

SES-2130: KINESIOLOGY: FUNDAMENTALS OF HUMAN MOVEMENT

Cuyahoga Community College

Viewing: SES-2130 : Kinesiology: Fundamentals of Human Movement

Board of Trustees:

January 2023

Academic Term:

Fall 2023

Subject Code

SES - Sport and Exercise Studies

Course Number:

2130

Title:

Kinesiology: Fundamentals of Human Movement

Catalog Description:

The scientific study of human movement based on the neuromuscular, fascial and skeletal systems and the principles of physiology and mechanics as it relates to movement in exercise, recreation, sport and dance.

Credit Hour(s):

3

Lecture Hour(s):

2

Lab Hour(s):

2

Requisites

Prerequisite and Corequisite

BIO-2331 Anatomy and Physiology I or SES-2010 Exercise and Movement Anatomy or departmental approval.

Outcomes

Course Outcome(s):

Explain the various foundations of structural kinesiology and the concepts of the neuromuscular, fascial and skeletal systems and apply the concepts in the analysis of selected movements, exercises, and sport skills.

Objective(s):

1. Explain the terminology used to describe body part locations, reference positions, and anatomical directions.
2. Explain the planes of motion and their respective axes of rotation in relation to human movement.
3. Describe the various types of bones and joints in the human body and their functions, features and characteristics.
4. Demonstrate various joint movements in selected exercises and sport skills.
5. Explain the basic anatomy, functions, and connections of the muscular, nervous and fascial systems.
6. Describe the locations, arrangements, characteristics, and roles of the muscles.
7. Explain the various roles of muscles including agonist, antagonist, stabilizer, synergist, neutralizer and force couples.
8. Explain the neuromuscular concepts including motor units, muscle fiber type, muscle tension development, muscle-length tension, muscle force-velocity, stretch-shortening cycle, reciprocal inhibition, angle of pull, muscle articulations, and active and passive insufficiency.

Course Outcome(s):

Explain the basic concepts and principles of biomechanics and apply the concepts and principles in the analysis of selected movements, exercises, and sport skills.

Objective(s):

1. Describe the principles of tensegrity and how the body functions as a biotensegrity system.
2. Describe how knowledge of torque, lever arm length, Newton's laws of motion, balance, equilibrium stability, force and momentum can help improve physical performance.
3. Describe the effects of forces and mechanical loading on the body tissues, including the muscular and fascial systems.
4. Describe how the musculoskeletal system functions as a lever system.

Course Outcome(s):

Identify the bones, bony features, nerves, muscles, joints, joint actions, planes of motion and axes of rotation of the upper extremity, including the shoulder girdle, shoulder joint, elbow, radioulnar joints, wrist and hand joints and demonstrate analysis of the joint actions, muscles and muscle contraction types involved in selected movements and exercises of the upper extremities.

Objective(s):

1. Identify the skeleton bones, bony features, nerves and muscles of the shoulder girdle.
2. Demonstrate the movements of the shoulder girdle and list their respective planes of motion and axes of rotation.
3. Demonstrate, through analysis, the shoulder girdle movements and the muscles involved in selected movements, exercises and skills.
4. Identify the skeleton bones, bony features, and muscles of the shoulder joint.
5. Demonstrate the movements of the shoulder joint and list their respective planes of motion and axes of rotation.
6. Demonstrate, through analysis, the shoulder joint movements and the muscles involved in selected movements, exercises and skills.
7. Identify the skeleton bones, bony features, nerves and muscles of the elbow and radioulnar joints.
8. Demonstrate the movements of the elbow and radioulnar joints and list their respective planes of motion and axes of rotation.
9. Demonstrate, through analysis, the wrist and hand joint movements and the muscles involved in selected movements, exercises, and skills.
10. Demonstrate, through analysis, the elbow and radioulnar joint movements and the muscles involved in selected movements, exercises, and skills.
11. Identify the skeleton bones, bony features, and muscles of the wrist and hand joints.
12. Demonstrate the movements of the wrist and hand joints and list their respective planes of motion and axes of rotation.
13. Describe the difference between open- and closed-chain exercises in the analysis of movement.
14. Analyze an upper extremity exercise or sport skill to determine the joint actions, muscles, and types of muscle contractions occurring in these movements.

Course Outcome(s):

Identify the bones, bony features, nerves, muscles, joints, joint actions, planes of motion and axes of rotation of the lower extremity, including the pelvis, hip joint, knee joint, ankle and foot joints and trunk and spinal column, and demonstrate analysis of the joint actions, muscles and muscle contraction types involved in selected movements and exercises of the lower extremities, trunk and spinal column.

Objective(s):

1. Identify the skeleton bones, bony features, nerves and muscles of the pelvic girdle and hip joint.
2. Demonstrate the movements of the pelvic girdle and hip joint and list their respective planes of motion and axes of rotation.
3. Demonstrate, through analysis, the pelvic girdle and hip joint movements and the muscles involved in selected movements, exercises and skills.
4. Identify the skeleton bones, bony features, nerves and muscles of the knee joint.
5. Demonstrate the movements of the knee joint and list their respective planes of motion and axes of rotation.
6. Demonstrate, through analysis, the knee joint movements and the muscles involved in selected movements, exercises, and skills.
7. Identify the skeleton bones, bony features, nerves and muscles of the ankle and foot joints.
8. Demonstrate the movements of the ankle and foot joints and list their respective planes of motion and axes of rotation.
9. Demonstrate, through analysis, the ankle and foot joint movements and the muscles involved in selected movements, exercises, and skills.
10. Identify the skeleton bones, bony features, nerves and muscles of the trunk and spinal column.
11. Demonstrate the movements of the trunk and spinal column and list their respective planes of motion and axes of rotation.
12. Demonstrate, through analysis, the trunk and spinal column movements and the muscles involved in selected movements, exercises and skills.
13. Analyze a lower body extremity, trunk and spinal column exercise or sport skill to determine the joint actions, muscles, and types of muscle contractions occurring in these movements.

