TEACHING PLAN

1. IDENTIFICATION

Course: Advanced Studies on Human Performance Biodynamics
Code: DEF 510002
Number of Credits: 03 Theoretical Credits
Workload: 45 hours/class
Level: PhD in Physical Education
Professor(s): Prof. Dr. Fernando Diefenthaeler
Prof. Dr. Gabriel Siqueira Trajano – Queensland University of Technology (QUT)

2. SYLLABUS

This course will review basic neural mechanisms of human movement control with emphasis on ageing and exercise. It will discuss how supra-spinal and spinal mechanisms can control the production of muscle force and specific adaptations occurring during exercise and as part of the process of ageing. To achieve this goal, specific applied examples of movement control in sport and human movement context will be discussed.

3. OBJECTIVES

• Revisit the structures that are part of the neuromuscular system: Supra-spinal, spinal and peripheral structure;
• Discuss the function organization of the central nervous system;
• Introduce the concept of persistent inward currents (PICs);
• Propose alternative model of functional organization of the central nervous system;
• Discuss how ageing can affect the CNS and its functional organization;
• Discuss the latest research on how exercise can change the CNS.

4. CONTENT

4.1. UNIT I - The neuromuscular system: Structure and function
4.1.1. Supra-spinal mechanisms
4.1.2. Spinal mechanisms
4.1.3. The motor unit
4.1.4. Persistent Inward currents (PICs)
4.1.5. The three fundamental parts of motor command: Excitation, inhibition and neuromodulation
4.2. UNIT II - Age-related changes in the neuromuscular system
4.2.1. Age-related motor unit remodeling
4.2.2. How ageing affects inhibition?
4.2.3. Age-related changes in Neuromodulation

4.3. UNIT III - Exercise-related changes in the neuromuscular system
4.3.1. Strength-related changes
4.3.2. Aerobic-related changes
4.3.3. Stretching-related changes

5. TEACHING STRATEGIES

The subject will be developed using expositive-dialogued classes, review of classical literature in each field and critical analysis of recent scientific papers, individual studies and seminars.

6. ASSESSMENT

Classes activities.......................................................................................................................... (5,0)
Scientific article or research project............................................................................................ (5,0)

7. SCHEDULE OF CLASSES

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<thead>
<tr>
<th>SESSION</th>
<th>DATE</th>
<th>HOUR</th>
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<th>PROFESSOR</th>
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<tr>
<td>I</td>
<td>04/11/2019</td>
<td>08h30 to 12h00</td>
<td>Sala 112 (PPGEF)</td>
<td>Prof. Dr. Gabriel Trajano</td>
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8. REFERENCES

Recommended textbook:

Recommended articles:


