Course Prefix and Number: PTAP 202   **Credit Hours**: 4

Course Title: Clinical Kinesiology

Textbooks: Muscolino; <u>Kinesiology</u>
           Reese & Bandy; <u>Joint Range of Motion and Muscle Length Testing</u>
           Reese; <u>Muscle and Sensory Testing</u>

Course Prerequisites: Selective admission to the Physical Therapist Assistant program.

Course Description:
Application of physics principles, musculoskeletal anatomy, and muscle physiology to the biomechanics of human motion (on a regional basis). Laboratory component includes instruction in joint ROM measurement (goniometry), and muscle strength assessment (manual muscle testing) and selected PT interventions (exercise).

Learning Outcomes:

At the end of this course the student will:

     A. communicate effectively (verbally/nonverbally/written) with both patients and clinicians using appropriate terminology related to musculoskeletal/neuromuscular anatomy and biomechanics;
     B. perform interim clinical assessments and simple analyses of postures and movements including the use of physics and mathematics principles based on foundational knowledge of musculoskeletal anatomy/physiology, kinematics and kinetics;
     C. reliably and accurately measure and document joint ROM and muscle strength for selected regions, recognizing abnormal findings and describing common causes and consequences of such abnormalities;
     D. appropriately select, implement, modify, progress and document common conditioning, strengthening, ROM, posture and balance/coordination activities/exercises based upon a PT evaluation and plan of care.
     E. apply skills or expand knowledge from this course (or concurrent courses) by participating in one or more community service or professional development opportunities.

To achieve the learning outcomes the student will:

1. describe and differentiate between kinematics and kinetics. (A,B)
2. categorize given joints based on design, function, and/or components. (A,B)
3. define and differentiate terms: intratester/intertester reliability; closed/open kinetic chain; arthrokinematic/osteokinemtic. (A,C)
4. identify arthrokinematics that occur during given joint movements with understanding of convex/concave rule. (A,B,C,D)
5. discuss effects of gravity, friction, resistances and muscle force on given lever movements. (A,B,C)

6. differentiate between 1st, 2nd, and 3rd class lever systems and give examples. (A,B)
7. describe mechanical advantage and torque and give examples of how to affect patient function by altering the MA of the muscle or the resistance. (A,B,C,D)
8. describe and identify the contractile and non-contractile components of muscle. (A,B)
9. discuss the categories of muscle fibers and their primary function. (A,B)
10. recognize the general effects of disease, injury, and immobilization on joint and muscle structures. (A,B,C,D)
11. define and differentiate terms and give examples of:active/passive insufficiency; isokinetic/isoinertial; tonic/phasic muscle fibers. (A,B,C,D)
12. compare the primary categories of muscles contractions to include isometric, concentric, and eccentric and apply these concepts to analysis of human movements/exercises. (A,B,D)
13. discuss the purpose of goniometry and the 0-180 system of recording measurements. (C)
14. differentiate between active, active assisted and passive ROM. (C,D)
15. list and define normal and abnormal joint end-feels. (C)
16. identify the normal ROM, capsular pattern, and end-feel for each joint/movement. (C)
17. describe manual muscle testing and identify the criteria for grades 0-5. (C)
18. demonstrate on a laboratory competency entry level skill with measurement of muscle strength using manual muscle testing. (C)
19. demonstrate on a laboratory competency entry level skill with implementing selected exercises for ROM, strength, balance/coordination, and posture on a regional basis based on components of a PT evaluation and/or POC. (D)
20. demonstrate on a laboratory competency entry level skill with measurement of ROM for given joints. (C)
21. accurately identify, label and palpate selected bony and soft-tissue landmarks of the vertebral column. (B,C,D)
22. discuss unique anatomical and mechanical features of given regions of the spine. (B)
23. identify ligamentous structures that support the vertebral column and describe their individual functions. (B,D)
24. describe and demonstrate appropriate body mechanics for selected ADL's in terms of protecting the spine. (B,D)
25. accurately name scoliosis curves based on region and location of convexity. (A,D)
26. discuss principle joints of the vertebral column and their structure and movement. (A,B)
27. discuss the structure, function, response to loading and effects of aging on the intervertebral disc. (B,D)
28. identify nerve roots that supply upper and lower extremity muscles including recall of myotome levels. (A,B,C,D)
29. identify muscles of the vertebral column and trunk and name origin, insertion, action and innervation of selected muscles. (A,B,C)
30. describe normal postural alignment in sitting and standing and discuss consequences of abnormal habitual postures. (B)
31. describe the role of the diaphragm and accessory muscles in normal and common faulty breathing patterns. (B)
32. discuss the lumbosacral angle and closed chain pelvic motions as they relate to associated trunk and hip motions. (B)
33. accurately identify and palpate selected bony and soft-tissue landmarks of the UE; (B,C)
34. discuss the effect of active and passive insufficiency of the 2-joint UE muscles on measurements of ROM, strength and exercise prescription; (B,C,D)

