

National Registry Examination for Nerve Conduction Studies



Candidate Handbook 2021

Application Deadline*	Testing Window
December 16, 2020	January 23 – February 6, 2021
April 21, 2021	May 22 – June 5, 2021
July 21, 2021	August 21 – September 4, 2021

***Applications will not be accepted after this deadline**

Administered by:



1350 Broadway, Suite 800 | New York, NY 10018
www.ptcny.com/contact

COVID-19 Precautions

Candidates are reminded that face masks are REQUIRED at Prometric testing centers. Candidates must bring and wear face masks for the duration of their time inside the testing center.

Masks with exhale/one-way valves are prohibited to use at the testing center, due to the lack of viral particle filtration provided by these masks. Masks with wearable technology are also prohibited. **Any test taker that comes to the test center without an acceptable face mask will not be allowed to test, marked as a “no show,” and will not be eligible for a free reschedule.**

Additionally, candidates must comply with all federal, state and local mandates and guidelines.

Note: if you fall into any of the following categories, you will not be permitted to test until you no longer fit the criteria:

- Have been diagnosed with COVID-19 in the past 14-days;
- Have been exposed to someone diagnosed with COVID-19 in the past 14-days;
- Are experiencing flu or cold-like symptoms; OR
- Have returned from travel to a highly infected area in the past 14-days.

Please contact PTC (www.ptcny.com/contact) if you fall into any of the above categories.

If you are diagnosed with or under quarantine due to exposure to COVID-19 during your testing window: PTC will allow a free transfer to a later testing window. We will need documentation of a positive test or a doctor's note or letter from an employer to confirm quarantine dates.

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This Handbook contains necessary information about the National Registry Examination for Nerve Conduction Studies. Please retain it for future reference. Candidates are responsible for reading these instructions carefully. This Handbook is subject to change.

CONTACT INFORMATION

Professional Testing Corporation (PTC) www.ptcny.com (212) 356-0660	<ul style="list-style-type: none">• Apply for examination• Obtain general application policy and procedure information• Obtain information about testing policies and procedures• Transfer to a new testing period• Request Special Accommodations• Request Hand Score• Question about score reports• Miscellaneous inquiries
Prometric www.prometric.com/AAET (800) 741-0934	<ul style="list-style-type: none">• Schedule test appointment• Reschedule test appointment (within a testing period)• Cancel test appointment• Find directions to test site• Questions regarding testing sites and appointments
The Nerve Conduction Association (AAET) www.aaet.info	<ul style="list-style-type: none">• Study materials• Recertification information

ATTENTION CANDIDATES

This handbook contains necessary information about the AAET National Registry Examination for Nerve Conduction Studies. It is required reading for those applying and taking the Examination. All individuals applying for these examinations must comply with the policies, procedures, and deadlines in this Handbook and attest to this by signing the Candidate Attestation found on the application. Please retain this handbook for future reference. This handbook is subject to change. See www.ptcny.com for handbook updates.

REGISTRATION

The Nerve Conduction Association (AAET) supports the concept of voluntary registration by examination for health care professionals in nerve conduction studies. Registration focuses specifically on the individual and is an indication of current knowledge in electrodiagnostic nerve conduction studies technology.

OBJECTIVES OF AAET

AAET aims to establish standards for registration of electrodiagnostic technologists by:

- Providing a standard of knowledge in nerve conduction studies required for registration.
- Establishing and measuring the level of knowledge required for registration in nerve conduction studies by means of an objective written examination.
- Recognizing formally those individuals who meet the eligibility requirements of AAET and pass the National Registry Examination for Nerve Conduction Studies.
- Encouraging continued professional growth in nerve conduction studies

NON-DISCRIMINATION STATEMENT

The Nerve Conduction Association (AAET) does not discriminate on the basis of age, sex, race, religion, national origin, marital status or handicapped condition.

ELIGIBILITY REQUIREMENTS

In addition to the eligibility requirements listed below it is recommended that the candidate:

- Has received education through an Accredited Neurodiagnostic Technology program and/or have at least six months experience involving training in both practical applications and theory directly related to Nerve Conduction Studies (NCS).
- Download and study from the AAET Handbook for Candidates.

Candidates are required to provide the following supporting documentation with submission of the AAET National Registry Examination for Nerve Conduction Studies. The application will allow for uploading of the necessary files:

1. AAET Attestation Statement signed by the supervising physician attesting that the technologist is not performing invasive (needle) examinations that the physician is responsible for interpreting data.

OR

2. A copy of the certificate for the superseding active board certification which allows EMG and interpretation as stated by your state and regional guidelines.

Along with:

Pathway 1:

One year experience and proof of performance of 100 patient encounters **OR** one year of experience and 30 AAET CEUs. For purposes of AAET registration, a patient encounter is defined at an individual patient visit. Use the AAET Patient Encounter form to submit documentation of patients.

