

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



**MASTER SYLLABUS**

**COURSE NUMBER: EXSC 410**

**COURSE TITLE: Advanced Strength and Conditioning**

CIP Code: 31.0505

Created by: Dr. Janet Parcell

School: School of Science, Health, and Criminal Justice  
Department:  
Implementation Semester/Year: Fall 2027

A. **COURSE TITLE:** Exercise Prescription

B. **COURSE NUMBER:** EXSC 410

C. **CREDIT HOURS** (# Hours of Lecture, Laboratory, Recitation, Clinical):

# Credit Hours per Week	4
# Lecture Hours per Week	2
# Lab Hours per Week	4
Other per Week	

D. **GRADING METHOD:**

A – F	<input checked="" type="checkbox"/>
Pass/Fail	<input type="checkbox"/>
Other:	

E. **WRITING INTENSIVE COURSE:**

Yes	<input type="checkbox"/>
No	<input checked="" type="checkbox"/>

F. **GER CATEGORY:**

Does the course satisfy a GER category? If so, please select all that apply.

(<https://www.canton.edu/provost/assessment/ger/>)

[1-2] Communication	<input type="checkbox"/>
[3] Diversity: Equity, Inclusion & Social Justice	<input type="checkbox"/>
[4] Mathematics & Quantitative Reasoning	<input type="checkbox"/>
[5] Natural Science & Scientific Reasoning	<input type="checkbox"/>
[6] Humanities	<input type="checkbox"/>
[7] Social Sciences	<input type="checkbox"/>
[8] Arts	<input type="checkbox"/>
[9] US History & Civic Engagement	<input type="checkbox"/>
[10] World History & Global Awareness	<input type="checkbox"/>
[11] World Languages	<input type="checkbox"/>

CORE COMPETENCIES (Required starting in Fall 2026):

[12] Critical Thinking and Reasoning	<input checked="" type="checkbox"/>
[13] Information Literacy	<input type="checkbox"/>
[14] Civic Discourse	<input type="checkbox"/>

**G. APPLIED LEARNING COMPONENT (High-Impact Practices):**

Yes	<input checked="" type="checkbox"/>
No	<input type="checkbox"/>

If Yes, select [X] one or more of the following Curricular Attribute categories:  
 HIPs definitions found here: <https://www.suny.edu/applied-learning/resources/>

<b>Capstone</b>	
Creative Works	<input type="checkbox"/>
For-Credit Internship	<input type="checkbox"/>
<b>Practicum</b>	
Practicum [Clinical Placement]	<input type="checkbox"/>
Practicum [Non-Clinical Placement]	<input checked="" type="checkbox"/>
<b>Research &amp; Field Study</b>	
Field Research	<input type="checkbox"/>
Research	<input type="checkbox"/>
Undergraduate Research	<input type="checkbox"/>
<b>Service or Community</b>	
Service Learning	<input type="checkbox"/>
Community Service	<input type="checkbox"/>
Civic Engagement	<input type="checkbox"/>
<b>Study Abroad</b>	
International and Domestic Travel/Exchange	<input type="checkbox"/>
COIL	<input type="checkbox"/>

**H. SEMESTER(S) OFFERED:**

Fall	<input checked="" type="checkbox"/>
Spring	<input type="checkbox"/>
Fall and Spring	<input type="checkbox"/>

**I. COURSE DESCRIPTION:**

This course examines the science and practice of designing and implementing advanced strength and conditioning programs for athletes and team sports. Students will learn how to apply physiological principles, performance analysis, and training models to create structured programs for athletes and teams. Programs are geared towards sport specificity in regard to bioenergetics, aerobic needs, and muscular strength/power requirements for the sport. Students will have an in-depth study of the various periodization models (example: triphasic, undulating, linear, etc.) and apply this knowledge in classroom lab activities. Hands-on training using various methods of program design is included during classroom lab activities. Analyzing data and metrics to optimize training, enhance recovery, and decrease injury risk using scientific, data-driven approaches will also be addressed. This course provides specific preparation for the student who wants to pursue certification as a Strength and Conditioning Specialist (CSCS) through the National Strength and Conditioning Association (NSCA).