Course Outcome(s):

Demonstrate, through analysis and evaluation, the joint actions, muscles, type of muscle contractions, types of myofascial connections, mechanical and conditioning principles occurring in selected movements, exercises and/or sport skills.

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. Explain the various phases used in the analysis of movement for selected exercises and sport skills.
2. Demonstrate, through assessment and analysis, the joint actions, muscles, muscle contraction types, myofascial connections, and biomechanical principles for a selected total body exercise or sport skill.

Methods of Evaluation:

- a. Class participation
- b. Written assignments
- c. Quizzes
- d. Written examinations
- e. Lab assignments
- f. Movement analysis assignment
- g. Oral presentations

Course Content Outline:

- a. Foundations of structural kinesiology
 - i. Reference positions and reference lines
 - ii. Anatomical directional terminology
 - iii. Planes of motion and axes of rotation
 - iv. Bone types, development, and markings
 - v. Types of joints
 - vi. Joint movement terminology
- b. Neuromuscular and myofascial fundamentals
 - i. Musculoskeletal and neuromuscular terminology
 - ii. Muscle shape, fiber arrangement, tissue properties
 - iii. Types of muscle contraction
 - iv. Neural control of voluntary movement
 - v. Proprioception
 - vi. Myofascial concepts
- c. Basic biomechanical factors and concepts
 - i. Machines and levers in the body
 - ii. Anatomical lever concepts and principles
 - iii. Tensegrity system of the body
 - iv. Laws of motion and physical activities
 - v. Friction
 - vi. Balance, equilibrium, and stability
 - vii. Forces
 - viii. Functional application
- d. Shoulder girdle
 - i. Bones
 - ii. Joints
 - iii. Movements
 - iv. Muscles
 - v. Nerves
 - vi. Shoulder girdle movement and/or sport skill analysis
- e. Shoulder joint
 - i. Bones
 - ii. Joints
 - iii. Movements
 - iv. Muscles

- v. Nerves
- vi. Shoulder joint movement and/or sport skill analysis
- f. Elbow and radioulnar joints
 - i. Bones
 - ii. Joints
 - iii. Movements
 - iv. Muscles
 - v. Nerves
 - vi. Elbow and radioulnar movement and/or sport skill analysis
- g. Wrist and hand joints
 - i. Bones
 - ii. Joints
 - iii. Movements
 - iv. Muscles
 - v. Nerves
 - vi. Wrist and hand movement and/or sport skill analysis
- h. Muscular analysis of upper extremity exercises
 - i. Concepts for analysis of movement
 - ii. Kinetic chain concept
 - iii. Conditioning considerations
 - iv. Myofascial meridian concept
 - v. Analysis of selected upper extremity exercises
- i. Hip joint and pelvic girdle joints
 - i. Bones
 - ii. Joints
 - iii. Movements
 - iv. Muscles
 - v. Nerves
 - vi. Hip joint and pelvic girdle movement and/or sport skill analysis
- j. Knee joint
 - i. Bones
 - ii. Joints
 - iii. Movements
 - iv. Muscles
 - v. Nerves
 - vi. Knee joint movement and/or sport skill analysis
- k. Ankle and foot joints
 - i. Bones
 - ii. Joints
 - iii. Movements
 - iv. Muscles
 - v. Nerves
 - vi. Ankle and foot joint movement and/or sport skill analysis
- l. Trunk and spinal column
 - i. Bones
 - ii. Joints
 - iii. Movements
 - iv. Muscles
 - v. Nerves
 - vi. Trunk and spinal column movement and/or sport skill analysis
- m. Muscular analysis of trunk and lower extremity exercises
 - i. Concepts for analysis of movement
 - ii. Kinetic chain concept
 - iii. Myofascial meridian concept
 - iv. Analysis of trunk and lower extremity exercises
- n. Analysis of total body movement and/or sport skill analysis
 - i. Assessment of movement
 - ii. Analysis of movement

- iii. Biomechanical analysis
- iv. Neuromuscular and myofascial analysis

Resources

Behnke, R S. & Plant, J.L. (2022) *Kinetic Anatomy, 4th ed.*, Chicago, Ill: Human Kinetics.

Lippert, L. (2022) *Clinical Kinesiology and Anatomy, 7th ed.*, Philadelphia, PA: F.A. Davis Company.

Lippert, L. (2023) *Laboratory Manual for Clinical Kinesiology and Anatomy, 5th ed.*, Philadelphia, PA: F.A. Davis Company.

Myers, T. (2022) *Anatomy Trains Myofascial Meridians for Manual and Movement Therapists, 4th ed.*, New York City: Churchill Livingstone Elsevier.

Floyd, R.T. (2021) *Manual of structural kinesiology*, New York: McGraw Hill.

Hoffman, S. & Knudson, D. (2022) *Introduction to Kinesiology with Web Study Guide, 6th ed.*, Champaign: Human Kinetics.

Schleip, R. (2021) *Fascial Fitness, 2nd ed.*, Chichester: Lotus Publishing.

Schleip, R. & Wilke, J. (2021) *Fascia in Sport and Movement, 2nd ed.*, UK: Handspring Publishing.

Biel, A. (2019) *Trail Guide to Movement, 2nd ed.*, Boulder: Books of Discovery.

Resources Other

- McGraw Hill Connect: Manual of Structural Kinesiology.
- App: Muscle & Motion Strength Training

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