



Western Technical College

10524156 PTA Applied Kinesiology 1

Course Outcome Summary

Course Information

Description	Introduces basic principles of musculoskeletal anatomy, kinematics, and clinical assessment. Students locate and identify muscles, joints, and other landmarks of the lower quadrant in addition to assessing range of motion and strength.
Career Cluster	Health Science
Instructional Level	Associate Degree Courses
Total Credits	4
Total Hours	99

Textbooks

Fundamentals of Tests and Measures for the Physical Therapist Assistant. Copyright 2020. Fruth, Stacie J. and Carol Fawcett. Publisher: Jones & Bartlett. **ISBN-13**: 978-1-284-14713-1. Required.

Clinical Kinesiology and Anatomy – with Access. 7th Edition. Copyright 2023. Lippert, Lynn S. Publisher: F.A. Davis Co. **ISBN-13**: 978-1-71964-452-5. Required.

Clinical Kinesiology and Anatomy - Laboratory Manual. 5th Edition. Copyright 2023. Lippert, Lynn S. Publisher: F.A. Davis Co. **ISBN-13**: 978-1-71964-453-2. Required.

Kinesiology Flash Cards. 5th Edition. Copyright 2023. Lippert, Lynn S. Publisher: F.A. Davis Co. **ISBN-13**: 978-1-71964-454-9. Optional.

Success Abilities

1. Refine Professionalism: Improve Critical Thinking
2. Refine Professionalism: Participate Collaboratively

Program Outcomes

1. Function under the supervision of a physical therapist in a safe, legal, professional, and ethical manner to ensure the safety of patients, self, and others throughout the clinical interaction
2. Demonstrate clear and collaborative communication with patients, families, and health care team
3. Produce documentation to support the delivery of physical therapy services
4. Demonstrate critical thinking skills to implement and modify treatment within a plan of care under the direction and supervision of a physical therapist
5. Perform data collection essential for carrying out the plan of care under the direction and supervision of the physical therapist
6. Integrate components of operational and fiscal practices of physical therapy service in a variety of settings

Course Competencies

1. Apply the principles of kinesiology.

Assessment Strategies

- 1.1. by answering questions related to basic principles of kinesiology on one or more written exams
- 1.2. by analysis (format may be oral, written, or graphic)

Criteria

You will know you are successful when

- 1.1. you identify torque, levers, and forces.
- 1.2. you analyze axis of rotation and planes of motion.
- 1.3. you differentiate between osteokinematics and arthrokinematics.
- 1.4. you differentiate between types of lever systems.
- 1.5. you analyze kinetic chains.

Learning Objectives

- 1.a. Define levers, force, and torque as they apply to musculoskeletal anatomy.
- 1.b. Describe the relationship between lever, force and torque as they apply to a patient scenario.
- 1.c. Define frontal, sagittal and transverse plane and their axes of rotation.
- 1.d. Give examples of frontal, sagittal and transverse axes of rotation found in the human body.
- 1.e. Use frontal, sagittal and transverse planes and axes of rotation to describe motion of the human body.
- 1.f. Define osteokinematic motion.
- 1.g. Define arthrokinematic motion including convex on concave and concave on convex laws of motion.
- 1.h. Give an examples of first, second and third class levers found in the human body.
- 1.i. Identify where the axis, force and resistance are located in first, second and third class levers.
- 1.j. Describe bony, capsular and empty end feel.
- 1.k. Give example of bony, capsular and empty end feel.

2. Explain the anatomy and kinematics of the hip.

Assessment Strategies

- 2.1. by answering questions on one or more written exams
- 2.2. by locating on diagrams or models
- 2.3. by analysis (format may be oral, written, or graphic)

Criteria

You will know you are successful when

- 2.1. you identify the components of the hip.

- 2.2. you apply the basic principles of kinesiology to the hip.
- 2.3. you identify origin, insertion, action and innervation of the muscles of the hip.
- 2.4. you describe movement of the hip.
- 2.5. you palpate anatomical structures of the hip.

Learning Objectives

- 2.a. Describe the structures of the hip including the pelvis, femur, ligaments, cartilage, muscles and joint capsule.
- 2.b. Label the bony landmarks of the pelvis and femur.
- 2.c. Know the function of the ligaments, cartilage and joint capsule.
- 2.d. Label the major ligaments of the hip.
- 2.e. List the origin, insertion, innervation and action of the hip muscles.
- 2.f. Label the muscles of the hip.
- 2.g. Demonstrate flexion, extension, internal rotation, external rotation and adduction of the hip joint.
- 2.h. Palpate the major landmarks of the pelvis and hip.
- 2.i. Describe forces in the hip and how they relate to principles of kinesiology.
- 2.j. Identify the degrees of range of motion for each plane of motion in the hip.
- 2.k. Describe common pathologies related to the hip including etiology.

3. Explain the anatomy and kinematics of the foot/ankle.

Assessment Strategies

- 3.1. by answering questions on one or more written exams
- 3.2. by analysis (format may be oral, written, or graphic)
- 3.3. by locating on diagrams or models

Criteria

You will know you are successful when

- 3.1. you identify the components of the ankle and foot.
- 3.2. you apply the basic principles of kinesiology to the ankle and foot.
- 3.3. you identify origin, insertion, action and innervation of the muscles of the ankle and foot.
- 3.4. you describe movement of the ankle and foot.
- 3.5. you palpate anatomical structures of the ankle and foot.

Learning Objectives

- 3.a. Describe the structures of the foot and ankle including bones, ligaments, joint capsule and muscles.
- 3.b. Label the bony landmarks of the ankle and foot.
- 3.c. Label the major ligaments of the foot and ankle.
- 3.d. Know the function of the ligaments, cartilage and joint capsule.
- 3.e. List the origin, insertion, innervation and action of the muscles of the foot and ankle.
- 3.f. Label the muscles of the foot and ankle.
- 3.g. Demonstrate dorsiflexion, plantarflexion, inversion, eversion of the ankle.
- 3.h. Identify the degrees of range of motion for each plane of motion in the foot and ankle.
- 3.i. Palpate the major bony and soft tissue landmarks of the foot and ankle.
- 3.j. Identify the structures that make up the forefoot, midfoot and hindfoot.
- 3.k. Identify the lateral longitudinal arch, transverse arch and medial longitudinal arch.
- 3.l. Describe common pathologies of the foot and ankle including etiology.
- 3.m. Describe knee position, calcaneal position and arch in a patient.

4. Explain the anatomy and kinematics of the knee.

Assessment Strategies

- 4.1. by answering questions on one or more written exams
- 4.2. by analysis (format may be oral, written, or graphic)
- 4.3. by locating on diagrams or models

Criteria

You will know you are successful when

- 4.1. you identify the components of the knee.
- 4.2. you apply the basic principles of kinesiology to the knee.
- 4.3. you identify origin, insertion, action and innervation of the muscles of the knee.
- 4.4. you describe movement of the knee.

4.5. you palpate anatomical structures of the knee.

Learning Objectives

- 4.a. Describe the structures of the knee including bones, ligaments, joint capsule and muscles.
- 4.b. Label the bony landmarks of the knee.
- 4.c. Label the major ligaments of the knee.
- 4.d. Know the function of the ligaments, cartilage and joint capsule.
- 4.e. List the origin, insertion, innervation and action of the muscles of the knee.
- 4.f. Label the muscles of the knee.
- 4.g. Demonstrate flexion and extension of the knee.
- 4.h. Palpate the major bony and soft tissue landmarks of the knee.
- 4.i. Identify the degrees of range of motion for each plane of motion in the knee.
- 4.j. Apply the laws of arthrokinematics to the knee joint.
- 4.k. Describe common pathologies of the knee including underlying etiology.

5. Explain the structure and function of the musculoskeletal system.

Assessment Strategies

- 5.1. by answering questions on one or more written exams
- 5.2. by analysis (format may be oral, written, or graphic)
- 5.3. by locating on diagrams or models

Criteria

You will know you are successful when

- 5.1. you differentiate between the axial and appendicular skeleton.
- 5.2. you describe the structure and function of contractile tissue.
- 5.3. you describe the structure and function of noncontractile tissue.
- 5.4. you describe the structure and function of nerves.
- 5.5. you describe the structure and function of joints.

Learning Objectives

- 5.a. List the components of the axial skeleton.
- 5.b. Describe the function of joints.
- 5.c. Give example of bony, capsular and empty end feel.
- 5.d. Label the structure of bone.
- 5.e. Identify the different 4 different types of bones.
- 5.f. Identify the 5 different types of joints.
- 5.g. List the 4 classifications of diarthroidal joints.
- 5.h. List examples of each classification of diarthroidal joint.
- 5.i. Describe arthrokinematic motion of roll, spin, glide.
- 5.j. Define origin and insertion of muscles.
- 5.k. Define parallel and oblique muscle fiber arrangement including how it relates to function.
- 5.l. Give examples of parallel and oblique muscle fiber arrangements in the body.
- 5.m. Diagram length- tension curve for muscles.
- 5.n. Define open kinetic chain exercises.
- 5.o. Define closed kinetic chain exercises.
- 5.p. List examples of open and closed kinetic chain exercises with a patient.
- 5.q. Identify the components of the central nervous system including the function of each component.
- 5.r. Identify the components of the peripheral nervous system including the function of each component.
- 5.s. Describe the functional significance of spinal cord level.
- 5.t. Describe plexus formation.
- 5.u. Identify 3 types of non-contractile tissue.
- 5.v. Define cranial and spinal nerves including function.

6. Analyze normal movement in the lower quadrant.

Assessment Strategies

- 6.1. by developing an analysis (format may be written, graphic, oral, or three dimensional model)
- 6.2. by answering questions on one or more written exams

Criteria

You will know you are successful when

- 6.1. you identify movement at each joint involved.
- 6.2. you analyze how movement at each joint affects the other joints in the kinematic chain.
- 6.3. you identify range of motion at each joint involved.

