

# PTAT-1300: FUNCTIONAL ANATOMY

## Cuyahoga Community College

### Viewing: PTAT-1300 : Functional Anatomy

**Board of Trustees:**

November 2024

**Academic Term:**

Fall 2025

**Subject Code**

PTAT - Physical Therapist Assist

**Course Number:**

1300

**Title:**

Functional Anatomy

**Catalog Description:**

Study of human anatomy and clinical kinesiology with emphasis on the application of neuromusculoskeletal anatomy, physiology, physics principles, and biomechanics during the analysis of static and dynamic movement.

**Credit Hour(s):**

4

**Lecture Hour(s):**

3

**Lab Hour(s):**

3

**Other Hour(s):**

0

### Requisites

**Prerequisite and Corequisite**

BIO-2331 Anatomy and Physiology I, and HTEC-1060 Medical Terminology I; and departmental approval: admission to Physical Therapist Assisting program or Occupational Therapy program.

### Outcomes

**Course Outcome(s):**

A. Apply joint osteokinematics and arthrokinematics when analyzing normal and abnormal functional movements.

**Essential Learning Outcome Mapping:**

Critical/Creative Thinking: Analyze, evaluate, and synthesize information in order to consider problems/ideas and transform them in innovative or imaginative ways.

**Objective(s):**

1. Describe the anatomical position of the joints of the trunk and upper & lower extremities.
2. Use professional terminology when referring to anatomical structures and positions.
3. List and identify, visually and by palpation, the bones of the body and their landmarks.
4. Describe cardinal planes of the body and associated axes of movement.
5. Identify osteokinematic and arthrokinematic movements occurring at the joints and use these terms in describing human movement.
6. Identify and palpate on a skeleton and on a human subject the joints of the body.
7. Analyze functional and abnormal movement patterns of the trunk and upper & lower extremities.
8. Identify the types of joints and their associated degrees of freedom, structural components, movements, and ranges of motion.
9. Identify common substitution patterns of the trunk and upper & lower extremities when pathology is present.

10. Compare and contrast joint motion occurring during open and closed kinematic chain movements of the upper & lower extremities.
11. Identify normal and pathological joint end feels.
12. Describe the joint deviations or deformities which may occur as a result of trauma or disease.
13. Apply biomechanical principles to functional human movement.

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**Course Outcome(s):**

B. Accurately measure range of motion of all joints.

**Essential Learning Outcome Mapping:**

Critical/Creative Thinking: Analyze, evaluate, and synthesize information in order to consider problems/ideas and transform them in innovative or imaginative ways.

**Objective(s):**

1. Make use of the foundation elements of patient interaction when obtaining range of motion data.
2. Accurately measure active and passive joint range of motion of the trunk and upper & lower extremities using a goniometer.
3. Create documentation that reflects measured range of motion.

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**Course Outcome(s):**

C: Apply the functional properties & characteristics of skeletal muscles to human movement.

**Essential Learning Outcome Mapping:**

Critical/Creative Thinking: Analyze, evaluate, and synthesize information in order to consider problems/ideas and transform them in innovative or imaginative ways.

**Objective(s):**

1. Identify and palpate on a human subject the significant anatomical landmarks.
2. Classify muscles according to shape and arrangement of fibers, as longitudinal, quadrilateral, triangular, fusiform, penniform, bipenniform, and multipenniform.
3. Describe and demonstrate types of muscle contraction, such as concentric, eccentric, isotonic, isometric, and static.
4. Describe and demonstrate how muscles function as prime mover, agonist, antagonist, synergist, and stabilizer.
5. Identify the motor and sensory components of the nervous system and describe how muscle function is controlled by the nervous system.
6. Describe and identify single-joint & multi-joint muscles and associated functional properties.
7. Identify the innervation of contractile & non-contractile tissue of the trunk and upper & lower extremities.
8. Identify the name, origin, insertion, and action of the muscles of the trunk and upper & lower extremities.
9. Compare and contrast muscle function occurring during open and closed kinematic chain movements of the upper & lower extremities.
10. Identify the general properties of muscles.

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**Course Outcome(s):**

D. Accurately perform manual muscle tests for all joints.

**Essential Learning Outcome Mapping:**

Critical/Creative Thinking: Analyze, evaluate, and synthesize information in order to consider problems/ideas and transform them in innovative or imaginative ways.

**Objective(s):**

1. Identify and palpate muscles of the trunk and upper & lower extremities.
2. Make use of the foundation elements of patient interaction when obtaining objective data.
3. Safely and efficiently perform manual muscle testing.
4. Use the manual muscle testing numerical grading system and associated descriptive terms.
5. Create documentation that reflects objective MMT grade.

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**Course Outcome(s):**

E. Analyze each component of the human gait cycle.

**Essential Learning Outcome Mapping:**

Critical/Creative Thinking: Analyze, evaluate, and synthesize information in order to consider problems/ideas and transform them in innovative or imaginative ways.

**Objective(s):**

1. Identify characteristics of normal gait.
2. Identify the determinants of normal gait including required joint range of motion and muscle action.
3. Analyze human gait to identify common functional gait deviations and associated joint and muscular impairments.
4. Analyze human gait to identify common functional gait deviations resulting from a lesion to the central nervous system, peripheral nervous system, or neuromuscular system.
5. Create documentation that reflects observed gait pattern.

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**Methods of Evaluation:**

1. Announced and unannounced computer-based lecture/lab quizzes
2. Computer-based examinations, including midterm and final examinations
3. Laboratory skill checks
4. Practical examinations on laboratory skills
5. Homework assignments

**Course Content Outline:**

1. Osteology of the human skeletal system
2. Arthrology and arthrokinematics of the human skeletal system
3. Principles of goniometry and manual muscle testing
4. Disorders of joint range of motion and their functional significance
5. Myology of the human body
  - a. Classification of muscles
  - b. Structure and function of muscle
  - c. Muscle spindle and golgi tendon organ
  - d. Types of muscle contraction, as concentric, eccentric, isotonic, isometric, static
  - e. How muscles function as agonist, antagonist, synergist, fixator, stabilizer
6. Biomechanical principles of body movement
7. Basic organization of the nervous system and its function in control of the musculoskeletal system
8. Anatomy and kinesiology of the muscles of head, neck and trunk
9. Kinesiology and anatomy of the upper extremities
10. Kinesiology and anatomy of the lower extremities
11. Function of the trunk and lower extremity in normal gait
12. Determinants of normal gait and posture
13. Abnormal gait patterns
14. Simple analysis of functional body movement during activities of daily living

The Course Schedule is subject to change due to pedagogical needs, instructor discretion, parts of term, and unexpected events.

**Resources for the Instructor**

Lippert, Lynn S. *Clinical Kinesiology and Anatomy*. 7th ed. F.A. Davis, 2022.

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Lippert, Lynn, and Mary Alice Duesterhaus Minor. *Laboratory Manual for Clinical Kinesiology and Anatomy*. 4th ed. F.A. Davis, 2017.

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Norkin, Cynthia C., and D. Joyce White. *Measurement of Joint Motion: A Guide to Goniometry*. 5th. F.A. Davis, 2016.

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Biel, Andrew. *Trail Guide to the Body: A Hands-on Guide to Locating Muscles, Bones and More*. 6th ed. Books of Discovery, 2019.

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Biel, Andrew. *Trail Guide to Movement: Building the Body in Motion*. 2nd ed. Books of Discovery, 2019.

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Kendall, Florence Peterson, et al. *Muscles: Testing and Function with Posture and Pain*. 5th ed. Maryland: Williams and Wilkins, 2005.

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The American Physical Therapy Association. "Physical Therapy Journal"

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**Additional Resources for the Instructor**

Kinesiology in Action ([www.kinesiologyinaction.com](http://www.kinesiologyinaction.com))

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