Kingsborough Community College

Of the

City University of New York

Physical Therapy Assistant Program

Course Syllabus

PTA 7

Modalities and Procedures

Course Description:
This course includes the physical basis of physical therapy modalities of electricity along with physiological principles, indications, and contra-indications and precautions. The course also introduces the student to pulmonary toilet, mechanical traction, phototherapy and therapeutic massage.


Pre-requisites: PTA1, PTA2, PTA10, PTA20, PTA3, PTA4, PTA5, PTA 6, BIO11, BIO12

Co-requisites: PTA8, PTA 25

Student Learning Objectives

As evidenced by successful performance and completion of written and practical examinations, assignments, research article reviews, lab presentations, and the role playing and analysis of clinical scenarios, the student will:

1.0. Implement electrotherapy interventions (including high/low voltage, interferential and TENS).
   1.1. State the historical use of electrical stimulation in rehabilitation.
   1.2. Define the therapeutic goals of electrical therapy.
1.3 Define the concepts of electrophysics including: voltage, resistance, impedance and capacitance.
1.3. Identify the difference between direct current and alternating current.
1.4. Identify the differences between low voltage and high voltage current.
1.5. Define electrical current in terms of pulse and wave forms, amplitude, duration, frequency and duty cycle.
1.6. Identify the physiological events associated with electrical stimulation.
1.7. Define the distinguishing characteristic and indications and contraindications of electrical stimulation.
1.8. Describe the uses and benefits of electrical stimulation in the treatment of pathology (loss of ROM, weakness, pain, open wounds).
1.10. Distinguish the physiological effects of various parameters of electrical stimulation (voltage, type, dosage, duty cycle, etc.).
1.11. Discuss the therapeutic relationship of electrotherapy with other therapeutic procedures.
1.12. Demonstrate safe administration of electrical stimulation including low and high volt current, TENS and interferential current, in the management of pain, weakness, open wounds, and other common conditions treated with physical therapy.

2. Implement EMG biofeedback intervention.
   2.1 Define the distinguishing characteristics and indications and contraindications of EMG biofeedback.
   2.2 Describe the uses of EMG biofeedback in physical therapy intervention.
   2.3 Discuss the therapeutic relationship of EMG biofeedback with other therapeutic procedures.
   2.4 Demonstrate the safe use of EMG biofeedback while considering indications and contraindications.

3. Implement iontophoresis interventions.
   3.1 Define the distinguishing characteristics and indications and contraindications of iontophoresis.
   3.2. Explain the concepts of ion transfer related to iontophoresis.
   3.3. Discuss the therapeutic relationship of iontophoresis with other therapeutic procedures.
   3.4. Demonstrate safe administration of iontophoresis, while considering patient comfort, dosage, agent, indications and contraindications and physiological effects.

4.0 Implement edema control activities utilizing air compression, external wrapping, and elevation.
   4.1 Define the distinguishing characteristics and indications and contraindications of air compression, external wrapping, and elevation activities.
   4.2 Define mechanisms of edema control.
4.3 Demonstrate safe and appropriate administration of mechanical compression, external wrapping, and elevation activities.

5.0 Interpret thoracoabdominal movement and breathing patterns
   5.1 Observe breathing patterns.
   5.2 Identify contraction of accessory muscles.
   5.3 Describe coughing techniques and demonstrate breathing exercises.
   5.4 Teach coughing and breathing activities.

6.0 Implement pulmonary toilet intervention.
   6.1 Describe the anatomical organization of the respiratory system.
   6.2 Discuss the importance of the recognition of respiratory distress and pulmonary hygiene in the prevention and treatment of disease.
   6.3 Describe postural drainage, vibration and percussion techniques, and the characteristics of cough and sputum.
   6.4 Describe pathological conditions treated with postural drainage and pulmonary hygiene techniques.
   6.5 Demonstrate safe and appropriate performance of auscultation, postural drainage, vibration, percussion, and pulmonary hygiene techniques.
   6.6 Teach pulmonary hygiene activities.
   6.7 Demonstrate appropriate documentation of pulmonary toileting.
   6.8 Analyze the effectiveness of pulmonary hygiene techniques.
   6.9 Discuss the therapeutic relationship of pulmonary toileting with other therapeutic procedures (therapeutic exercise, range of motion, functional activities, etc.)

