

# CSEP **HIGH PERFORMANCE** **SPECIALIZATION™**

## Core Competencies

The CSEP High Performance Specialist™ must demonstrate advanced knowledge in the following five Core Competency areas:

### **Core Competency #1: Sport and Occupational Biomechanics, Physiology, and Performance Psychology**

1. Sport and Occupational Physiology
  - a. Demonstrate knowledge of the metabolic demands of various sports and demanding occupations (such as military, police, and firefighting).
  - b. Demonstrate knowledge of the rate and capacity of the three energy systems.
    - i. Aerobic (oxidative phosphorylation)
      1. Define aerobic power, aerobic capacity, and aerobic endurance.
    - ii. Anaerobic (non-oxidative) glycolysis
    - iii. Phosphocreatine-ATP
  - c. Demonstrate knowledge of the determinants of VO<sub>2</sub> max (maximal oxygen consumption).
  - d. Demonstrate knowledge of anaerobic threshold and how it can be used to guide exercise prescription.
    - i. Lactate Threshold
    - ii. Ventilatory Threshold
  - e. Apply knowledge of the steps associated with a muscular contraction
    - i. Sliding Filament Theory
    - ii. Types of muscular contractions (concentric, eccentric, and isometric)
    - iii. Neuromuscular adaptations
  - f. Demonstrate knowledge of the causes of fatigue in various sports or demanding occupations.
  - g. Demonstrate knowledge of physiological changes following training in athletes and high demand occupations.
2. Biomechanics of Sport and Occupational Performance
  - a. Demonstrate knowledge of basic biomechanical principles applied to human movement.
    - i. Linear and angular kinematics
    - ii. Linear and angular kinetics
    - iii. Force velocity curve
3. Environmental Physiological Considerations
  - a. Demonstrate knowledge of the physiological response to sport and occupational performance in extreme environmental conditions.
  - b. Heat

Canadian Society for Exercise Physiology

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- i. Pre-cooling strategies
- ii. Estimating sweat rate
  - 1. Identify and describe the consequences of dehydration, such as cardiovascular drift
- c. Cold
- d. Altitude
  - i. Acute and chronic adaptations.
  - ii. Understand the implications of altitude on performance.
- e. Environmental factors affecting physiological responses of occupational workers (i.e. protective equipment, respirators).

4. Demonstrate knowledge of unique psychological issues/strategies pertaining to athletes or exercising individuals (e.g., goal setting, imagery/visualization, emotional regulation, observational learning, goal setting) and the impact on health and performance.

5. Knowledge of the basics factors that can impact sport and occupational performance, such as sleep and stress on performance and injury risk.

## **Core Competency #2: Sport and Occupational Performance Assessment**

1. Components of, and when to apply, frequently used sport and occupational specific testing protocols for:
  - a. Agility
  - b. Speed
  - c. Flexibility
    - i. Differentiate active and passive range of motion
  - d. Aerobic
    - i. Appropriate field-based predictive test
  - e. Muscular Strength (1 Repetition Maximum)
  - f. Muscular Power
  - g. Muscular Endurance
  - h. Anaerobic Power and Capacity
  - i. Demonstrate knowledge of how to perform a “gap analysis” to guide an individualized training plan.

Occupational Fitness Testing

  - i. Theory and legislation of bona fide occupational requirements including both testing procedures and legal requirements/issues.
  - ii. Occupations that require pre-employment and mandatory physical fitness testing; such as Correctional officers, Firefighters, Paramedics, Police Officers, and Military Personnel.
2. Sport performance or occupational performance monitoring of internal and external loads.
  - a. Internal loads
  - b. External loadsHeart Rate Training Zones
  - c. Power Output Training Zones
3. Body composition for exercising individuals relevant to sport performance or occupational performance.
  - a. Normative values for various sports and occupations.
  - b. Explain assumptions and limitations of basic methods used to determine body composition, including sum of skinfolds, bioelectrical impedance, densitometry.