Pathway 2:

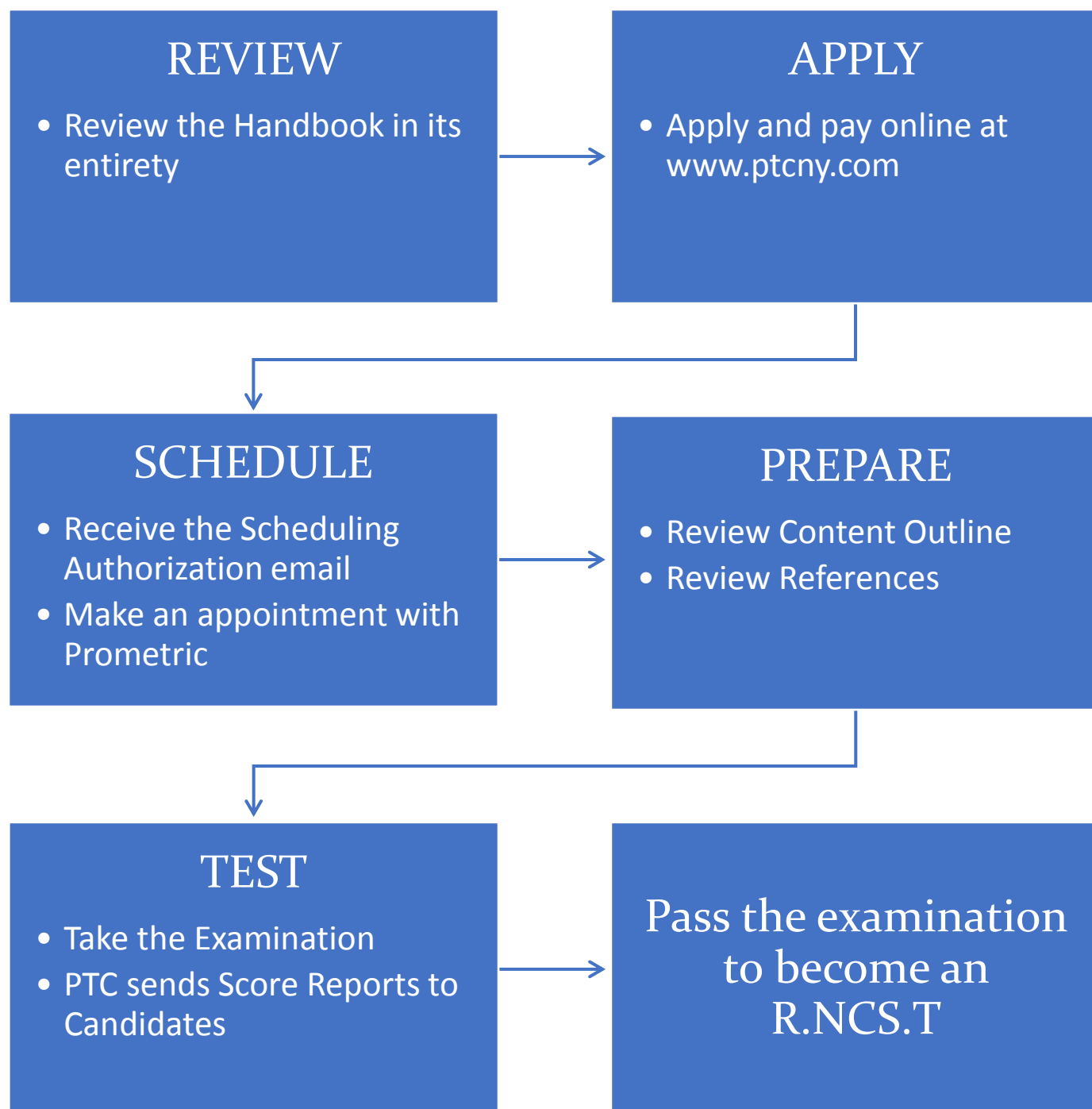
NDT CAAHEP graduate and proof of performance if 100 patient encounters **OR** NDT CAAHEP graduate and 30 AAET CEUs.

Additional required documentation for all pathways:

- A copy of certification card for Basic Life Support (BLS) for the Healthcare Provider under the American Heart Association.
- Complete and file the application for AAET National Registry Examination for Nerve Conduction Studies.
- Pay \$625 by credit card

A candidate may sit for the AAET R.NCS.T. examination after receiving confirmation of supporting documentation and payment.

THE REGISTRATION PROCESS



COMPLETION OF APPLICATION

Read and follow the directions on the application and in this handbook; all applications must be completed online. Candidates must complete the examination application in full, using your name exactly as it appears on your current government-issued photo ID such as a driver's license or a passport. The completed application, with all documentation, can be submitted and paid for online at www.ptcny.com/test-sponsors/aaet.

Payment is due at the time of application. All applications will be reviewed for eligibility once payment is received. Candidates found to be ineligible or applications incomplete as of 21 days before the start of the chosen testing period will be refunded their examination fee minus a \$50.00 processing fee.