7. Implement therapeutic massage intervention.
   7.1 Discuss the uses, precautions, and applications of therapeutic massage.
   7.2 Describe specific massage techniques including, effleurage, petrissage, tapotement and myofascial release.
   7.3 Discuss the therapeutic relationship of massage with other therapeutic procedures (therapeutic exercise, range of motion, functional activities, etc.)
   7.4 Demonstrate safe and appropriate performance of therapeutic massage techniques.
   7.5 Demonstrate appropriate documentation of therapeutic massage.
   7.6 Teach the benefits of therapeutic massage.

8. Given mock patient scenarios, implement comprehensive physical therapy plan of care as directed by a physical therapist.
   8.1 Perform therapeutic techniques demonstrating an understanding of the role of the physical therapist assistant in rehabilitation.
   8.2 Perform therapeutic techniques appropriately employing universal precautions and sound body mechanics.
   8.3 Perform therapeutic techniques demonstrating an understanding of organizational structure, levels of authority, and fiscal considerations of the health care delivery system.
8.4. Teach the uses, applications and responses of modalities and procedures to patient, family and other healthcare workers with emphasis on safety and rationale as directed by the physical therapist.

8.5 Demonstrate the adjunctive nature of modalities and procedures by integrating their use in complete treatment applications.

8.6 Implement therapeutic interventions within the plan of care utilizing knowledge of assessment and measurement, functional activities, modality, and therapeutic exercises skills.

8.7 Implement therapeutic interventions within the plan of care demonstrating consideration of time management, therapeutic sequence and procedure selection issues.

8.9. Demonstrate appropriate documentation of modality and procedure use, considering patient response, treatment parameters, long/short term goals, and effectiveness.

8.10. Perform physical therapy interventions considering influencing factors (psychosocial, economic, patient satisfaction, legal/ethical, etc.).

8.11 Assist in discharge planning and alternative levels of care decision making with supervising physical therapist.


8.13. Identify clinical responses and situations that require the attention of the supervising physical therapist or immediate interventions such as first aid or cardiopulmonary resuscitation and take appropriate action.


8.15. Assess patient response to treatment and appropriately alter therapeutic intervention within the plan of care.

8.16. Delineate beneficial and untoward effects of electrotherapy, ultraviolet pulmonary toileting and therapeutic massage.

8.17. Analyze the relationship of all physical modalities with other therapeutic procedures (therapeutic exercise, range of motion, functional activities).


8.19. Recognize aspects of the plan of care that may be outside the PTA’s scope of practice and act accordingly.

9. **Demonstrate appropriate professional behavior**

9.1. Attend and be on time for class, lab, and scheduled appointments.

9.2. Be prepared for lab activities, attend to tasks assigned.

9.3. Accept constructive criticism and respond and/or follows through appropriately.

9.4. Express self in a clear and easily understood manner.

9.5. Maintain appropriate personal hygiene.

9.6. Treat others with positive regard, dignity and respect.

9.7. Analyze and examine professional literature considering: specific scientific methods, interpretation of results, and clinical significance in order to foster further personal investigation and clinical effectiveness.

9.8. Explain the importance of lifelong learning.
9.9. Describe how professional development can occur.

**Student Assessment**

As indicated in the student handbook, to receive a passing grade in this course the student must successfully complete all comprehensive examinations* with a grade of “C” or better. Additionally, the instructor assesses student competencies in skills critical to this course using the standardized skills checklists, located in the laboratory requiring a passing score of at least 90%. Critical skills in this course include:

1.0 Application of the following modalities: low voltage galvanic and faradic stimulation, high voltage galvanic stimulation, interferential stimulation, iontophoresis, TENS, EMG biofeedback, ultraviolet, and mechanical compression.
2.0 Instruction of effects and uses of the following modalities: low voltage galvanic and faradic stimulation, high voltage galvanic stimulation, interferential stimulation, iontophoresis, TENS, EMG biofeedback, ultraviolet, and mechanical compression.
3.0 Performance of postural drainage.
4.0 Performance of vibration and percussion techniques.
5.0 Instruction of breathing exercises.
6.0 Performance of basic therapeutic massage techniques.
7.0 Reporting to supervising physical therapist.