## Core Competency #3: Sport and Occupational Performance Exercise Design & Prescription

1. Sport and Occupational Performance Training Principles including:
  - a. Progressive Overload
    - i. Demonstrate how functional overreaching fits into progressive overloading
  - b. Specificity
  - c. Variety and Periodization
    - i. Familiarity with most common periodization models
      1. Linear
      2. Undulating
      3. Block
  - d. Individualization
  - e. Rest and Recovery
  - f. Reversibility
2. Advanced periodization/prescription across the lifespan.
  - a. Knowledge of volume and intensity with regards to general preparation, specific preparation, competition, and transition phases
  - b. Be able to define linear, undulating, and block periodization
  - c. Polarized training
  - d. Knowledge that periodization requires an integrated multifactorial approach
  - e. Be able to design and prescribe an annual training plan
  - f. Quadrennial Plan
3. Sport performance or occupational performance of specific to:
  - a. Train for aerobic fitness
  - b. Develop a resistance training plan
  - c. Incorporate flexibility into a training plan
  - d. Train for anaerobic fitness
  - e. Train for agility and speed
4. Development and administration of training program for a performance-based individual.
  - a. Evidenced based guidelines for proper warm ups and cool downs.
  - b. High intensity interval training for anaerobic and aerobic adaptations.
  - c. Demonstrate the ability to develop and demonstrate safe and effective plyometric progressions including appropriate work:rest ratios.
  - d. Work:rest ratios for aerobic and anaerobic training
  - e. Resistance Training – Sets, reps, loads, rest time, and time under tension for hypertrophy, power, endurance, and strength training.
    - i. Must be able to evaluate/instruct proper form for the CSEP- PATH® listed resistance training exercises, as well as Olympic weightlifting.
  - f. Aerobic Training – Speed, speed endurance, endurance
  - g. Flexibility programs
  - h. Knowledge of the implications of concurrent training
  - i. Knowledge of how to maximize a training taper for performance.

- j. Knowledge of the importance of optimizing recovery.
- k. Knowledge of the basics of the long-term athlete development model (LTAD).
  - i. Knowledge of the concept of training age versus chronological age.
  - ii. Understand that to be a coach for a specific sport that candidates should obtain NCCP certifications.

## **Core Competency #4: Energy Intake for Sport and Occupational Performance**

1. Applied Sport and Exercise Nutrition
  - a. Basic nutrition for individuals engaged in exercise. Including an understanding of the physiological roles of macronutrient and micronutrients to support exercise and recovery.
    - i. Energy Balance – Weight management
    - ii. Carbohydrates
    - iii. Protein
    - iv. Fat
    - v. Hydration
    - vi. Micronutrients – Vitamins and minerals
  - b. Knowledge of nutritional (e.g., fat, protein, and carbohydrate) requirements during competition to support exercise performance.
  - c. Knowledge of nutritional (e.g., fat, protein, and carbohydrate) requirements during training to support training adaptations.
  - d. Knowledge of common supplements used by exercising individuals, including potential benefits and risks. Knowledge of the role of energy availability and the implications of relative energy deficiency in sport (RED-S) on reproductive, musculoskeletal adaptations, protein synthesis, immune system, and cardiovascular responses.

## **Core Competency #5: Professional and Ethical Practice**

1. Development and administration of training program for a high performance group/team.
  - a. Organization of group training sessions
  - b. Instructor to athlete ratio
  - c. How to coach and observe skills in a group/team setting
2. Facility design and layout
  - a. Basic knowledge of space requirements.
3. Inter-disciplinary professionalism, professional practice
  - a. Knowledge that an integrated high-performance team involves many professionals (i.e. coach, athletic therapist, sport doctor, etc.) working together with the goal to enhance athletic performance
4. Usefulness and limitations of technology
  - a. Reliability, validity, and practicality.
5. Illegal Ergogenic Aids
  - a. Athletes and support personnel are subject to the rules of the Canadian AntiDoping Program (CADP) and international sport federation anti-doping programs

- b. Practitioners may be sanctioned for assisting doping or working with athletes who are serving a sanction for doping violation.
  - c. Athletes are strictly liable for any prohibited substance identified in a doping control sample.
  - d. Practitioners should be familiar with the categories of prohibited substances and methods of the World Anti-Doping Agency (WADA) Prohibited List.
  - e. Practitioners should recognize the possible side effects of doping and know what to do if doping is suspected. Practitioners should be aware of athletes' rights and responsibilities during the sample collection process.
  - f. High-performance athletes may have biological passports established by Canadian Centre for Ethics in Sport (CCES) or their international federation – a longitudinal profile of their biological markers, created using their blood and urine samples.
  - g. Athletes who require the use of a medication on the WADA Prohibited List to treat an illness or injury, can apply for a medical exemption
6. Monitor performance/training:
- a. Knowledge of acute:chronic load and injury risk.
    - i. Explain the link and risks associated with overreaching and overtraining to injury risk.
  - b. Knowledge of the concepts of general adaptation syndrome, overtraining, overreaching, and function overreaching.
  - c. Knowledge of common injuries in exercising individuals (e.g. concussions, muscle strains, ligament sprains, stress fractures, and muscle cramps).
  - d. The importance of having an emergency action plan.