Application Checklist

Candidates must check that the following documents are uploaded with their application:

- ✓ Patient Encounter Documentation Form
- ✓ Attestation completed and signed by supervising physician or a copy of the certificate for the superseding active board certification which allows EMG and interpretation as stated by state and regional guidelines
- ✓ CAAHEP accredited neurodiagnostics program diploma/END program certificate (if applicable)
- ✓ AAET CEUs (if applicable)
- ✓ Copy of current AHA BLS certification card

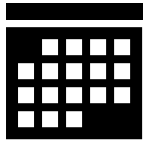


Please note: Applicants who are not approved to sit for the examination or whose applications are incomplete 21 days prior to the first day of the testing window will receive a refund of their application fee minus the \$75 administrative fee. Refunds will be processed approximately 30 days after the end of the testing period.

EXAMINATION ADMINISTRATION AND SCHEDULING

The National Registration Examination for Nerve Conduction Studies is administered during an established two-week testing window on a daily basis, excluding holidays, at computer-based testing facilities managed by Prometric.

Scheduling Examination Appointments



Approximately eleven (11) weeks prior to the start of the testing window, approved candidates will be emailed a Scheduling Authorization from **notices@ptcny.com**. Please ensure you enter your correct email address on the application and add the 'ptcny.com' domain to your email safe list. If you do not receive a Scheduling Authorization eight (8) weeks prior to the start of your chosen testing window contact the Professional Testing Corporation at (212) 356-0660 or online at www.ptcny.com/contact.

The Scheduling Authorization will indicate how to schedule your examination appointment with Prometric as well as the dates during which testing is available. Appointment times are first-come, first-serve, so schedule your appointment as soon as you receive your Scheduling Authorization in order to maximize your chance of testing at your preferred location and on your preferred date. **Candidates who wait until the last minute run the risk of missing out on their preferred date, time, and testing center. Candidates unable to schedule an appointment will forfeit their fees.**

Candidates unable to take the examination during their chosen testing window will need to reapply for the examination and pay a new application fee. See page 8 for more information on transferring to a new testing window.

After you make your test appointment, Prometric will send you a confirmation email with the date, time, and location of your exam. Please check this confirmation carefully for the correct date, time, and location. Contact Prometric at (800) 741-0934 if you do not receive this email confirmation or if there is a mistake with your appointment.

Note: International candidates may also schedule, reschedule, or cancel an appointment online at www.prometric.com/AAET.

IMPORTANT!

You **MUST** present your current driver's license, passport, or U.S. military ID at the test center. Expired, temporary, or paper driver's licenses will **NOT** be accepted.

The first and last name on your Scheduling Authorization **MUST** exactly match the first and last name on your photo ID.

Fees will not be refunded for exams missed because of invalid ID.

Rescheduling Examination Appointments within a Testing Period

Candidates are able to reschedule their examination appointments within the same testing period as long as the request is submitted within the timeframe described below. Reschedule within the permitted time frame by calling or going to the Prometric website: www.prometric.com/AAET.

Time Frame	Reschedule Permitted?	Stipulations
Requests submitted 30 days or more before the original appointment	Yes	None
Requests submitted 29 to 5 days before the original appointment	Yes	Candidate must pay Prometric a rescheduling fee of \$50.
Requests submitted less than 5 days before the original appointment	No	Candidates who do not arrive to test for their appointment will be considered a no-show and all their examinations fees will be forfeited. Candidates will need to reapply and pay full examination fees for a future testing period.

Transferring to a New Testing Period

Candidates unable to take the examination during their scheduled testing period may request a **ONE-TIME** transfer to a future testing period. **There is a transfer fee of \$216.00.** After you have transferred once by paying the \$216.00 fee, you will need to pay the examination fee of \$650.00 in order to transfer a second time; so, ***please plan carefully.***

Please note: requests to transfer to a new testing period must be received within 30 days of your originally scheduled testing period.

Candidates wishing to transfer to a new testing period need to follow the steps below.

1. Go to <http://secure.ptcny.com/apply>.
2. Click "Start New Application."
3. Choose AAET in the first drop-down menu; then choose the new examination period in the second drop down menu and fill out the rest of the information on the page.
4. Fill out the application making sure you answer yes to the question asking if you are transferring.
5. When you have finished the application, click "Submit Transfer Request."
6. PTC Support will send you an email letting you know your transfer application was approved and that you can log back into your application and pay the one-time \$216.00 transfer fee.

Call 212-356-0660 if you have any questions regarding the transfer process.

If candidates are unable to attend the examination on the date for which they registered and elect not to transfer to another testing period, the application will be closed and all fees will be forfeited. There will be no refund of fees.

The transfer fee is based on costs and is not punitive in nature. The transfer fee must be paid at the time the request is approved. The candidate is responsible for contacting Prometric and canceling the original examination appointment, if one was made.

Exams may only be transferred to a new testing period once; please plan carefully.

Please note: Transferring your Examination only refers to instances when a candidate is unable to take their exam during a testing period for which they have already applied. Candidates who did not pass their examination and are retaking the examination need to pay the full \$650 Examination Fee.

