

**STATE UNIVERSITY OF NEW YORK
COLLEGE OF TECHNOLOGY
CANTON, NEW YORK**



MASTER SYLLABUS

**COURSE NUMBER – COURSE NAME
HEFI 303 – EXERCISE PHYSIOLOGY**

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School of Science, Health, and Criminal Justice

Department: Health and Fitness Promotion

Semester/Year: Spring 2020

- A. **TITLE:** Exercise Physiology
- B. **COURSE NUMBER:** HEFI 303
- C. **CREDIT HOURS:** (Hours of Lecture, Laboratory, Recitation, Tutorial, Activity)

Credit Hours: 3
Lecture Hours: 3 per week
Lab Hours: per week
 Other: per week

Course Length: 15 Weeks

- D. **WRITING INTENSIVE COURSE:** Yes No
- E. **GER CATEGORY:** None: Yes: GER
If course satisfies more than one: GER
- F. **SEMESTER(S) OFFERED:** Fall Spring Fall & Spring

G. **COURSE DESCRIPTION:**

Students study immediate and long term physiological responses and adaptations to exercise. Specifically, the role of the musculoskeletal, neuromuscular, cardiovascular, and respiratory systems in regulating exercise is covered in detail and adaptations of these systems to exercise are discussed. Environmental and hormonal influences are also included. Students explore specific aspects of training for sports performance.

- H. **PRE-REQUISITES:** None Yes If yes, list below:

BIOL 217 and BIOL 218 with a minimum grade of C for BIOL 218 or permission of instructor

CO-REQUISITES: None Yes If yes, list below:

I. STUDENT LEARNING OUTCOMES: (see key below)

By the end of this course, the student will be able to:

<u>Course Student Learning Outcome</u> <u>[SLO]</u>	<u>Program Student Learning Outcome</u> <u>[PSLO]</u>	<u>ISLO & SUBSETS</u>	
a. Describe structure and function of muscle relative to production of body movement.	<p>P4. Capably communicate, orally and in writing, as a health and fitness professional within various health and fitness settings.</p> <p>P8. Utilize knowledge of foundational science and/or business principles to guide decision making in the health and fitness setting.</p>	1-Comm Skills 2-Crit Think ISLO	W CA Subsets Subsets
b. Discuss the role of the nervous system in coordination of muscle action.	<p>P4. Capably communicate, orally and in writing, as a health and fitness professional within various health and fitness settings.</p> <p>P8. Utilize knowledge of foundational science and/or business principles to guide decision making in the health and fitness setting.</p>	1-Comm Skills 2-Crit Think ISLO	W CA Subsets Subsets
c. Discuss the body's ability to meet the energy needs for exercise.	<p>P4. Capably communicate, orally and in writing, as a health and fitness professional within various health and fitness settings.</p> <p>P8. Utilize knowledge of foundational science and/or business principles to guide decision making in the health and fitness setting.</p>	1-Comm Skills 2-Crit Think ISLO	W CA Subsets Subsets
d. Explain adaptations of the cardiovascular and respiratory systems to meet the demands of exercise.	<p>P4. Capably communicate, orally and in writing, as a health and fitness professional within various health and fitness settings.</p> <p>P7. Effectively utilize research evidence to guide best practice in the area of health promotion and fitness programming.</p> <p>P8. Utilize knowledge of foundational science and/or business principles to guide decision making in the health and fitness setting.</p>	1-Comm Skills 2-Crit Think ISLO	W CA Subsets Subsets
e. Compare and contrast how the body adapts to exercise under unusual environmental conditions.	<p>P4. Capably communicate, orally and in writing, as a health and fitness professional within various health and fitness settings.</p> <p>P7. Effectively utilize research evidence to guide best practice in the area of health promotion and fitness programming.</p> <p>P8. Utilize knowledge of foundational science and/or business principles to guide decision making in the health and fitness setting.</p>	1-Comm Skills 1-Comm Skills ISLO	W CA Subsets Subsets

f. Discuss methods of optimizing training to enhance sports performance.	<p>P4. Capably communicate, orally and in writing, as a health and fitness professional within various health and fitness settings.</p> <p>P7. Effectively utilize research evidence to guide best practice in the area of health promotion and fitness programming.</p> <p>P8. Utilize knowledge of foundational science and/or business principles to guide decision making in the health and fitness setting.</p>	1-Comm Skills 2-Crit Think ISLO	W CA Subsets Subsets
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KEY	<u>Institutional Student Learning Outcomes [ISLO 1 – 5]</u>
ISLO #	ISLO & Subsets
1	Communication Skills Oral [O], Written [W]
2	Critical Thinking <i>Critical Analysis [CA], Inquiry & Analysis [IA], Problem Solving [PS]</i>
3	Foundational Skills <i>Information Management [IM], Quantitative Lit./Reasoning [QTR]</i>
4	Social Responsibility <i>Ethical Reasoning [ER], Global Learning [GL], Intercultural Knowledge [IK], Teamwork [T]</i>
5	Industry, Professional, Discipline Specific Knowledge and Skills

*Include program objectives if applicable. Please consult with Program Coordinator

J. APPLIED LEARNING COMPONENT: Yes No

If YES, select one or more of the following categories:

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|---|--|
| <input type="checkbox"/> Classroom/Lab | <input type="checkbox"/> Civic Engagement |
| <input type="checkbox"/> Internship | <input type="checkbox"/> Creative Works/Senior Project |
| <input type="checkbox"/> Clinical Placement | <input type="checkbox"/> Research |
| <input type="checkbox"/> Practicum | <input type="checkbox"/> Entrepreneurship |
| <input type="checkbox"/> Service Learning | (program, class, project) |
| <input type="checkbox"/> Community Service | |

K. TEXTS:

Physiology of Sport and Exercise, 3rd Ed, Wilmore, JH and Costill, DL, Human Kinetics, Champaign, IL, 2004.

L. REFERENCES:

Exercise Physiology: Energy, Nutrition, and Human Performance, McCardle, WD, Katch, FI, Katch, VL, Lippincott Williams & Wilkins, 2006.

M. EQUIPMENT: None Needed: Technology enhanced classroom

N. GRADING METHOD: A-F

O. SUGGESTED MEASUREMENT CRITERIA/METHODS:

Written exams

Written homework

Discussion postings

Topic paper

P. DETAILED COURSE OUTLINE:

I. Essentials of Movement

- A. Musculoskeletal control of movement
 - 1. Skeletal muscle structure
 - 2. Skeletal muscle function
 - 3. Slow twitch vs fast twitch muscle fibers
 - 4. Recruitment for exercise
- B. Neurological control of movement
 - 1. Nervous system overview
 - 2. Function of Central Nervous System
 - 3. Function of Peripheral Nervous System
 - 4. Sensory Motor Integration
- C. Neuromuscular adaptations to exercise
 - 1. Strength, Power, Endurance
 - 2. Basic Principles of resistance training
 - 3. Strengthening
 - 4. Muscle soreness (acute vs DOMS)
 - 5. Components of resistance training programs

II. Energy for Movement

- A. Metabolism and energy systems
 - 1. Energy sources
 - 2. Energy systems
 - 3. Measurement of energy
 - 4. Energy expenditure
 - 5. Fatigue
- B. Hormonal regulation of exercise
 - 1. Hormone classifications and actions
 - 2. Specific hormones related to physical activity
 - 3. Hormone response to exercise
- C. Metabolic adaptations to exercise
 - 1. Adaptation to aerobic training
 - 2. Adaptation to anaerobic training

III. Cardiovascular and Respiratory Function

- A. Cardiovascular control during exercise
 - 1. Overview of cardiovascular anatomy and function
 - 2. Cardiovascular response to exercise
- B. Respiratory regulation during exercise
 - 1. Ventilation
 - 2. Gas Exchange
 - 3. Regulation of ventilation
 - 4. Respiratory limitations to physical activity
- C. Cardiovascular and Respiratory adaptations to exercise
 - 1. Evaluating aerobic capacity (VO_2 max)
 - 2. Cardiovascular adaptations to aerobic exercise
 - 3. Respiratory adaptations to aerobic exercise
 - 4. Metabolic adaptations to endurance training
 - 5. Factors affecting cardiorespiratory exercise response
 - 6. Relationship of endurance to sport performance

IV. Environmental Influences on Performance

- A. Exercise in hot and cold environments
 - 1. Regulation of body temperature
 - 2. Physiologic response to exercise in heat
 - 3. Physiologic response to exercise in cold
 - 4. Acclimatization
- B. Exercise in hypobaric, hyperbaric, and microgravity environments
 - 1. Physiologic response to altitude
 - 2. Water immersion exercise
 - 3. Physiologic response to microgravity

IV. Sports Performance

- A. Training for Sport
 - 1. Overload principle of training
 - 2. Excessive training
 - 3. Tapering training
 - 4. Detraining
 - 5. Retraining
- B. Ergogenic Aids and Sport
 - 1. Pharmacological
 - 2. Hormonal
 - 3. Physiological
 - 4. Nutritional

Q. **LABORATORY OUTLINE:** None Yes