Douglas College

CURRICULUM GUIDELINES

A: Division: **Science & Technology**

B: Department/ Program Area: **Sport Science**

Date: **November 24, 2000**

New Course [ ] Revision [X]

If Revision, Section(s) Revised: **C**

Date Last Revised: **November 19, 1996**

C:	**D:**	**E:**
SPSC 363	**Scientific Training Principles**	**3**
Subject & Course No.	Descriptive Title	Semester Credits

F: Calendar Description: This course will cover the scientific training principles involved in the maximization of human performance. Topics include high performance training principles, training methodology, planning and factors that influence training.

G: Allocation of Contact Hours to Types of Instruction/Learning Settings

Primary Methods of Instructional Delivery and/or Learning Settings:

Lecture/Practice

Number of Contact Hours: (per week / semester for each descriptor)

4

Number of Weeks per Semester:

14

H: Course Prerequisites:

SPSC 163 or Permission of the Instructor

I. Course Corequisites:

None

J. Course for which this Course is a Prerequisite:

None

K. Maximum Class Size:

30

L: PLEASE INDICATE:

[ ] Non-Credit

[ ] College Credit Non-Transfer

[X] College Credit Transfer: Requested [X] Granted [ ]

SEE BC TRANSFER GUIDE FOR TRANSFER DETAILS (www.bccat.bc.ca)

Equivalent Courses:

U.B.C.	Unassigned credit 2nd year
S.F.U.	Unassigned credit 2nd year
U.VIC.	Unassigned credit 2nd year

M: Course Objectives/Learning Outcomes

Upon completion of this course, students will be able to:

1. Describe the scientific principles of training for high performance
2. Describe factors that affect high performance training
3. Describe training methodology for high performance
4. Describe planning processes involved in training for high performance

N: Course Content

1. Advanced Principles of Training

The student will:

- 1.1 Describe the principle of overload
  - 1.1.1 stress/adaptation cycle
  - 1.1.2 responses to overload
- 1.2 Describe the principle of recovery and regeneration
  - 1.2.1 physiological factors
  - 1.2.2 neurological factors
- 1.3 Describe the principle of specificity
  - 1.3.1 role of general training
  - 1.3.2 specificity as related to various types of training
  - 1.3.3 angles, rate of force development, posture, velocity, acceleration, range of movement, motor patterns, type of contraction, fibre type
- 1.4 Describe the principle of individuality
  - 1.4.1 inter individual differences
  - 1.4.2 intra individual factors
- 1.5 Describe the principle of variation
- 1.6 Describe the principle of periodization
- 1.7 Describe sport specific training factors
- 1.8 Describe the implications associated with the misuse of training principles

2. Factors Affecting Training

The student will:

- 2.1 Describe the genetic factors that affect high performance training:
  - 2.1.1 hereditary
  - 2.1.2 age
  - 2.1.3 sex
  - 2.1.4 anthropometric
- 2.2 Describe the acquired factors that affect high performance training:
  - 2.2.1 strength and flexibility
  - 2.2.2 skill
- 2.3 Describe the social factors that affect high performance training
- 2.4 Describe the emotional factors that affect high performance training
- 2.5 Describe the environmental factors that affect high performance training
- 2.6 Describe the training age factors that affect high performance training:
  - 2.6.1 training to train
  - 2.6.2 training to compete
  - 2.6.3 training to win
- 2.7 Describe the injury and illness factors that affect high performance training

N: Course Content (continued)

2.8 Describe the concurrent training factors that affect high performance training:
- 2.8.1 interference
- 2.8.2 transfer of training
- 2.8.3 complementary training

2.9 Describe the individual sport specific factors that affect high performance training

2.10 Describe the team sport specific factors that affect high performance training

3. Advanced Training Methodology

The student will:

3.1 Describe high performance energy systems training methodology:
- 3.1.1 alactic power
  - 3.1.1.1 general training methods
  - 3.1.1.2 sport specific training methods
- 3.1.2 alactic capacity
  - 3.1.2.1 general training methods
  - 3.1.2.2 sport specific training methods
- 3.1.3 lactic power
  - 3.1.3.1 general training methods
  - 3.1.3.2 sport specific training methods
- 3.1.4 lactic capacity
  - 3.1.4.1 general training methods
  - 3.1.4.2 sport specific training methods
- 3.1.5 aerobic power
  - 3.1.5.1 general training methods
  - 3.1.5.2 sport specific training methods
- 3.1.6 aerobic capacity
  - 3.1.6.1 general training methods
  - 3.1.6.2 sport specific training methods

