

Course Description

PHT2120 | Applied Kinesiology | 2.00 credits

Students will learn concepts and principles of applied kinesiology and biomechanics with emphasis on the function of the musculoskeletal system as it pertains to human motion. Anatomical structures and movement concepts covered in PHT1102C Anatomy for PTA are expanded upon. Goniometric measurement, manual muscle testing skills, plumb-line analysis, data collection skills, palpation skills, understanding of special tests, and concepts of reliability and validity as it relates to goniometry are emphasized. Prerequisites: BSC2086, BSC2086L, PHT1102C, PHT1201, PHT1201L, PHT1211, PHT1211L; Corequisites: PHT2120L, PHT2224, PHT2224L, PHT2801C

Course Competencies:

Competency 1: The student will understand terms associated with biomechanical principles and musculoskeletal function and assessment tools by:

1. Defining the anatomical position
2. Describing and giving examples of the three classes of levers
3. Defining planes, axes of movement, and hand degrees of freedom as they relate to each joint
4. Describing the elementary principles of joint design
5. Describing the terms the composition and resolution of forces
6. Identifying and defining the three main classifications of joints and give examples of each
7. Identifying the five features standard to all diarthrodial joints
8. Comparing a closed kinematic chain with an open kinematic chain
9. Comparing close-packed/open-packed positions of a given joint
10. Identifying examples of connective tissue
11. Differentiating between phasic and tonic muscle contraction
12. Differentiating between isometric, isotonic, and Isokinetic muscle contraction
13. Defining the length-tension relationship in muscle
14. Defining positive and negative work
15. Describing the influence of speed of contraction on tension
16. Defining torque
17. Differentiating between aerobic vs. anaerobic metabolism
18. Defining agonists, antagonists, synergists and co-contractors, and forcing couples
19. Describing the purpose of goniometric measurement
20. Identifying fulcrum, proximal arm alignment, distal arm alignment, and reference points
21. Describing the importance of stabilization
22. Defining stability and validity as they relate to goniometric measurement
23. Documenting the ROM measurement at a specified joint
24. Defining the muscle grades
25. Describing the purpose(s) of manual muscle testing
26. Describing the importance of positioning in testing the strength of the extremities and trunk

Competency 2: The student will understand the hip region by:

1. Listing the joints that make up the hip joint and name their articulating surfaces
2. Describing the motions available at the hip joint
3. Identifying the significant ligaments associated with the hip joint
4. Naming origin, insertion, action, and nerve supply of the major muscles of the hip joint
5. Describing the planes and accompanying motions at the lumbar spine and hip joints for the following pelvic motions: pelvic rotation, anterior/posterior pelvic tilting, and lateral tilting of the pelvis
6. Describing the procedure and alignment for measuring ROM of the hip joint
7. Describing the procedure and grading for manual muscle testing of the major muscle groups of the hip joint

8. Describing the purpose and procedures of tests that pertain to the anatomy and pathological conditions of the hip joint
9. Defining lumbar – pelvic rhythm
10. Describing the position of most excellent stability at the hip during an erect bilateral stance
11. Describing the role of the gluteus Medius during unilateral stance

Competency 3: The student will understand the knee region by:

1. Listing the joints and articulations within the knee complex
2. Defining the function and structure of the menisci and ligaments in the knee complex
3. Identifying the significant bursae found at the knee complex
4. Describing the motions available at the knee joint, including the locking and unlocking of the knee when the femur is fixed and when the femur is free
5. Naming origin, insertion, action, and nerve supply of the major muscles of the knee joint
6. Describing the procedure and alignment for measuring ROM of the Knee complex
7. Describing the procedure and grading for manual muscle testing of the major muscle groups of the knee joint
8. Describing the purpose and procedures of tests that pertain to the anatomy and pathological conditions of the knee joint and region

Competency 4: The student will demonstrate an understanding of the ankle and foot region by:

1. Listing the joints and articulations in the ankle-foot complex
2. Describing the motions available at the joints of the ankle-foot complex
3. Identifying the ligaments that support the joints of the ankle and foot for the major muscle groups, naming the origin, insertion, action, and nerve supply
4. Describing the procedure and alignment for measuring ROM of the ankle-foot complex
5. Describing the procedure and grading for manual muscle testing of the major muscle groups of the ankle-foot complex
6. Describing the purpose and procedures of tests that pertain to the anatomy and pathological conditions of the ankle-foot region
7. Defining the primary role of the intrinsic musculature of the foot
8. Describing the function and location of the plantar arches

Competency 5: The student will demonstrate an understanding of the trunk and neck by:

1. Listing the joints that make up the vertebral column and name their articulation surfaces
2. Describing the motions available at the vertebral column for each area
3. Describing the standard curves of the erect spine
4. Identifying the significant ligaments associated with the spine
5. Defining intervertebral disc
6. Naming origin, insertion, action, and nerve supply of the major muscles of the trunk
7. Describing the procedure and alignment for measuring ROM of the spine
8. Describing the procedure and grading for manual muscle testing of the major muscle groups of the trunk
9. Describing the purpose and procedure for tests that pertain to the anatomy and pathological conditions of the spine and trunk
10. Listing the joints that make up the vertebral column and name their articulation surfaces
11. Describing the motions available at the vertebral column for each area
12. Describing the standard curves of the erect spine
13. Identifying the significant ligaments associated with the spine
14. Defining intervertebral disc
15. Naming origin, insertion, action, and nerve supply of the major muscles of the trunk
16. Describing the procedure and alignment for measuring ROM of the spine
17. Describing the procedure and grading for manual muscle testing of the major muscle groups of the trunk

18. Describing the purpose and procedure for tests that pertain to the anatomy and pathological conditions of the spine and trunk

Competency 6: The student will demonstrate an understanding of the shoulder region by:

1. Listing the three structural (skeletal) components of the shoulder complex
2. Listing the four independent joints of the shoulder complex and identifying their articulating surfaces
3. Listing and defining the role of the significant ligaments at each joint
4. Describing the motions available at each joint of the shoulder complex and in which plane it takes place
5. Defining scapulohumeral rhythm
6. Identifying and describing the role of the rotator cuff
7. Naming the origin, insertion, action, and nerve supply of the major muscle groups of the shoulder complex
8. Describing the procedure and alignment for measuring ROM of the shoulder complex movements
9. Describing the procedure and grading for manual muscle testing of the major muscle groups of the shoulder complex
10. Describing the purpose and procedures of tests that pertain to the anatomy and pathological conditions of the shoulder region

Competency 7: The student will understand the elbow complex by:

1. Identifying the structural components of the elbow complex
2. Identifying the articulating surfaces of the joints of the elbow complex
3. Describing the motions available at the joints of the elbow complex
4. Identifying the significant ligaments associated with joints of the elbow complex
5. Naming the origin, insertion, action, and nerve supply of the major muscles of the elbow complex
6. Describing the procedure and alignment for measuring ROM of the elbow complex movements
7. Describing the procedure and grading for manual muscle testing of the major muscle groups of the elbow complex
8. Describing the purpose and procedures of tests that pertain to the anatomy and pathological conditions of the shoulder region

Competency 8: The student will understand the wrist and hand by:

1. Listing the two compound joints of the wrist complex and describe their articulation surfaces
2. Describing the motions available at the wrist complex
3. Identifying the structural components of the joints that make up the fingers and thumb
4. Describing the motions available at those joints
5. Naming the origin, insertion, action, and nerve supply of the major muscles of the wrist and fingers
6. Identifying the significant ligaments associated with wrist joints, fingers, and thumbs
7. Differentiating between the extrinsic and intrinsic muscles of the hand
8. Defining prehension
9. Describing the procedure and alignment for measuring ROM of the wrist and fingers
10. Describing the procedure and grading for manual muscle testing of the major muscle groups of the wrist and fingers
11. Describing the purpose and procedures of tests that pertain to the anatomy and pathological conditions of the wrist and fingers

Competency 9: The student will understand posture by:

1. Defining posture
2. Defining the center of gravity and base of support in normal posture
3. Describing the normal curvatures of the erect spine
4. Recognizing postural deviations with the use of plumb-line analysis
5. Recognizing high/low shoulder and hips
6. Defining apparent and true leg length discrepancies
7. Describing commonly found deviations associated with posture

8. Defining and giving examples of scoliosis

Competency 10: The student will understand Gait by:

1. Describing a regular gait pattern
2. Defining the phases of gait and types of muscle contractions occurring at each joint
3. Stating minimal joint motions needed in lower extremities for normal gait
4. Identifying major gait deviations and describe their most probable cause
5. Discussing possible therapeutic measures in the correction of gait deviation

Learning Outcomes:

- Communicate effectively using listening, speaking, reading, and writing skills
- Use quantitative analytical skills to evaluate and process numerical data
- Solve problems using critical and creative thinking and scientific reasoning
- Create strategies that can be used to fulfill personal, civic, and social responsibilities
- Demonstrate knowledge of ethical thinking and its application to issues in society
- Use computer and emerging technologies effectively