

Course Description:

This course teaches students about the fundamentals of exercise science, including principles of the relevant body systems, fitness testing, training, and program design. Throughout the course, students are expected to evaluate their own fitness, design an exercise plan, and track their results.

Course Objectives:

- Describe the properties of open and closed chain exercises by highlighting their characteristics and studying how they relate to physical activity.
- Evaluate the function of the nervous, skeletal, and muscular systems in exercise by examining each system and relating its activity to physical exercise.
- Evaluate the function of the cardiovascular, respiratory, and endocrine systems in exercise by examining each system and relating its activity to physical exercise.
- Analyze how the ATP-PC, glycolytic, and oxidative energy systems relate to physical exercise by comparing function and characteristics of each system.
- Evaluate how the energy systems work in different types of exercise by examining the energy requirements of the types of exercise and relating them to properties of the energy systems.
- Describe how the human body moves by studying motion in terms of planes of motion and force, leverage, torque, and rotary motion.
- Evaluate the role of fitness testing in physical exercise by examining the goal and procedures of fitness testing and relating them with fitness goals.
- Describe how to determine heart rate, body mass index, and body composition by examining the procedures for each test.
- Analyze the importance of knowing heart rate, body mass index, and body composition in fitness by examining how each relates to fitness and by relating them with fitness goals
- Describe how to determine flexibility, cardio status, and muscular endurance by examining the procedures for determining each.
- Analyze the importance of knowing flexibility, cardio status, and muscular endurance in fitness by examining how each relates to fitness and by relating them with fitness goals.
- Evaluate the importance of warm-up and cooldown in physical exercise by examining the effects of warm-up and cooldown procedures on the body.
- Evaluate how flexibility can be increased by highlighting the characteristics of different stretching methods and comparing their advantages and disadvantages.
- Analyze how cardiorespiratory training affects overall fitness levels by examining the characteristics of variables relevant to cardiorespiratory training and how the cardiorespiratory system functions during exercise.
- Describe different levels of core training by highlighting the characteristics of the core and comparing and contrasting the properties of the core systems at different training levels.
- Evaluate the importance of core training in physical exercise by highlighting the structure of the core systems and examining different core training activities.
- Evaluate the benefits of plyometric training by examining the effects of the stretch-shortening cycle and the effects of plyometric training on the body.
- Evaluate the benefits of speed, agility, and quickness (SAQ) training by examining mechanics of SAQ training and its effects on the body.

- Evaluate the risks associated with plyometric training and SAQ training by examining exercises of each training.
- Describe resistance training by examining the SAID principle and endurance, speed, and power.
- Evaluate the benefits of resistance training by examining the effects of resistance training on the body.
- Describe the acute variables that define an exercise program by examining each variable.
- Evaluate ways to estimate energy needs of a program by examining how the body provides energy and how exercises consume energy.
- Analyze the effects of cardiovascular training programs on the body by identifying the characteristics of steady-state, interval, aerobic, and anaerobic training.
- Analyze the effects of resistance training programs on the body by determining the effects of building muscular endurance, strength, and power.
- Determine ways to design all-inclusive muscular development programs by identifying relevant activities to be included.
- Identify ways to design exercise programs for people with health conditions by examining the health condition and how it affects the body.

Required Materials:

In course.

Course Overview:

Unit 1: Exercise Science Principles

Videos:

- The Kinetic Chain (Lesson 1)

Texts:

- Lesson 1: Nervous System and Physical Activity, Skeletal System and Physical Activity, Muscular System and Physical Activity
- Lesson 2: Cardiovascular System and Physical Activity, Respiratory System and Physical Activity, Endocrine System and Physical Activity
- Lesson 3: Energy and Work, Energy Systems, Energy: Intensity and Duration
- Lesson 4: Metabolism during Steady-State Exercise, Metabolism during Intermittent Work, Myth of the Fat-Burning Zone
- Lesson 5: Muscle Fiber Types, Planes of Motion and Joint Motion, Muscle Actions, Muscular Leverage and Force, Motor Learning and Proprioception

Key Terms

Workbook Problems (lessons 1-5, two questions each)

Discussion Board (lessons 1-5)

Checkpoint (lessons 1-4, 10 questions each)

Unit 1 Exam (lesson 5, 20 questions)

Project: Physical Activity Log (lessons 1-5)

Unit 2: Sport and Recreation

Videos:

- Overview of Fitness Testing (lesson 6), Resting Heart Rate (lesson 8) BMI (lesson 8), Body Composition (lesson 8), Flexibility Tests (lesson 10), Cardiorespiratory Tests (lesson 10), Muscular Endurance Tests (lesson 10)

Text:

- Lesson 6: Benefits and Limitations of Fitness Testing, Health History Questionnaires
- Lesson 7: Heart Rate and Blood Pressure, BMI, Body Composition Tests
- Lesson 8: N/A
- Lesson 9: Flexibility Assessments, Cardio Assessments, Muscular Endurance Assessments
- Lesson 10: N/A

Key Terms

Workbook Problems (lessons 6-10, two questions each)

Discussion Board (lessons 6-10)

Checkpoint (lessons 6-9, 10 questions each)

Unit 2 Exam (lesson 10, 20 questions)

Project: Physical Activity Log (lessons 6-10)

Unit 3: Exercise Testing and Program Design

Videos:

- Static Stretching (lesson 11), PNF Stretching (lesson 11), Dynamic Stretching (lesson 11), Cardiorespiratory Training (lesson 11), Beginner Core Exercises (lesson 14), Intermediate Core Exercises (lesson 14), Advanced Core Exercises (lesson 14)

Texts:

- Lesson 11: Warm-Up and Cooldown Protocols
- Lesson 12: Static Stretching, Dynamic Stretching, PNF Stretching
- Lesson 13: Cardiorespiratory Training Guidelines, Benefits of Cardiorespiratory Training, Monitoring Intensity
- Lesson 14: N/A
- Lesson 15: Muscles and Function of the Core, Core Training Guidelines, Core Training and Low Back Pain

Key Terms

Workbook Problems (lessons 11-15, two questions each)

Discussion Board (lessons 11-15)

Checkpoint (lessons 11-14, 10 questions each)

Unit 3 Exam (lesson 15, 20 questions)

Project: Physical Activity Log (lessons 11-15)

Unit 4: Behavior Modification

Videos:

- Beginner Plyometric Exercises (lesson 16), Intermediate Plyometric Exercises (lesson 16), Advanced Plyometric Exercises (lesson 16), Ladder Drills (lesson 16), Cone Drills (lesson 16), Chest Exercises (lesson 19), Back Exercises (lesson 19), Shoulder Exercises (lesson 19), Biceps and Triceps Exercises (lesson 19), Leg Exercises (Lesson 19)

Texts:

- Lesson 16: N/A
- Lesson 17: Overview of Plyometric Training, Plyometric Training and Performance Enhancement, Plyometric Training and Injury Prevention
- Lesson 18: Overview of SAQ Training; Sprint Mechanics; Differentiating Speed, Agility, and Quickness
- Lesson 19: N/A
- Lesson 20: Overview of Resistance Training, Benefits of Resistance Training, Resistance Training Systems, Acute Variables, Resistance Training Myths, Gym Etiquette and Spotting Techniques

Key Terms

Workbook Problems (lessons 16-20, two questions each)

Discussion Board (lessons 16-20)

Checkpoint (lessons 16-19, 10 questions each)

Unit 4 Exam (lesson 20, 20 questions)

Project: Physical Activity Log (lessons 16-20)

Unit 5: Nutrition and Weight Management

Videos: N/A

Texts:

- Lesson 21: Overview of Program Design, Physical Activity Guidelines for Americans, FITT-VP, Estimating Energy Needs
- Lesson 22: Steady-State Cardiovascular Training, Aerobic Interval Training Programs, Anaerobic Training Programs
- Lesson 23: Muscular Endurance Training, Muscular Development Training, Power Training
- Lesson 24: All-Inclusive Endurance Program, All-Inclusive Muscular Development Program, All-Inclusive Power Program
- Lesson 25: Exercise Programming for Asthma, Exercise Programming for Obesity, Exercise Programming for Diabetes Mellitus

Key Terms

Workbook Problems (lessons 21-25, two questions each)

Discussion Board (lessons 21-25)

Checkpoint (lessons 21-24, 10 questions each)

Unit 5 Exam (lesson 25, 20 questions)

Project: Physical Activity Log (lessons 21-25)

Unit 6: Review and Final Exam

Lesson 26 – Unit 1 Review

- Lesson 1 Review, Lesson 2 Review, Lesson 3 Review, Lesson 4 Review, Lesson 5 Review
- Discussion Board

- Project: Physical Activity Log

Lesson 27 – Unit 2 Review

- Lesson 6 Review, Lesson 7 Review, Lesson 8 Review, Lesson 9 Review, Lesson 10 Review
- Discussion Board
- Project: Physical Activity Log

Lesson 28 – Unit 3 Review

- Lesson 11 Review, Lesson 12 Review, Lesson 13 Review, Lesson 14 Review, Lesson 15 Review
- Discussion Board
- Project: Physical Activity Log

Lesson 29 – Unit 4 Review

- Lesson 16 Review, Lesson 17 Review, Lesson 18 Review, Lesson 19 Review, Lesson 20 Review
- Discussion Board
- Project: Physical Activity Log

Lesson 30 – Unit 5 Review & Final Exam

- Lesson 21 Review, Lesson 22 Review, Lesson 23 Review, Lesson 24 Review, Lesson 25 Review
- Discussion Board
- Project: Physical Activity Log (final submission)
- Final Exam
- End of Course