectures: 4 hours

1. **Prerequisite:** Successful completion of Days 1, 2, 3 & 4.

2. **Course Description:** This session consists of lecture instruction with emphasis on special topics in electrophysiology and student submission of 4 complete nerve conduction studies. These studies should be a mix of both upper and lower extremity studies. These studies could be performed on individuals without pathology, but could also be conducted on actual patients with appropriate levels of supervision. These studies should have all information that could identify individuals removed.

3. **Textbooks and Journal Readings:**
   a. **Required - Textbooks**
      
   
   b. **Recommended – Textbooks**
      

4. **Month 3 Objectives**
   a. **Terminal Learning Objective (TLO) with enabling objectives (EO):**
      
      **TLO #1:** Demonstrate a patient-centered and ethical approach in conducting the NCS exam
TLO #2: Explain the anatomic and electrophysiologic basis for electrical NCS testing.
TLO #3: Identify the applications and limitations of NCS

TLO #4: Demonstrate knowledge and application of instrumentation used for monitoring, recording, and measuring electrophysiologic properties of nerve and muscle.

TLO #5: Identify safety considerations in the practice of clinical electrophysiology to include: precautions and contraindications, electrical safety, and infection control procedures.

TLO #6: Identify and describe common pathologic conditions for which EMG/NCS evaluation is indicated and recognize the need for referral for testing.

TLO #7: Recognize normal and abnormal potentials and explain their significance.

TLO #8: Given unexpected or unusual findings, demonstrate the ability to trouble shoot, explain sources of error, and differentiate technical errors from pathology.

Final Outcome Objective: Given a patient with a neuromuscular condition, organize, perform, and document an NCS exam in an ethical, safe and accurate manner.

5. Requirements for successful completion of Day 5 and to earn a ‘Certificate of Proficiency” the student must:
   a. Complete all lectures and reading assignments
   b. Attend 5 days of on-site lectures
   c. Score of 70% on both the written and practical examinations
   d. Score of 70% on each of the 4 submitted nerve conduction studies
## Appendix E – Report Grading Rubric

### Nerve Conduction Study Report Grading Rubric - Technician

<table>
<thead>
<tr>
<th>Case # ______________________</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>General Information</th>
<th>15 %</th>
<th>Points Deducted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reason for test/ Patient information</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Skin temperature</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Data Tables</th>
<th>15%</th>
<th>Points Deducted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recording site listed</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Latency measurement to onset/peak</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Normal values listed</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Nerve conduction waveforms</th>
<th>30%</th>
<th>Points Deducted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consistent waveform shape*</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Marker placement</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Gain/sensitivity</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Sweep</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Computation Technique</th>
<th>40 %</th>
<th>Points Deducted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Segment distance</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Latency determination</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Amplitude</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Velocity-by segments</td>
<td>10</td>
<td></td>
</tr>
</tbody>
</table>

| TOTAL | 100% | |

Comments: ____________________________________________________________
_________________________________________________________________
_________________________________________________________________
_________________________________________________________________
_________________________________________________________________
_________________________________________________________________
_________________________________________________________________
_________________________________________________________________
_________________________________________________________________
_________________________________________________________________
_________________________________________________________________
_________________________________________________________________

Fatal Flaw—Failure—When this box is checked, the examiner must write the reason on reverse side of this form. The student and reviewer must sign below.

Student Sign. ______________________ Reviewer Sign. ______________________

* Assuming absence of pathology. If pathology is present, waveforms must not demonstrate signs of obvious technical error.
Appendix F – Technician Registry Process

AACE NCV Tech Registry
Application Process

Eligibility for registry designation

1. The American Academy of Clinical Electrodagnosis offers a registry process to those individuals who passed the following certificate courses:
   a. Expert Clinical Benchmarks, LLC: Certificate in Neuronal Conduction
   b. American Academy of Clinical Electrodagnosis: Certificate in Neuronal Conduction
2. All AACE Nerve Conduction Technician program graduates will receive a unique number after their credential that signifies current, active status, and inclusion in the AACE Registry website.
   a. For example John Smith, NCT-C 11-1003 – New York, New York
3. The AACE Registry is maintained online and will contain the contact information (approved by you), as well as, a summary of the AACE four-month Nerve Conduction for technician curriculum.
4. Process for application:
   a. Fill out application form (available upon request)
   b. Sign the agreement page (available upon request)
   c. Enclose application form and a copy of the certificate (from ECB or AACE) and mail it with the appropriate fee (check made out to AACE) to:
      AACE
      Townplace Victoria
      9 North Seventh Street
      2nd floor
      Indiana, PA 15701
   d. You will receive an email confirming your acceptance in our registry along with your unique identification number.