**J. PRE-REQUISITES:** EXSC 402, EXSC 411**CO-REQUISITES:** NONE**K. LEARNING OUTCOMES:**

Course Student Learning Outcome [SLO]	Program Student Learning Outcome [PSLO]	GER	ISLO & Subsets
a. Explain the scientific basis of and differentiate between various periodization.	4	-	5
b. Recommend ways to progress and/or regress resistance training exercises based on biomechanical analysis of the athlete.	4	-	5
c. Create an advanced athlete performance profile using various evidence-based tests and measures.	5	-	5
d. Analyze the results of an athlete performance profile to help guide program progression.	4	-	5
e. Design and implement various periodization models of program design based off the sport season (example: in season vs off season).	5	-	5

KEY	<u>Institutional Student Learning Outcomes</u> [ISLO 1 – 5]
ISLO #	ISLO & Subsets

1	Communication Skills Oral [O], Written [W]
2	Critical Thinking <i>Critical Analysis [CA], Inquiry &amp; 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

KEY	Program Student Learning Outcomes [PSLO] <a href="https://www.canton.edu/sci_health/hefi/outcomes.html">https://www.canton.edu/sci_health/hefi/outcomes.html</a>
PSLO #	PSLO & Subsets
1	Communication Skills
2	Social Responsibility
3	Critical Thinking
4	Professional Competencies

**L. TEXTS:**

Triphasic Training: A systematic approach to elite speed and explosive strength performance, Dietz, Cal., Peterson, Ben., 1<sup>st</sup> Ed., Dietz Sports Enterprise, 2012.

The Complete Guide to Strength Training Methods, Arsenault, Kevin., 1<sup>st</sup> Ed., Human Kinetics, IL, 2024.

**M. SUGGESTED INSTRUCTIONAL MATERIALS:**

Essentials of Strength Training and Conditioning, Haff, G.G., Triplett, N.T., 5th Ed., Human Kinetics, IL, 2026.

Science and Practice of Strength Training, Zatsiorsky, V.M., Kraemer, W.J., Fry, A.C., 3<sup>rd</sup> Ed., Human Kinetics, IL, 2021.

ACSM's Guidelines for Exercise Testing and Prescription, 7th Ed., ACSM 2006.

**N. EQUIPMENT:**

Technology enhanced classroom for lectures. Use of fitness center & field house for labs. Software Tools: Excel, TeamBuildr, or similar platforms for program design.

**O. SUGGESTED MEASUREMENT CRITERIA/METHODS:**

Quiz	<input checked="" type="checkbox"/>
Exam: practical	<input checked="" type="checkbox"/>

Assignment	<input checked="" type="checkbox"/>
Other:	<input checked="" type="checkbox"/>

**P. DETAILED COURSE OUTLINE:**

I: Introduction to Strength & Conditioning and Periodization

- A. Historical development of periodization
- B. Key concepts: overload, progression, specificity, reversibility

II: Exercise Physiology and Adaptations

- A. Neuromuscular and metabolic adaptations
- B. Stress, fatigue, recovery, and supercompensation models

III: Principles of Program Design

- A. Needs analysis (athlete, sport, environment)
- B. Goals, performance testing, and monitoring

IV: Traditional (Linear) Periodization

- A. Macrocycles, mesocycles, micro cycles
- B. Advantages/limitations

V: Nonlinear/Undulating Periodization

- A. Daily undulating vs. weekly undulating
- B. Evidence-based outcomes

VI: Block Periodization

- A. Accumulation, transmutation, realization phases
- B. Case applications for high-performance athletes