**Grade Determination**

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<thead>
<tr>
<th>Assignment</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Assigned Research Papers</td>
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<tr>
<td>Weekly Quizzes</td>
<td>20%</td>
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<tr>
<td>Mid-Term Examination</td>
<td>15%</td>
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<tr>
<td>Group Presentation</td>
<td>10%</td>
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<tr>
<td>*Laboratory Practical Examination</td>
<td>25%</td>
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<tr>
<td>*Final Examination</td>
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**Assigned Research Paper**

Each student submits two written papers summarizing and critiquing pertinent research article. Topics are assigned by the instructor. Each assignment is worth five percentage points for ten percent of total grade. Missed assignment are accepted without penalty up to one week after the due date. After that the assignment are accepted for no more than 2.5 percentage points.
Weekly Quizzes
Student must take weekly quizzes specifically related to assigned readings. Quiz type includes both “take home” and “in class”. Quizzes are mainly composed of short essay questions. Quizzes are graded and returned within one week. Weekly quizzes are worth twenty percent of the final grade.

Mid-Term Examination
The student takes a cumulative examination covering the first six weeks of the course. The examination includes mainly short essay and fill in type questions. The mid-term examination is worth fifteen percent of the final grade.

Group Presentation
Students are divided into study groups of 3-5 students. Each group is assigned a relevant clinical scenario. The group will be responsible for making a comprehensive presentation. Presentations are made from the sixth week through the twelfth week of the course. The presentation is worth ten percent of the final grade.

Laboratory Practical Examination
All students are required to take a comprehensive practical examination. This examination tests the student’s proficiency in modality application and documentation. The laboratory examination will be scheduled during final week and is worth twenty-five percent of the final grade.

Final examination
The student takes a cumulative final examination. The examination includes mainly short essay and fill in type questions. The final examination is worth twenty percent of the final grade.

Course Outline
TUESDAY INSTRUCTOR

Week #1 and 2- Introduction to Electrical Therapy
Lecture
Assignment: Michlovich, Chapter 9

This initial week introduces the student to electrical stimulation. The history of electrical stimulation as well as therapeutic goals and electrophysics are explored.

Laboratory
The introduction to electrical therapy continues. Students study and experience the parameters, responses, and sensations of electrical stimulation. Students are oriented to and identify common characteristics of electrical stimulation equipment (on/off switches, intensity, electrodes, etc.)
Week #3 and 4 – Electrical Therapy con’t.

Lecture
Assignment: Michlovich, Chapter 9
Current classifications including DC vs. AC, and HV vs. LV are studied in reference to: pulses and waveforms, amplitude and duration, and frequency and duty cycle.

Laboratory
Students practice proper electrode placement and use different size and type of electrodes. Waveforms produced by common electrical current generators are viewed on an oscilloscope. Student continue to experience and describe the sensation and visible physical effects of electrical current.

Week #5 and 6 - Physiological Effects of Electrical Stimulation

Lecture
Assignment: Michlovich, Chapter 9
The physiological effect of electric stimulation is studied. Membrane potentials, peripheral nerves and the motor unit are reviewed (previously learned in Bio 11).

Laboratory
Specific indications and contraindications, and procedures for low and high voltage galvanic stimulation (LVGS, HVGS) are presented. Students perform LVGS and HVGS interventions. Students consider therapeutic parameters as they relate to pathological conditions and effectiveness.

Treatment Application Activity
Student exhibit critical thinking and sound technical skills in the management of a cervical radiculopathy case as presented by the instructor and implement the prescribed plan of care. Students perform pain and sensation assessment, range of motion activities, thermal modalities and electrical stimulation appropriate to the scenario. While performing interventions, students consider additional factors influencing patient care and the contemporary practice of physical therapy including: psycho-social issues and other issues impacting the health care delivery system. Student practice reporting and documenting consequences of treatment to supervising physical therapist. Students perform discharge planning activities including suggestions for home equipment and discharge alternatives. Following this treatment application activity, students discuss patient management and therapeutic techniques.

Week #7 and 8 – Therapeutic Applications of Electrical Stimulation

Lecture
Assignment: Michlovich, Chapter 10, 11
Electrical stimulation application is studied. The effect of electrical stimulation on range of motion, muscle strengthening and edema reduction is discussed in relationship to pathological conditions.
**Laboratory**
Specific indication and contraindication of interferential current are reviewed. Given mock patient scenarios student perform interventions using, interferential, LVGS, and HVGS to produce specific motor responses.

