Course Title: **Applied Anatomy: Land & Water**

Produced by: **Fitness Learning Systems**
1012 Harrison Ave #3 Harrison OH 45030
www.fitnesslearningsystems.com 1-888-221-1612

Course Type: **e-Learning Home Study**

Credit hours: AEA 3.0, ACSM 4.0, NSCA 0.3, ATRI 0.4, COPS-KT 0.4, NFPT 1.0, NCSF 2.0, YMCA 4.0, NSPA 4.0, NETA 4.0

Author:

June Lindle-Chewning M.A., B.S.

June Lindle was owner and manager of Harrison Health and Fitness Center near Cincinnati, Ohio for 15 years. After college, June pursued a career as an educator and taught elementary Physical Education for six years. She left teaching to pursue a Master's degree in Health Enhancement and Exercise Physiology. She has taught a variety of fitness classes since 1978, and has been presenting educational health/ wellness lectures and fitness classes to corporations, the community and instructors since 1985 both in the U.S. and Internationally. June is proud to be an AEA Training Specialist since 1988, on the Aquatic Exercise Association Research Committee, and recipient of the AEA 1995 Achievement Award, and 2001 Contribution to the Aquatic Industry Award. She has served as Managing Editor for the Aquatic Fitness Professional Manual, A Guide to Aquatic Rubberized Resistance Exercises, AEA Aquatic Personal Trainer Manual, and the AEA Instructor Skills Manual. She serves as adjunct faculty for Cincinnati State College and has developed several class curriculums for their Health/ Fitness Technician degree program. She is president of Fitness Learning Systems, a company that provides innovative continuing education products for the fitness industry.

Course Summary:

It is important to understand the concept of human movement and be able to identify the muscle doing the work in an exercise and the type of contraction occurring. It is even more difficult to apply these concepts to different environments. Pure movement is different than movement on land affected by gravity. Movement in the water is different because of the presence of gravity and buoyancy as well as the drag forces of the water. Adding equipment complicates the muscle and contraction equation even more! The purpose of this course is to help you sort through muscles and contractions in various fitness environments to improve your understanding and increase the effectiveness of your instruction. This course is also part three of a three course certificate program. Part

one is Introduction to Aquatic Personal Training and part two is Aquatic Personal Training Programming.

Objectives:

After completing this course you will:

1. Explain and demonstrate movement in the planes and axes of motion. Understand anatomical movement terms. Identify and describe movement at the major joints in the body.
2. Describe primary muscle actions at the major joints in the body.
3. Identify which muscle or muscle group is responsible for a particular movement.
4. Understand muscle actions and muscle involvement influenced by gravity on land.
5. Understand muscle actions and muscle involvement for submerged movement.
6. Be able to effectively use weighted, buoyed, drag, and rubberized equipment in the aquatic environment and on land, identifying muscles targeted by specific movements.
7. Explain progressive overload principles for land and water resistance programs.

Outline:

Planes of Motion:
- Frontal Plane (1)
- Sagittal Plane (2)
- Transverse Plane (3)
- Diagonal or Oblique Plane

Axis of Rotation:
- Frontal Axis
- Sagittal Axis
- Vertical Axis

Anatomical Movement Terms:

Angular Movements:
- Flexion/ Extension/ Hyperextension
- Lateral Flexion/ Extension
- Abduction/ Adduction
- Transverse Abduction/ Adduction
- Rotation
- Circumduction

Special Movements:
- Supination/ Pronation (Forearm)
- Inversion/ Eversion (Ankle)
- Protraction/ Retraction (Scapula)
- Elevation/ Depression (Scapula)

Joint Structures:

Types of Joints:

Gliding or Arthroidial
Hinge Joint or Ginglymus
Pivot or Trochoid
Condyloid or Ellipsoidal
Saddle or Sellaris Ball
Socket or Spheriod

Joint Summary Chart

Movements at Primary Joints:

Cervical Spine
Shoulder Joint
Shoulder Girdle
Elbow
Wrist
Lumbar Spine
Hip
Knee
Ankle

Muscle Actions:

Isotonic
Concentric
Eccentric
Isometric
Isokinetic

Pure Movement:

Pure Movement Muscle Involvement:

Shoulder - Flexion and Extension of the Arm.
Shoulder - Transverse Adduction and Abduction of the Arm.
Shoulder - Lateral Abduction and Adduction of the Arm.
Shoulder Girdle - Elevation and Depression.
Shoulder Girdle - Protraction and Retraction.
Arm Curl - Flexion and Extension of the Forearm at the Elbow.
Wrist - Flexion and Extension.
Abdominal Crunch - Flexion and Extension of the Trunk at Lumbar Spine.
Leg Kick - Flexion and Extension of the Leg at the Hip.
Leg Curl - Flexion and Extension of the Lower Leg at the Knee.
Leg Raise - Abduction and Adduction of the Leg at the Hip.
Calf Raise - Plantar and Dorsi Flexion of the Foot at the Ankle.

Land Movement:

RESISTED (concentric)

ASSISTED (eccentric)

Land Movement Muscle Involvement:

Shoulder - Flexion and Extension of the Arm.
Shoulder - Transverse Adduction and Abduction of the Arm.
Shoulder - Lateral Abduction and Adduction of the Arm
Shoulder Girdle - Elevation and Depression
Shoulder Girdle- Protraction and Retraction
Arm Curl - Flexion and Extension of the Forearm at the Elbow.
Wrist - Flexion and Extension.
Abdominal crunch - Flexion and Extension of the Trunk at Lumbar Spine.
Leg Kick - Flexion and Extension of the Leg at the Hip.
Leg Curl - Flexion and Extension of the Lower Leg at the Knee.
Leg Raise - Abduction and Adduction of the Leg at the Hip.
Calf Raise - Plantar and Dorsi Flexion of the Foot at the Ankle.

Submerged Movement:

RESISTED (concentric)

Submerged Movement Involvement:

Shoulder - Flexion and Extension of the Arm.
Shoulder - Transverse Adduction and Abduction of the Arm.
Shoulder - Lateral Abduction and Adduction of the Arm
Shoulder Girdle - Elevation and Depression
Shoulder Girdle- Protraction and Retraction
Arm Curl - Flexion and Extension of the Forearm at the Elbow.
Wrist - Flexion and Extension.
Abdominal crunch - Flexion and Extension of the Trunk at Lumbar Spine.
Leg Kick - Flexion and Extension of the Leg at the Hip.
Leg Curl - Flexion and Extension of the Lower Leg at the Knee.
Leg Raise - Abduction and Adduction of the Leg at the Hip.
Calf Raise - Plantar and Dorsi Flexion of the Foot at the Ankle.

Types of Equipment:

Weighted Equipment:
Free weights to be used on land or in the water.

Buoyant Equipment :
For use in the aquatic environment.

Drag Resistance Equipment:
For use in the aquatic environment.

Rubberized Equipment:
Bands and tubes to be used on land or in the aquatic environment.

Other Topics:

Purpose of Equipment
How To Analyze Equipment Use

Progressive Overload:

Progressive Overload Methods for Land Exercise
Progressive Overload Methods for Water Exercise

Combined Equipment Review Charts:

Pure Movement:

Shoulder - Flexion and Extension of the Arm.
Shoulder - Lateral Abduction and Adduction of the Arm.

Gravity Resisted:

Arm Curl - Flexion and Extension of the Forearm at the Elbow.

Buoyancy Resisted/
Drag Resisted:

Leg Kick - Flexion and Extension of the Leg at the Hip.
Leg Curl - Flexion and Extension of the Lower Leg at the Knee.
Leg Raise - Abduction and Adduction of the Leg at the Hip.

Bibliography:

1. **Aquatic Fitness Professional Manual**, AEA, Nokomis Florida, www.aeawave.com
2. **Principles of Anatomy and Physiology**, Tortora and Grabowski, Harper Collins College Publishers, www.harpercollins.com/college
3. **Manual of Structural Kinesiology**, Thompson and Floyd, McGraw-Hill publisher, www.mhhe.com
4. **Physiology of Sport and Exercise**, Wilmore and Costill, Human Kinetics, www.humankinetics.com