VII: Hybrid & Emerging Models

- A. Triphasic periodization
- B. Conjugate method
- C. Tactical periodization (team sports)
- D. Integrating strength, speed, endurance, and skill

VIII: Periodization for Strength and Hypertrophy

- A. Load and volume manipulation
- B. Progression strategies for novice vs. advanced athletes

IX: Periodization for Power and Speed

- A. Olympic lifting integration
- B. Plyometrics and sprint programming

X: Periodization for Endurance and Conditioning

- A. Interval training strategies
- B. Concurrent training and interference effects

#### XI: Monitoring, Testing, and Recovery

- A. Load management
- B. Wearables, RPE, HRV, and performance markers

#### XII: Long-Term Athlete Development

- A. Multi-year planning
- B. Peak performance timelines (Olympics, pro seasons)

#### XIII: Program Design Project Presentations

- A. Students present and defend an annual plan for a chosen athlete or team
- B. Peer and instructor critique

### **Q. LAB OUTLINE:**

#### I. Introduction to Training Variables & Needs Analysis

- A. Objectives
  1. Review acute training variables (volume, intensity, frequency, rest).
  2. Conduct sport- and athlete-specific needs analyses.
- B. Activities:
  1. Case study: Analyze a chosen sport and identify key physiological demands.
  2. Lab exercise: Calculate strength ratios, baseline testing methods (e.g., 1RM estimation, vertical jump).
- C. Deliverable: Short report on needs analysis for an assigned sport.

#### II. Strength Assessments & Baseline Testing

- A. Objectives:
  1. Learn and administer performance assessments.
  2. Collect and interpret baseline data for program design.
- B. Activities:
  1. Perform fitness testing (1RM, max vertical jump, agility T-test, sprint timing).
  2. Record and analyze results for training implications.
- C. Deliverable: Data sheet and brief analysis of test results.

#### III. Micro cycle Design

- A. Objectives:
  1. Understand weekly programming structures.
  2. Apply progression and overload principles.
- B. Activities:
  1. Create a 7-day training plan for a beginner and an advanced athlete.
  2. Peer review of designed micro cycles.
- C. Deliverable: Written micro cycle training plan.

#### IV. Mesocycle & Periodization Models

- A. Objectives:
  1. Compare linear, undulating, and block periodization models.
  2. Practice creating a 4–6 week training cycle.
- B. Activities:
  1. Small-group design challenge: Build a mesocycle for strength or power emphasis.
  2. Presentation of rationale behind chosen model.
- C. Deliverable: Mesocycle training chart and justification.

## V. Long-Term Programming (Macrocycle Design)

### A. Objectives:

1. Integrate periodization models into an annual training plan.
2. Align training with competition schedules.

### B. Activities:

1. Draft a macrocycle for a collegiate athlete (off-season, pre-season, in-season, transition).
2. Incorporate peaking and tapering strategies.

### C. Deliverable: Annual training plan outline.

## VI. Special Populations & Individualization

### A. Objectives:

1. Adapt program design for different populations (youth, elderly, injured, female athletes).

### B. Activities:

1. Case study: Modify an existing training plan for a specific population.
2. Discussion on ethical and safety considerations.

### C. Deliverable: Modified training plan with rationale.

## VII. Technology & Monitoring in Training

### A. Objectives:

1. Use technology to track training load and recovery.
2. Apply session RPE, heart rate monitoring, and velocity-based training concepts.

### B. Activities:

1. Hands-on demo with wearables and bar velocity trackers (or simulated data if equipment unavailable).
2. Data analysis of training load trends.

### C. Deliverable: Monitoring report and recommendations.

## VIII. Capstone Project – Full Program Design

### A. Objectives:

1. Synthesize course content into a comprehensive strength & conditioning program.

### B. Activities:

1. Design a 12-month training program for a selected athlete/team.
2. Present program with justifications for periodization choices, assessments, and monitoring.

### C. Deliverable: Final written program + presentation.