_Treatment Application Activity_
Students exhibit critical thinking and sound technical skills in the management of a status post removal of a long leg cast case as presented by the instructor and implement the prescribed plan of care. Students perform pain and sensation assessment, range of motion activities, goniometry, manual muscle testing, therapeutic exercise, and electrical stimulation appropriate to the scenario. While performing interventions, students consider additional factors influencing patient care and the contemporary practice of physical therapy including: psycho-social issues and other issues impacting the health care delivery system. Students practice reporting and documenting consequences of treatment to supervising physical therapist. Students perform discharge planning activities including suggestions for home equipment and discharge alternatives. Following this treatment application activity, students discuss patient management and therapeutic techniques.

**Week # 9 and 10 – Therapeutic applications of Electrical Stimulation con’t**

*Lecture*
Assignment: Michlovich, Chapter 12, 13

Pain management is discussed in relation to the application of electrical stimulation. Specifically, the uses and indications of transcutaneous electrical nerve stimulation (TENS) are introduced. The applications of EMG biofeedback in pain management and motor re-education are explored.

**Laboratory**
Given mock patient scenarios students apply TENS, and EMG biofeedback techniques. Students practice the teaching of home application of TENS.

_Treatment Application Activity_
Students exhibit critical thinking and sound technical skills in the management of a lumbar peripheral neuropathy case as presented by the instructor and implement the prescribed plan of care. Students perform pain and sensation assessments, range of motion activities, goniometry, manual muscle testing, electrical stimulation and EMG biofeedback. While performing interventions students consider additional factors influencing patient care and the contemporary practice of physical therapy including psychosocial issues and other issues impacting the health care delivery system. Students practice reporting and documenting consequences of interventions to the supervising physical therapist. Students perform mock discharge planning activities including suggestion for home equipment and discharge alternatives. Following this activity, students discuss clinical management and therapeutic techniques.
**Week # 11 and 12- Therapeutic EMG Biofeedback**

**Lecture**
Michlovich, Chapter 16
EMG biofeedback applications are introduced and correlated with electrophysiology concepts, pathological conditions, and clinical applications.

**Laboratory**
Students practice use of EMG biofeedback equipment.

*Treatment Application Activity*
Students exhibit critical thinking and sound technical skills in the management of a low back sprain as presented by the instructor and implement the prescribed plan of care. Students perform pain and sensation assessments, thermal modalities, therapeutic exercise, electrical stimulation and massage appropriate to the scenario. While performing interventions students consider additional factors influencing patient care and the contemporary practice of physical therapy including psychosocial issues and other issues impacting the health care delivery system. Students practice reporting and documenting consequences of interventions to the supervising physical therapist. Students perform mock discharge planning activities including suggestion for home equipment and discharge alternatives. Following this activity, students discuss clinical management and therapeutic techniques.

**THURSDAY INSTRUCTOR**

**Week #1 and 2 –Introduction to Therapeutic Massage**

**Lecture**
Assignment: Handouts
The student is introduced to therapeutic massage. History and physiological effects of are studied. A study of indications, precautions and applications is undertaken.

**Laboratory**
Students practice positioning and preparing one another for therapeutic massage. Given mock patient scenarios, students perform back massages with emphasis on direction, hand placement and education.

*Treatment Application Activity*
Students exhibit critical thinking and sound technical skills in the management of an acute pneumonia case as presented by the instructor and implement the prescribed plan of care. Students perform basic pulmonary assessments, range of motion activities, and pulmonary hygiene techniques appropriate to the scenario. While performing interventions students consider additional factors influencing patient care and the contemporary practice of physical therapy including psychosocial issues and other issues impacting the health care delivery system. Students practice reporting and documenting consequences of interventions to the supervising physical therapist. Students perform
mock discharge planning activities including suggestion for home equipment and discharge alternatives. Following this activity, students discuss clinical management and therapeutic techniques.

**Week #3 and 4 – Therapeutic Massage con’t**

**Lecture**
Assignment: Handouts
Therapeutic massage discussion continues. Specific techniques are studied including: effleurage, petrissage, tapotement and others.

**Laboratory**
Given mock patient scenarios students continue to perform therapeutic massage on the back and extremities. Emphasis is placed on direction, sequence and selection of strokes and education.

**Treatment Application Activity**
Students exhibit critical thinking and sound technical skills in the management of a status post radical mastectomy case as presented by the instructor and implement the prescribed plan of care. Students perform pain and sensation assessments, range of motion activities, compression activities and massage appropriate to the scenario. While performing interventions students consider additional factors influencing patient care and the contemporary practice of physical therapy including psychosocial issues and other issues impacting the health care delivery system. Students practice reporting and documenting consequences of interventions to the supervising physical therapist. Students perform mock discharge planning activities including suggestion for home equipment and discharge alternatives. Following this activity, students discuss clinical management and therapeutic techniques.