Failing to Report for an Examination



If you fail to report for an examination, you will forfeit all fees paid to take the examination. A completed application form and examination fee are required to reapply for the examination.

EXAMINATION FEES

Fee Type	Amount	Details
Application Fee	US \$650.00	<ul style="list-style-type: none"> • Non-refundable¹ • Non-transferable • Includes testing center fees • Includes non-refundable \$75 administrative fee
Transfer Fee (Moving to a new testing window; see page 8)	US \$216.00	<ul style="list-style-type: none"> • Applies to candidates who need to move to a new testing period • Must submit new application & fee to PTC
Rescheduling Fee (29-5 days prior to scheduled appointment; see page 8)	US \$50.00	<ul style="list-style-type: none"> • Applies to candidates who need to move their appointment within their current testing period • Payable directly to Prometric • Reschedule with Prometric online or over the phone



All fees are non-refundable and non-transferable.

There will be no refund of fees. **Please be advised: Prometric does not have the authority to grant transfers to another testing period or refunds.**

There will be no refund of fees except if applicants are ineligible for the examination. Ineligible candidates will be refunded their fees minus an administrative fee. Please be advised: Prometric does not have the authority to grant transfers to another testing period or refunds. All requests must be made through PTC.

¹ Applicants who are ineligible to take the examination or whose applications are incomplete by the application deadline will have their examination fees returned minus an administrative fee.

SPECIAL ACCOMMODATIONS

AAET and PTC support the intent of and comply with the Americans with Disabilities Act (ADA). PTC will take steps reasonably necessary to make certification accessible to persons with disabilities covered under the ADA. According to the ADA, an individual with a disability is a person who has a physical or mental impairment that substantially limits a major life activity (such as seeing, hearing, learning, reading, concentrating, walking) or a major bodily function (such as neurological, endocrine, or digestive system). The information you provide and any documentation regarding your disability and special test accommodations will be held in strict confidence.

All approved testing accommodations must maintain the psychometric nature and security of the examination. Accommodations that fundamentally alter the nature or security of the exam will not be granted.

Special testing arrangements may be made upon receipt of the Application, examination fee, and a completed and signed Request for Special Needs Accommodations Form, available from www.ptcnyc.com/PDF/PTC_SpecialAccommodationRequestForm.pdf or by calling PTC at (212) 356-0660.

This Form must be uploaded with the online application. Candidates who do not submit their Special Accommodations Form with their application may not be able to test during their chosen testing period and therefore be subject to rescheduling or transfer fees.

Only those requests made and received on the official Request for Special Needs Accommodations Form will be reviewed. Letters from doctors and other healthcare professionals must be accompanied by the official Form and will not be accepted without the Form. All requests must be made at the time of application. Accommodations cannot be added to an existing exam appointment.

PREPARING FOR THE EXAMINATION

- Check your government issued photo ID (driver's license, passport or U.S. Military ID) when you make your examination appointment. Is it expired? Does the first and last name on your ID match the first and last name on your Scheduling Authorization email? Proctors at the Prometric testing center will refuse admission to candidates with expired IDs, IDs with names that do not match their records, and temporary paper IDs. Candidates will be marked as no-shows and will forfeit their exam fees.
- Check your PTC Scheduling Authorization email and Appointment Confirmation email from Prometric to make sure everything is accurate (i.e. your name, exam name, appointment date, time and location).
- Make yourself familiar with the location of your chosen testing site and any requirements they may have for parking and check the weather and traffic conditions before you leave for the testing center. Make sure you give yourself plenty of time to arrive as late arrival may prevent you from testing.
- In the event of inclement weather, check the Prometric website for site closures: <https://www.prometric.com/closures>.
- Prometric's website provides information on what you can expect on your test day, including a walkthrough of check in and security procedures: <https://www.prometric.com/test-center-security>.
- This Handbook provides the Content Outline for the Examination (see appendix). Use these to help you start studying for the examination.
- Review What to Expect at the Test Center and Rules for the Examination on the next pages before your appointment.

WHAT TO EXPECT AT THE TESTING CENTER

PTC has partnered with Prometric Testing Centers to deliver examinations to candidates. Here is what you can expect when you arrive at your Prometric Testing Center.

- **Candidate Check-In**
 - Candidates will be asked to present their IDs
 - Candidates will be asked to empty and turn out their pockets
 - Candidates will be “wanded” or asked to walk through a metal detector
 - Inspection of eyeglasses, jewelry, and other accessories will be conducted. Jewelry other than wedding and engagement rings is prohibited.
 - Religious headwear may be worn into the testing room; however, it may be subject to inspection by a testing center administrator before entry into the testing room is permitted.
 - Prometric provides lockers for candidates to store their purses, mobile phones, jackets, food, drinks and medical supplies.
- **During the Exam**
 - No breaks are scheduled during the exam. Candidates who must leave the testing room to take a break will not be given extra time on the exam
 - Accessing mobile phones or study materials during the examination is prohibited
 - Smoking is prohibited at the testing center
 - All examinations are monitored and may be recorded in both audio and video format

Please keep in mind: other exams will be administered at the same time as your examination. Therefore, examinees may hear ambient noises such as typing, coughing, or people entering and exiting the testing room that cannot be avoided. Prometric is unable to provide a completely noise-free environment. However, headphones may be requested to minimize impact.