3.2 Describe high performance muscular strength and endurance training methodology:
- 3.2.1 physiological adaptations
  - 3.2.1.1 hypertrophy
  - 3.2.1.2 energetics
  - 3.2.1.3 fibres, myofibrils, cellular factors
  - 3.2.1.4 muscle stiffness/elasticity
- 3.2.2 neural adaptations
  - 3.2.2.1 stretch shorten cycle
  - 3.2.2.2 learning and performance
  - 3.2.2.3 motor unit factors
    - 3.2.2.3.1 motor unit recruitment, firing rate, synchronization
  - 3.2.2.4 agonist activation
  - 3.2.2.5 antagonist activation
- 3.2.3 training process
  - 3.2.3.1 isometric, isotonic, isokinetic, variable accommodating resistance, eccentric, concentric
  - 3.2.3.2 development
  - 3.2.3.3 maintenance
  - 3.2.3.4 assessment and prescription
  - 3.2.3.5 tempo training
  - 3.2.3.6 pause training

N: Course Content (continued)

- 3.2.3.7 plyometric training for strength
- 3.2.3.8 resistance, set and repetition relationships
- 3.2.3.9 fibre type training
- 3.2.3.10 specificity factors

3.3 Describe high performance power training methodology:
- 3.3.1 physiological adaptations
- 3.3.2 neural adaptations
- 3.3.3 training process
  - 3.3.3.1 development
  - 3.3.3.2 maintenance
  - 3.3.3.3 assessment and prescription
  - 3.3.3.4 maximum power training
  - 3.3.3.5 explosive power training
  - 3.3.3.6 functional isometrics
  - 3.3.3.7 high speed concentrics, high speed eccentrics
  - 3.3.3.8 traditional plyometrics
  - 3.3.3.9 fast intentions training
  - 3.3.3.10 sport specific factors

3.4 Describe high performance speed training methodology:
- 3.4.1 assisted/resisted
- 3.4.2 velocity training
- 3.4.3 acceleration training
- 3.4.4 resonance training
- 3.4.5 sport specific factors

3.5 Describe high performance flexibility training methodology:
- 3.5.1 development
  - 3.5.1.1 static
  - 3.5.1.2 dynamic
- 3.5.2 maintenance
- 3.5.3 sport specific flexibility training

3.6 Describe sport specific high performance speed training methodology:
- 3.6.1 sport specific factors
- 3.6.2 instantaneous conversions

3.7 Describe the integration of mental training:
- 3.7.1 goal setting
- 3.7.2 imagery
- 3.7.3 mental preparation
- 3.7.4 healing
- 3.7.5 breathing
- 3.7.6 arousal control
- 3.7.7 activation control
- 3.7.8 lifestyle management

3.8 Describe the integration of technical training with physical training

3.9 Describe the monitoring of training:
- 3.9.1 results
- 3.9.2 adaptations
- 3.9.3 fitness/fatigue/performance interrelationships

N: Course Content (continued)

4. Training Plans

The student will:

- 4.1 Describe the use of ergogenic aids:
  - 4.1.1 natural supplements
  - 4.1.2 drugs and doping
- 4.2 Describe the sequencing of training:
  - 4.2.1 session
  - 4.2.2 microcycle
  - 4.2.3 season
  - 4.2.4 career
- 4.3 Describe multi capacity training
- 4.4 Describe injury prevention planning
- 4.5 Describe training factors associated with children, youth and older adults
- 4.6 Describe planning for sessions, microcycles and macrocylces
  - 4.6.1 sequencing, content, adaptation
- 4.7 Describe seasonal planning:
  - 4.7.1 integration of skills, strategies, suppleness, strength and speed
  - 4.7.2 sequencing, scheduling, adaptation
  - 4.7.3 peaking and tapering
  - 4.7.4 assessment and individualization
- 4.8 Describe career planning:
  - 4.8.1 growth and development
  - 4.8.2 priority and timing of capacity and power training
  - 4.8.3 sport specific athlete development models

O: Methods of Instruction

Lecture
Discussion groups and group projects
Practical applications and experiences
Field observation
Guest presenter
Technology assisted learning

P: Textbooks and Materials to be Purchased by Students

A compendium of resources will be utilized, including readings from selected textbooks, NCCP and CAC materials, and materials developed specifically for this course.

Q: Means of Assessment

Mid-term Examination	20%
Final Examination	20%
Practical Applications	20%
Term Project	20%
Course Journal	20%
TOTAL:	100%

R: Prior Learning Assessment and Recognition: specify whether course is open for PLAR

Course Designer(s)

Education Council/Curriculum Committee Representative

Dean/Director

Registrar