**Week # 5 and 6 – Introduction to Pulmonary Toilet**

**Lecture**
Assignment: Handouts
A review of the anatomy and physiology of the respiratory system is undertaken. The student is introduced pulmonary toileting. Specifically, auscultation, percussion, vibration, and postural drainage positioning are presented. Students practice these techniques.

**Laboratory**
Students practice auscultation, positioning, and manual techniques for effective pulmonary physical therapy.
Week # 7 and 8 – Pulmonary Toileting con’t

Lecture
Assignment: Handouts
Specific pathological conditions requiring chest physical therapy are reviewed and discussed. Treatment goals of chest physical therapy as related to the specific pathologies are explored.

Laboratory
Given mock patient scenarios students continue to practice postural drainage positioning, percussion and vibration techniques. Student practice performing and teaching segmental, lateral costal and diaphragmatic breathing.

Treatment Application Activity
Students exhibit critical thinking and sound technical skills in the management of a chronic obstructive pulmonary disease case as presented by the instructor and implement the prescribed plan of care. Students perform transfer and ambulation activities, vital signs monitoring, and chest physical therapy techniques appropriate to the scenario. While performing interventions students consider additional factors influencing patient care and the contemporary practice of physical therapy including psychosocial issues and other issues impacting the health care delivery system. Students practice reporting and documenting consequences of interventions to the supervising physical therapist. Students perform mock discharge planning activities including suggestion for home equipment and discharge alternatives. Following this activity, students discuss clinical management and therapeutic techniques.

Week # 9 and 10 – Edema Management

Lecture: Michlovich, Chapter 8

The student is also introduced to the various mechanisms of edema control (external compression, elevation, etc.). Edema is defined and causes explored.

Laboratory
Given mock patient scenarios students apply ace wrapping, Coban, and mechanical compression devices to upper and lower extremities.

Treatment Application Activity
Students exhibit critical thinking and sound technical skills in the management of a lymphedema case as presented by the instructor and implement the prescribed plan of care. Students perform pain and sensation assessment, circumferential and volumetric measurement, range of motion, goniometry, manual muscle testing, therapeutic exercise, and external compression activities appropriate to the scenario. While performing interventions students consider additional factors influencing patient care and the contemporary practice of physical therapy including psychosocial issues and other issues impacting the health care delivery system. Students practice reporting and documenting consequences of interventions to the supervising physical therapist.
Students perform mock discharge planning activities including suggestion for home equipment and discharge alternatives. Following this activity, students discuss clinical management and therapeutic techniques.

**Week # 11 and 12 – Iontophoresis**

**Lecture**
Assignment: Michlovich, pp. 267-275

Iontophoresis is also introduced.

**Laboratory/Treatment Application Activity**

Students apply iontophoresis utilizing their knowledge of dosage, agent and pathology indications and contraindications. Given mock patient scenarios students practice integrating the use of all modalities with therapeutic exercise. Student document integrated interventions.

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*Access-Ability Services (AAS) serves as a liaison and resource to the KCC community regarding disability issues, promotes equal access to all KCC programs and activities, and makes every reasonable effort to provide appropriate accommodations and assistance to students with disabilities. Please contact this office if you require such accommodations and assistance. Your instructor will be glad to make the accommodations you need, but you must have documentation from the Access-Ability office for any accommodations.*

***Academic dishonesty is prohibited in The City University of New York and is punishable by penalties, including failing grades, suspension, and expulsion. Additional information can be found in the College catalog ([http://www.kingsborough.edu/sub-registration/Pages/catalog.aspx](http://www.kingsborough.edu/sub-registration/Pages/catalog.aspx)). Plagiarism is a violation of academic integrity. Plagiarism is the intentional theft(s) of someone else’s intellectual property without attribution (proper credit). Determination and penalty – ranging from grade reduction to course failure – will be decided by the instructor.*

***Class attendance is a vital part of the learning experience. A student who has been absent 15% or more of the total instructional hours that a class meets may be considered excessively absent by the instructor. The instructor may consider excessive absences as a factor in the assignment of a student’s grade.***

****The course professor utilizes a variety of teaching methodologies to facilitate accomplishment of student learning objectives. These methodologies may include interactive lecturing, supervised group and simulation activities, web-based instruction, use of custom computer based study guides, and active learning strategies.