Learning Objectives

- 6.a. Define isometric, eccentric and concentric muscle contraction.
- 6.b. Describe type of muscle contraction at hip, knee, and ankle with functional activities of sitting, standing, stair climbing.
- 6.c. Describe ROM at hip, knee and ankle with functional activities of sitting, standing and stair climbing.
- 6.d. Apply joint range of motion measuring and types of muscle contraction to functional activities in case scenarios.

7. Assess joint range of motion for the lower quadrant.

Assessment Strategies

- 7.1. in a skill demonstration
- 7.2. by answering questions on one or more written exams

Criteria

You will know you are successful when

- 7.1. you position yourself and subject.
- 7.2. you align and read goniometer correctly.
- 7.3. you instruct subject in correct motion.
- 7.4. you differentiate between normal and restricted range of motion.
- 7.5. you verbalize an explanation of the process.
- 7.6. you document data.

Learning Objectives

- 7.a. Demonstrate correct positioning of the patient and therapist prior to performing lower extremity range of motion.
- 7.b. Instruct patient in completing correct range of motion at the hip, knee, ankle and foot.
- 7.c. Demonstrate correct alignment of the goniometer for measuring range of motion at hip, knee, ankle and foot.
- 7.d. Demonstrate accurate reading of the goniometer when measuring range of motion at hip, knee, ankle and foot.
- 7.e. Analyze the results of the range of motion testing correctly.
- 7.f. Explain the process of testing and the results correctly to a patient.
- 7.g. Demonstrate correct documentation of the range of motion testing results.

8. Assess muscle length for the lower quadrant.

Assessment Strategies

- 8.1. through analysis (format may be oral, written, or graphic)
- 8.2. in a skill demonstration
- 8.3. by answering questions on one or more written exams

Criteria

You will know you are successful when

- 8.1. you differentiate between muscular and joint restriction.
- 8.2. you document data.
- 8.3. you assess passive range of motion.
- 8.4. you recognize abnormal and normal muscle length.
- 8.5. you position yourself and subject.
- 8.6. you demonstrate special tests.
- 8.7. you verbalize an explanation of the process.

Learning Objectives

- 8.a. Demonstrate correct positioning of the patient and therapist prior to performing special flexibility testing for hip, knee, ankle and foot.
- 8.b. Instruct patient in completing correct range of motion at the hip, knee, ankle and foot.
- 8.c. Demonstrate correct positioning of the patient and therapist prior to performing passive range of motion.
- 8.d. Describe the end feel when there is a restriction in joint range of motion.

- 8.e. Demonstrate correct documentation of muscle length for hip, knee, ankle and foot.
- 8.f. Explain clearly the process and results of special flexibility testing to the patient.
- 8.g. Demonstrate the major special tests for flexibility related to the hip, knee, ankle and foot.

9. Assess muscle strength for the lower quadrant.

Assessment Strategies

- 9.1. in a skill demonstration
- 9.2. by answering questions on one or more written exams

Criteria

You will know you are successful when

- 9.1. you position and observe subject.
- 9.2. you identify presence or absence of muscle mass.
- 9.3. you apply correct manual resistance.
- 9.4. you perform all critical steps in the right order.
- 9.5. you identify the correct muscle grade.
- 9.6. you verbalize an explanation of the process.
- 9.7. you position yourself correctly applying correct body mechanics.

Learning Objectives

- 9.a. Demonstrate correct positioning of the patient and therapist prior to performing strength testing for hip, knee, ankle and foot.
- 9.b. Instruct patient in completing correct range of motion at the hip, knee, ankle and foot.
- 9.c. Describe correctly to the patient the procedure for manual muscle testing of the hip, knee, ankle and foot.
- 9.d. Demonstrate application of appropriate amount of resistance to assess muscle strength in hip, knee, ankle and foot.
- 9.e. Demonstrate the steps of manual muscle testing in the correct order.
- 9.f. Demonstrate correct positioning of a patient with grade 2 or less muscle strength for each muscle at the hip, knee, ankle and foot.
- 9.g. List muscle grades and their definitions.
- 9.h. Identify the correct muscle grade on a patient example.
- 9.i. Identify the primary muscle movers for each direction of movement in the hip, knee, ankle and foot.

10. Examine features of normal gait.

Assessment Strategies

- 10.1. by analysis (format may be oral, written, or graphic)
- 10.2. by answering questions on one or more exams

Criteria

You will know you are successful when

- 10.1. you describe normal muscle firing in each stage of gait.
- 10.2. you describe the stages and phases of normal gait.
- 10.3. you describe normal range-of-motion required for normal gait.

Learning Objectives

- 10.a. Describe the stages of gait.
- 10.b. Identify the phases of gait.
- 10.c. Analyze muscle action in each phase of gait.
- 10.d. Describe normal range of motion required for gait.
- 10.e. Illustrate range of motion changes and muscle action between phases of gait.
- 10.f. Explore common variations in each phase of gait.