Oxford College *of Emory University*

PE 101 Weight Training

Dr. Richard Shappell

Spring 2001

Course Description:

The course is designed for the novice (male or female) interested in learning the technique and implications for a progressive resistance exercise program based on physiological principles. Further, the emphasis here will be on methodology and the adherence to physiologically based principles of training.

Sequence of Events in Class:

Orientation (handout); Exercise Demonstration (handout); Lectures; Workouts; Exams. Workouts will be held each Monday, Wednesday, and Friday.

Text: Strengthening Skeletal Muscle, Dr. Richard Shappell

NOTE: Specific readings in the text will be assigned prior to all lectures. Students should be prepared for all lectures by having read specific portions of the text which pertain to the specific lecture or lectures.

Dress:

Students are required to wear flat-soled tennis shoes and socks. Students are urged to wear loose fitting shirts and shorts. Shirts are to be worn at all times. No cut-off jeans or pants will be permitted. Further, no shorts or pants with buckles or studs will be permitted. All students must bring a small towel to class.

Lectures: (Section I)

1. Skeletal Muscle Characteristics

   Instructional Objectives: The student should be able to list, understand,explain and list the following skeletal muscles characteristics:

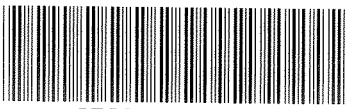
   (#1)

   1. Excitability
   2. Contractability
   3. Extensibility
   4. Elasticity

   Reading: Chapters I and II

2. Training Principles and Regimens

EMORY UNIVERSITY



050000020122

The student should be able to define, understand, and be able to implement the following:

(#1)

1. Volume
2. Intensity
3. Maximum(s)
4. Hypertrophy
5. Atrophy
6. Training Principles
   a. Adapting to Stress
   b. Intensity
   c. Progression
   d. Volume
   e. Repetition Speed
   f. Frequency & Duration
   g. Adaptation Time

Reading: Chapter III

3. Gross Anatomy

Instructional Objective: The student should be able to list, identify and understand the following components of skeletal muscle:

(#1)

1. Tendon
2. Epimysium
3. Fasciculus
4. Fiber
5. Filament
   a. Actin
   b. Myosin
6. Sarcomere
7. ATP
8. Cross-Bridges
9. Z-Line

Reading: Chapter IV

4. Neuromuscular Structures

The student should be able to list, identify and understand the following neural structures:

(#2)

1. Neurons
2. Axon
3. Neuromuscular Junction
4. Motor Unit
5. All or None Law
6. Acetylcholine

Reading: Chapter V

5. Muscular Contraction

The student should be able to list the steps in muscle contraction (sliding filament theory).

(#2)

1. Rest
2. Excitation
3. Contraction
4. Rest
5. Concentric & Eccentric Contractions

Reading: Chapter VI

6. Types of Contractions
The student should be able to define and understand three types of contractions.

(#2)

1. Concentric Contractions
2. Eccentric Contractions
3. Isometric Contractions
4. Relationship to Training

Reading: Chapter VII

LECTURES (Section II)

7. Energy Systems
The student should be able to describe the energy systems which supply energy for muscle contraction.

(#3)

1. ATP-PC
2. Glycolysis
3. Aerobic System

Reading: Chapter VIII

8. Micro-Anatomy and other Muscle Structures
The student should be able to list and describe the function of the following structures:

(#3)

1. Fiber Type (Fast, Slow, Intermediate)
2. Fiber Arrangement (fusiform, peniform, Multi-penate)

Reading: Chapter IX

9. Skeletal Muscles

(#3)

Functions of muscles (flex, extend, abduct, adduct, rotate, elevate, depress, tensors, prime movers, antagonists, agonists, synergists).

10. Training Effects
The student should be able to list the physiological effects (charges occurring in the muscle) due to training.

(#4)

1. Hypertrophy
2. Connective Tissue
3. Water
4. Glucose
5. ATP
6. Sychronization
7. Bone Density
8. PC

Reading: Chapter XI

11. When Training Ceases
The student should be able to describe what occurs (physiologically) when training ceases and also be able to describe the maintenance regimen.

(#4)

1. Atrophy
2. Complete Reversal of Training Effects
3. Maintenance Training

Reading: Chapter XI

12. Factors Affecting Strength
The student should be able to discuss the genetic factors which affect strength.

(#5)

1. Size
2. Biomechanical
3. Sex differences
4. Fiber type and configuration
5. Neural mechanisms

Reading: Chapter XII

13. Diet and Ergogenic Aids
The student should be able to discuss the following:

(#5)

1. Carbohydrates, proteins and fats
2. Ergogenic Aids
   a. steroids
   b. stimulants
   c. "Energy Drinks"
   d. Creatine Supplements

Evaluation:

A. Announced Written Exams: (40%/400 pts.)
There will be five (5) announced written exams during the semester. The lowest test grade will be dropped.

B. Final Exam: (10%/100 pts.)
Administered on the final class day, this exam covers all material.

C. Program:
Completion of the exercise program earns the student 50% (500 pts.)

D. Cut Policy:
Students may take three (3) absences. These are to be used for illness, emergencies, weddings, religious holidays, etc. Students absent more than three (3) times will have fifty (50) points per absence over three deducted from the 500 points earned for the Program aspect of this course.

F. Grading:

A = 90% or better (900 plus)
B = 80% - 89% (800-890)
C = 70% - 79% (700-790)
D = 60% - 69% (600-690)

Practical Application:

Students will apply what they have learned about basic muscle anatomy and physiology to training regimens of their own choice (increased muscle strength, increased muscle size, increased muscular contraction endurance (toning) for a combination of all. These regimens (the training) will occur each class day (Monday, Wednesday, and Friday).

Honor Code:

Students are expected to adhere to the Honor Code with reference to all matters relating to the evaluative process of this course.

TRAINING REGIMENS

I. **BASIC:** 70-80% max/l set of l0 reps (attempted) Increase resistance once 10 reps have been completed!

II. **STRENGTH:** 90% max/3 sets of 3-4 reps

III. **ENDURANCE:** 60% max/3-5 sets of 16-18 reps

IV. **HYPERTROPHY:** (Body Building) 80% max/3 sets 6-8 reps

V. **PYRAMIDS:**

a) 1 set 6 reps with 70% max
b) 1 set 6 reps with 80% max
c) 1 set (exhaustion?) with 90%

Basic: Results in some strength, hypertrophy, and endurance. Great as adjunct to aerobic workouts.

Strength: Results in some hypertrophy with emphasis on strength gain.

Endurance: Results in little strength and hypertrophy but allows for repeated contractions over time.

Hypertrophy: Results in some strength but emphasizes hypertrophy (Body Building)

Pyramids: Used for strength or hypertrophy regimens.

WEIGHT TRAINING PROGRAM PROCEDURES

Step One

To determine resistances which are at 80% of maximum per each exercise:

a. choose (guess) a weight you believe you can move (complete repetitions) more than 5 times (reps) but no more than 8 times (reps)

The resistance arrived at should be reflected in increments of 0 (e.g. 50 lbs.), 2-1/2 (e.g. 52-1/2), 5 (55) or 7-1/2 (57-1/2).

Step Two

Place the resistance (which is your starting weight) in the box in the left column of your chart. For "chest" (top left), place (e.g. 50) in that box.

Step Three

You are to attempt 10 reps with the resistance. Resistances stay the same until 10 reps are completed. Do not execute any more than 10 reps.

Step Four

Once 10 reps are completed, add 5-10% more weight to the original resistance.

Continue this progressive-resistance increase.