Please see [Prometric's website](#) for more information about what to expect on testing day.

RULES FOR THE EXAMINATION

Please read the information below carefully. You are responsible for adhering to the examination rules while at the testing center.

- ⇒ You must present your current driver's license, passport, or US Military ID at the testing center. Candidates without valid ID will NOT be permitted to test. Temporary or paper copies of your ID will not be accepted.
- ⇒ No Electronic devices that can be used to record, transmit, receive, or play back audio, photographic, text, or video content, including but not limited to, cell phones, laptop computers, tablets, Bluetooth devices; wearable technology (such as smart watches), MP3 players (such as iPods), pagers, cameras, and voice recorders are permitted to be used and cannot be taken in the examination room. Prometric provides lockers for your personal items.
- ⇒ No papers, books, or reference materials may be taken into or removed from the testing room.
- ⇒ No questions concerning content of the examination may be asked during the examination session. The candidate should read carefully the directions that are provided on screen at the beginning of the examination session.
- ⇒ Candidates are prohibited from leaving the testing room while their examination is in session, with the sole exception of going to the restroom.
- ⇒ Bulky clothing, such as sweatshirts (hoodies), jackets, coats, and hats (except hats worn for religious reasons), and most types of jewelry may not be worn while taking the examination. Proctors will ask you to remove such items and place them in your locker. Please see [Prometric's statement on Test Center Security](#) for more information.
- ⇒ All watches and "Fitbit" type devices cannot be worn during the examination.
- ⇒ No food/beverages are permitted inside the testing room. Leave these items in your assigned locker.



Contact PTC at (212) 356-0660 or www.ptcny.com/contact with any questions about the Examination Rules.

Violation of any of the rules listed above may lead to forfeiture of fees, dismissal from the testing room, and cancellation of your test scores.

TESTING CONDITIONS OR EXAMINATION FEEDBACK

Any candidate who feels that the examination effort was negatively impacted by the test center conditions should notify the proctor immediately. The situation should also be reported to PTC at www.ptcny.com/contact within 3 business days of the test appointment. Any comments about the test itself should also be reported to PTC at www.ptcny.com/contact within 3 business days of the test appointment.

REPORT OF RESULTS

At the end of the examination, candidates will receive information on how to receive their unofficial test score report. Candidates are not eligible to use the R.NCS.T. credential until their official score is received. Candidates will be notified in writing by PTC approximately four weeks after the end of the examination period whether they have officially passed or failed the examination. This is necessary to allow for the psychometric review and administrative time required to ensure accurate and reliable scores. Scores on the major areas of the examination and on the total examination will also be reported. Successful candidates will also receive certificates from AAET.

REQUESTING A HANDSCORE

Candidates who fail the examination may request a hand scoring of their data file. Hand scoring is a manual check of the data file by the testing service to determine if there have been any errors in scoring. Although the probability of such an error is extremely remote, this service is available. Requests for hand scoring must be received by PTC no later than 90 days after the date of the examination by completing and returning the Request of Handscore form on www.ptcny.com with payment of \$25. Candidates who fail the examination will not be permitted to see the examination questions. For reasons of test security, no candidate is allowed to review the examination or any of its items.

To ensure correct reporting of results, PTC automatically performs handscores of examinations of candidates who score within 3 points of passing as a quality control measure. Thus, it is extremely doubtful that any examination results will change from “fail” to “pass” through handscoreing.

CONFIDENTIALITY OF EXAMINATION SCORES

AAET will release the individual test scores ONLY to the individual candidate. Any questions concerning test results should be referred to AAET or PTC.

REEXAMINATION

The National Registry Examination for Nerve Conduction Studies may be taken as often as desired, upon filing of a new Application and fee. There is no limit to the number of times the examination may be repeated.

ATTAINMENT OF REGISTRATION

Candidates who pass the Registry Examination for Nerve Conduction Studies will be authorized to use the designation R.NCS.T.

REVOCATION OF REGISTRATION

Registration will be revoked for either of the following reasons:

1. Falsification of Application.
2. Misrepresentation of certification status.
3. Failure to complete and submit the required continuing education for recertification.

AAET provides an appeal mechanism for any action taken in this regard. It is the responsibility of the individual to initiate this process.

RECERTIFICATION

Each R.NCS. T. must either retake and pass the written examination or submit documentation of continuing education totaling a minimum of 30 hours directly related to NCS or neuromuscular diseases over the five (5) year period. Technologists must keep records with proof of attendance. When a technologist fails to renew his/her credential, the credential expires and the technologist is unable to legally claim certification. Recertification policies can be found by navigating to the recertification tab at www.aaet.info or e-mailing aaet-cerc@aaet.info.