35. describe scapulohumeral rhythm and discuss implications of faulty rhythms on observed shoulder joint motions, ROM measurements and exercise. (B,C,D)
36. discuss the normal structure and biomechanics of the principle joints of the UE. (B,C)
37. identify selected muscles of the UE and name origin, insertion, action and innervation of each; (B,C,D)
38. describe normal and common abnormal postures of the shoulder or scapulae. (B)
39. discuss the normal structure and biomechanics of the principle joints of the LE (B,C)
40. identify selected muscles of the LE and name origin, insertion, action and innervation of each; (B,C,D)
41. discuss the effects of active and passive insufficiency of selected 2-joint LE muscles on strength testing, ROM assessment and exercise prescription. (C,D)
42. recognize and discuss common deviations from normal structure, function, posture and gait at selected LE joints. (B,D)
43. participate in one or more approved community service or professional development activity during this semester (E)

Course Requirements: To earn a grade of "C" or higher the student must earn 70% of the total points for the course and meet all of the following course requirements.
- pass all lab competencies.
- minimum 75% average on laboratory practical tests
- minimum 75% average on integrated lab practicals
- score a minimum of 75% on the math computation station in Kinesiology lab related to classes of levers and mechanical advantage.
- co-curricular community service or professional development (required for grade of A only)

Course Grading Scale:

A- 90% or more of total possible points including the comprehensive final exam; and minimum of 75% average on laboratory practical tests; and pass all lab competencies; and minimum 75% average on integrated lab practicals and participation in at least one approved community service or professional development activity.

B- 80% or more of total possible points including the comprehensive final exam; and minimum of 75% average on laboratory practical tests; and pass all lab competencies; and minimum 75% average on integrated lab practicals

C- 70% or more of total possible points including the comprehensive final exam; and minimum of 75% average on laboratory practical tests; and pass all lab competencies; and minimum 75% average on integrated lab practicals

D- 60% or more of total possible points including the comprehensive final exam; and minimum of 75% average on laboratory practical tests; and pass all lab competencies; and minimum 75% average on integrated lab practicals

F- less than 60% of total possible points including the comprehensive final exam; or less than 75% average on laboratory practical tests; or failure to pass all lab competencies; or less than 75% average on integrated lab practicals

Attendance Policy: The college attendance policy, which is available at http://www.bpcc.edu/catalog/current/academicpolicies.html, allows that "more restrictive attendance requirements may apply to some specialized classes such as laboratory, activity, and clinical courses because of the nature of those courses." The attendance policy of the Physical Therapy Assistant program in described is the Physical Therapy Assistant Clinical Handbook.

Course Fees: This course is accompanied with an additional non-refundable fee for supplemental materials, laboratory supplies, certification exams and/or clinical fees.

Nondiscrimination Statement

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Reviewed by L.Bryant 5/21