

# Syllabus: Efferent Organization of Human Movement



## SYLLABUS

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## MODULES

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- ≡ MODULE 1. The Motor Cortex and Corticospinal Tract
- ≡ MODULE 2. The Role of the Cerebellum and the Basal Ganglia
- ≡ MODULE 3. Feedback and Motor Adjustment
- ≡ MODULE 4. Integrative reading

# Objectives

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By establishing objectives, we give ourselves a clear idea of what we want to achieve once the teaching and learning process of this course has finished. But our aims are even more specific: we also want to establish what you will need to accomplish in order for this new knowledge to contribute to your educational goals.

To achieve these objectives, you must complete the entire process laid out in the different stages of the course.

Thus, if you work in the way suggested, you will be well-positioned to meet the following objectives:

## Overall Objective

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Learn about the adjustments and control of human movement.

## Specific Objectives

1

Become familiar with the anatomy and functions of the motor cortex and the corticospinal tract and their influence on human movement.

2

Learn about the cerebellum and basal ganglia and their effect on human movement.

3

Become familiar with the modes of feedback and motor adjustment.

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# Skills

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The skills we hope you will develop throughout this course are:

## General Skills

- 1 Group and collaborative work: the ability to work with colleagues in order to accomplish shared goals and to achieve the synergy typical of a high performance group.
- 2 The capacity of analysis/reflection: the capacity to methodically examine the different aspects of a certain reality or situation and to carry out an assessment of that situation.
- 3 Creativity and innovative, knowledge-based solutions: the capacity to find alternative solutions to existing problems based on formal knowledge.

## Specific Skills

- Identify the areas involved in the control and adjustment of movements, as well as how they are involved.

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# Bibliography

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# Criteria for participation and approval

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## Participation criteria

During the month of course, the student is expected to:

- Browse the multimedia contents of each of the modules that make up the course.
- Solve the evaluations assigned in each module.
- Carry out the proposed activities, whether group or individual.
- Take the final exam.

## Approval criteria

For the approval of the course, the student is required to complete the (4) proposed activities in the course and pass the final exam. The student must obtain a final score of 70% or more. This grade will be the average between the activities and the final exam.

# MODULE 1. The Motor Cortex and Corticospinal Tract

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## Unit 1.1 Motor Areas

1.1.1 Dimensions of Motor Programs

1.1.2 PMC and 1MC, the Pianist and the Kinesthetic Melody

1.1.3 The Motor Homunculus

1.1.4 Assemblage as an Object of Consciousness

## Unit 1.2 Giant Pyramidal Betz Cells and the Corticospinal Tract

1.2.1 Cortex, Layers, Plexus, and Columns

1.2.2 Spinal Organization. Intramuscular and Intermuscular Coordination

1.2.3 Irradiation and Parasitic Motions. Motor Refinement

1.2.4 Corticospinal Tract. Cross Education

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# MODULE 2. The Role of the Cerebellum and the Basal Ganglia

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## Unit 2.1 Cerebellum

2.1.1 Structure of the Cerebellum

2.1.2 The Role of the Cerebellum in Motor Refinement

2.1.3 Correcting and Changing the Motor Program

2.1.4 Alterations of Movement due to Cerebellum Injuries

## Unit 2.2 Basal Ganglia

2.2.1 Structure of the Basal Ganglia

2.2.2 Connection between the Basal Ganglia and other Nervous Structures

2.2.3 Assemblage of Movements in the Charge of the Basal Ganglia (Automatism)

2.2.4 Alterations of Movement due to Pathology (Parkinson's)

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# MODULE 3. Feedback and Motor Adjustment

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## Unit 3.1 Neurocybernetics

3.1.3 Introductory Remarks

3.1.2 Cybernetic Model

3.1.3 Serial and Parallel Processes

3.1.4 Thoughts on Teaching

## Unit 3.2 Feedback

3.2.1 Introductory Concepts

3.2.2 Neurocybernetics and Feedback

3.2.3 Types of Feedback

3.2.4 Consequences for Teaching

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## MODULE 4. Integrative reading

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