CONTENT OF THE EXAMINATION

The AAET National Registry Examination for Nerve Conduction Studies is a computer-based examination composed of a maximum of 250 multiple-choice, objective questions with a total testing time of four (4) hours. The content for the examination is described in the Content Outline on the next page.

The questions for the examination are obtained from individuals with expertise in electrodiagnostic technology and are reviewed for construction, accuracy, and appropriateness by the AAET.

AAET, with the advice and assistance of the Professional Testing Corporation, prepares the examination.

The AAET National Registry Examination for Nerve Conduction Studies will be weighted in approximately the following manner:

I.	Physiology and Anatomy	20%
PRINCIPLES OF NCS		
II.	Basic Electronics, Instrumentation and Stimulation	5%
III.	Nerve Conduction Velocity Concepts and Wallerian Degeneration	10%
STIMULATION & RECORDING PRINCIPLES		
IV.	Late Responses and Blink Reflex	5%
V.	Neuromuscular Junction Transmission & Repetitive Nerve Stimulation Studies	13%
VI.	Peripheral Nerves, Case Studies & Electrode Placement/Practical Application	35%
VII.	Technical Considerations, Anomalies and Safety	12%

I. PHYSIOLOGY AND ANATOMY

- A. Basic Physiology
 - 1. Basics
 - 2. Physiologic Principles of Resting Potentials and Action Potentials
 - a. Resting Potentials
 - 1. Cell Membrane Physiology
 - 2. All or None Response
 - 3. Depolarization
 - 4. Repolarization
 - 5. Hyperpolarization
 - 6. Refractory Period
 - b. Propagation of Action Potentials
 - 1. Saltatory Conduction
 - a. Schwann Cells
 - b. Node of Ranvier—Internodal Length
 - c. Sodium Potassium Pump
 - 2. Myelinated Axons—Degree of Myelination
 - 3. Unmyelinated Axons
- B. Nerve Physiology
 - 1. Peripheral Nerve Anatomy
 - a. Fascicles
 - b. Connective Tissues (epineurium, perineurium, endoneurium)
 - c. Fiber Types
 - 2. Cell Body Location of Motor and Sensory Axons
 - a. Dorsal Root Ganglion
 - b. Anterior Horn Cell
- C. Muscle Physiology
 - 1. Structure
 - a. Myofibril
 - b. Sarcomere
 - c. H, A, I, and Z Bands
 - 2. Mechanism of Contraction
 - a. Myosin Filaments
 - b. Actin Filaments
 - c. Calcium
 - d. Sarcoplasmic Reticulum—T Tubules
- D. Plexus
 - 1. Spinal Roots
 - 2. Dorsal and Ventral Roots/Rami
 - 3. Plexus
 - a. Brachial Plexus
 - b. Lumbosacral Plexus

PRINCIPLES OF NCS

II. BASIC ELECTRONICS, INSTRUMENTATION, & STIMULATION

- A. Basic Electronics
 - 1. Ohm's Law
 - 2. Circuit Theory—AC&DC Current & Resistors
- B. Instrumentation
 - 1. Averaging
 - 2. Filtering Effects
 - 3. Phase Cancellation
 - 4. Amplifiers (CMRR—Input Impedance—Differential Amplifier)
- C. Equipment Parameters
 - 1. Filters
 - 2. Sweep Speed/Timebase
 - 3. Gain/Sensitivity
 - 4. Cursor Placement
- D. Stimulation
 - 1. Stimulators—Constant Current/Voltage
 - 2. Parameters
 - a. Intensity
 - b. Duration
 - c. Polarity
 - 1. Cathode
 - 2. Anode
 - 3. Concepts and Pitfalls
 - a. Anodal Black
 - b. Volume Conduction
 - c. Artifact
 - d. Supramaximal Stimulation

III. NERVE CONDUCTION VELOCITY CONCEPTS AND WALLERIAN DEGENERATION

- A. Nerve Conduction
 - 1. Anatomy
 - a. Pre and Post Ganglionic Lesions
 - 1. Localization
 - 2. Effects
 - b. Nerve Conduction Studies
 - 1. Focal Lesions
 - 2. Conduction Block
 - 3. Diffuse Processes
 - 4. Multifocal Disorders
 - 5. Demyelination
 - 6. Axonal Loss
 - 7. Temporal Dispersion

2. Waveform Evaluation
 - a. Nerve Conduction Parameters
 1. Latency
 2. Amplitude
 3. Conduction Velocity
 4. Area
 5. Duration
 6. Rise Time
 - b. Normal Values
3. Pediatric Nerve Conduction
- B. Wallerian Degeneration
 1. Neurapraxia
 2. Axonotmesis
 3. Neurotmesis

STIMULATION & RECORDING PRINCIPLES

IV. LATE RESPONSES AND BLINK REFLEX

- A. F Waves
 1. Origin
 2. Technical and Clinical Applications
 3. Relationship to M wave and Habituation
- B. H Reflexes
 1. Origin
 2. Technical and Clinical Applications
 3. Relationship to M wave and Habituation
- C. A Waves
- D. Blink Reflex
 1. Origin
 2. Technical and Clinical Applications
 3. R1, R2, Contralateral R2

V. NEUROMUSCULAR JUNCTION

TRANSMISSION AND REPETITIVE NERVE STIMULATIONS STUDIES

- A. Neuromuscular Junction
 1. Physiology/Anatomy
 2. Presynaptic Disorders
 - a. Lambert-Eaton Syndrome
 - b. Botulism
 3. Postsynaptic Disorders—Myasthenia Gravis
- B. Performing Repetitive Nerve Stimulation Studies
 1. Technical Setup
 - a. Electrode Stabilization
 - b. Stimulation Parameters
 2. Post Activation Evaluation

- a. Facilitation
- b. Exhaustion
- c. Pseudofacilitation

VI. PERIPHERAL NERVES, CASE STUDIES, & ELECTRODE PLACEMENT/PRACTICAL APPLICATION

- A. Neuroanatomy
 1. Upper Extremity
 - a. Median Nerve
 1. Median Motor Nerve
 2. Median Sensory Nerve
 3. Anterior Interosseous
 4. Palmar Cutaneous Branch
 - b. Ulnar Nerve
 1. Ulnar Motor Nerve
 2. Ulnar Sensory Nerve
 3. Dorsal Ulnar Cutaneous
 4. Medial Antebrachial Cutaneous
 5. Palmar Cutaneous Branch
 - c. Radial Nerve
 1. Radial Motor Nerve
 2. Posterior Interosseous Nerve
 3. Superficial Radial Nerve
 2. Lower Extremity
 - a. Saphenous Nerve
 - b. Femoral Nerve
 - c. Lateral Femoral Cutaneous
 - d. Sciatic Nerve
 1. Common Peroneal (Fibular)
 - a. Deep
 - b. Superficial
 2. Tibial Nerve
 - a. Medial Plantar Nerve
 - b. Lateral Plantar Nerve
 3. Sural Nerve
 3. Cranial Nerves I—XII
 - a. Innervations
 - b. Cutaneous Sensation
 - c. Facial Nerve
 - d. Trigeminal Nerve
 - e. Accessory Nerve
 4. Other Nerves
 - a. Phrenic
 - b. Suprascapular
 - c. Long Thoracic
 - d. Axillary

B. Clinical Syndromes

1. Motor Neuron
 - a. Multifocal Motor Neuropathy with Conduction Block
 - b. Amyotrophic Lateral Sclerosis
 - c. Other (Poliomyelitis, Spinal Muscular Atrophy)
2. Dorsal Root Ganglion Disorders/Sensory Neuropathies
3. Root
 - a. Radiculopathy
 - b. Polyradiculopathy
 - c. Root Avulsion
4. Plexus Lesions
 - a. Erb's Palsy
 - b. Neurogenic Thoracic Outlet Syndrome
 - c. Parsonage Turner
5. Mononeuropathies
 - a. Median at the Wrist (Carpel Tunnel)
 - b. Ulnar at the Elbow
 - c. Ulnar of Guyons Canal
 - d. Radial Nerve (Saturday Night Palsy)
 - e. Mononeuropathy Multiplex
 - f. Tibial at the Ankle (Tarsal Tunnel)
 - g. Peroneal at Fibular Head
6. Polyneuropathies
 - a. Hereditary (Charcot Marie Tooth)
 - b. Acquired
 1. Acute Inflammatory Demyelinating Polyneuropathy (AIDP)
 2. Chronic Inflammatory Demyelinating Polyneuropathy (CIDP)
 3. Other (Toxic, Metabolic, Infectious, etc.)
7. Muscle Disorders

VII. TECHNICAL CONSIDERATIONS, ANOMALIES, AND SAFETY

A. Physiologic Factors

1. Temperature
 - a. Effects on Latency, Velocity, and Amplitude
 - b. Effects on Repetitive Stimulation Factors
 - c. Warming Methods
2. Age
3. Height
4. Anomalous Innervation
 - a. Martin Gruber Anastomosis
 1. Hypothenar (ADM)
 2. First Dorsal Interosseous
 3. Thenar (APB)
 - b. Richie Cannieu Anastomosis
 - c. Accessory Peroneal

B. Technical Factors

1. Electrode Size
2. Electrode Polarity
3. Distance of Reference
4. Electrode Placement
5. Electrode Impedance
6. Measuring Errors
7. Limb Position
8. Antidromic vs. Orthodromic
9. Troubleshooting Abnormal NCS Findings

C. Safety Factors

1. Infection Control Guidelines
 - a. Transmissible Disease/Standard (Universal) Precautions
 - b. Disinfection
2. Electrical Safety
 - a. Equipment
 - b. Leakage Current
 - c. Electrically Sensitive Patients
3. Practice Compliance
 - a. HIPAA
 - b. OSHA

CODE OF ETHICS

The Code of Ethics of The Nerve Conduction Association

As a Member of The Nerve Conduction Association, I subscribe to this Code of Ethics.

1. In my work I will act in a manner so as to merit the respect of my patients, my colleagues, and/or my fellow AAET Members.
2. I will not work outside my scope of practice and will adhere to the state or regulatory guidelines for which I am employed.
3. I will maintain confidentiality as defined by Health Insurance Portability and Accountability Act (HIPAA) regarding any patient information.
4. I will treat all patients with the utmost respect and courtesy, regardless of their sex, race, creed, or the nature of their presenting disease.
5. I will strive to achieve excellence and maintain competence in my work, and to assist and encourage other technologists to do the same.

I understand that by becoming a R.NCS.T. and/or member of AAET I am bound by this Code of Ethics. I will abide by the rules and regulations as set forth by the Board of Directors of The Nerve Conduction Association. I understand that my membership may be revoked if I am found to be in violation of this code.

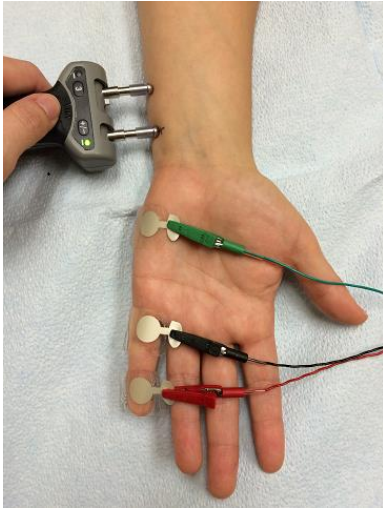
SAMPLE EXAMINATION QUESTIONS

In the following questions, choose the one best answer.

1. If a patient presents with possible upper trunk plexopathy, changes in which of the following diagnostic studies would most likely support a diagnosis of a lesion at this level?
 1. Median and ulnar sensory studies
 2. Median motor and ulnar sensory studies
 3. Ulnar and radial sensory studies and ulnar F wave studies
 4. Radial, median, and lateral antebrachial cutaneous sensory studies
2. The ulnar nerve is derived from which of the following roots and brachial plexus components?
 1. C6, 7; lower trunk; medial cord
 2. C7, 8, T1; lower trunk; posterior cord
 3. C8, T1; lower trunk; medial cord
 4. C8, T1; lower trunk; lateral cord
3. Preganglionic injury (proximal to the dorsal root ganglion) results in Wallerian degeneration to the
 1. motor axons only.
 2. sensory axons only.
 3. both motor and sensory axons.
 4. neither motor nor sensory axons.
4. If an individual referred for nerve conduction studies has a complete lesion of the femoral nerve immediately distal to the dorsal root ganglion, the H reflex studies would be expected to be
 1. absent.
 2. delayed.
 3. reduced.
 4. unaffected.
5. The distal onset latency on a median motor study is 3.4ms and the proximal latency is 7.4ms. If the distance between the two sites is 226mm, what is the conduction velocity of this segment?
 1. 32m/sec
 2. 57m/sec
 3. 66m/sec
 4. 77m/sec

(Continued on the next page)

6. What nerve conduction study is being performed in the photograph below?



1. Median sensory antidromic
2. Ulnar sensory antidromic
3. Median sensory orthodromic
4. Ulnar sensory orthodromic

ANSWER KEY	
Q	A
1	4
2	3
3	1
4	4
5	2
6	2

REFERENCES

The following references may be of some help in preparing for the examination. The list does not attempt to include all acceptable references nor is it suggested that the examination questions are necessarily based on these references.

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PTC19048



R. NCS.T. EXAMINATION ATTESTATION STATEMENT

Candidate Name: _____

Address: _____

E-mail Address _____

● **SUPERVISING PHYSICIAN**

- I attest that the above named candidate: (check all that apply)

- ☐ has undergone on-the-job training in NCS under my direction.
- ☐ is not performing invasive (needle) examination and that as the supervising physician, I am responsible for interpreting the data obtained in NCS and needle EMG testing.
- ☐ has satisfactorily completed the 100 patient encounters documented on the 'submitted cases sheet'.
- ☐ is competent in NCS testing and ready to sit for the R. NCS. T board examination.
- ☐ has graduated from a CAAHEP accredited neurodiagnostics/END program
OR has one year experience

Signature: _____ Name: _____

Email: _____ Date: _____
(for use by AAET to confirm or clarify candidate information.)



R.NCS.T. APPLICATION

NCS Patient Encounter Documentation Form

A patient encounter is defined as an individual patient visit. No more than 12 encounter per day; only encounters within three (3) years of application date will be accepted. Present cases in chronological order.

Candidate: _____ Employer: _____

Dates of studies: _____ through _____

#	DATE	PATIENT Referral (Mononeuropathy, Radiculopathy, MND, NMJD, Plexopathy, etc.)	SUPERVISING MD	NORMAL OR ABNORMAL?