1ST YEAR • 1ST SEMESTER

Anatomophysiology I ..... 6 ECTS

Syllabus

Acquire fundamental concepts of anatomy and physiology for understanding the functioning of the human organism; Understand the general concepts of the organization and functioning of the human body; Describe the different reference planes; Enable the student to understand Human Anatomy physiology in the different systems; Describe the structure and functioning of the different systems (cardiovascular, respiratory, digestive, nervous, Genito-urinary, musculoskeletal and integumentary); Understand the integrated functioning of the different systems; Develop competences in Human Anatomy physiology for the provision of physiotherapy care.

O1. Introduction to the study of Anatomy and Physiology. Levels of organization of the human body.
O2. Structure and functioning of the cell (cell functions, plasma membrane, movement through the plasma membrane, cytoplasm, nucleus, organelles, basic genetic mechanisms, cell cycle).
O3. Musculoskeletal system (osteology, arthrology, myology, trunk, extremities and head-neck, physiology of skeletal, smooth, and cardiac muscle).
O4. Nervous System - Synapses. Central and Peripheral Nervous System. Cranial nerves. Autonomic Nervous System.
O5. Integumentary system.
O6. Cardiovascular System: Anatomy of the heart. Blood vessels. Pulmonary and systemic circulation. Lymphatic System.
O7. Respiratory System: Functions and anatomy. Gas exchange. Transport of gases in the blood. Digestive System: Anatomy and Physiology.
O8. Urinary System: Anatomy and Physiology. Urine production. Regulation of urine concentration and volume.
O9. Digestive system, anatomy, and physiology.

Practice

O1. Understand the organization of the human body.
O2. Identify and distinguish the structures that make up the integumentary system.
O3. Understand the general anatomy of the skeletal system.
O4. Distinguish joints, structures, and associated movements.
O5. Understand the general anatomy of the muscular system.
O6. Recognize the interaction of the musculoskeletal system.
O7. Understand how the nervous system works.
O8. Apply knowledge of the integumentary and musculoskeletal systems in interaction with the nervous system.

Biophysics and Biomechanics ..... 4 ECTS

Syllabus

1. General Considerations in Biophysics.
   1.1. Notations, quantities and physical units. Vector representation.
   1.2. Mathematical tools for calculating and analyzing data.
   1.3. Vector operations.

2. Kinematics and Dynamics in Biomechanics
   2.1. 1D and 2D kinematics. Equations of motion. Acquisition and representation of kinematic data.
   2.2. Rotational kinematics. Angular movement: characterization. Physiological effects of circular movement.
   2.3. Concept of Force. Types of force. Composition of forces. Parallelogram rule.
   2.4. Newton's laws and their application in medicine.
   2.5. System of equivalent forces. Balance of forces.
   2.6. Dynamics of rotation. Moment of force (Torque).
   2.7. Levers of the human body. Mechanical equilibrium conditions.
   2.8. Linear momentum. Center of mass and the concept of center of resistance in dentistry. Moment of inertia of a solid.
   2.9. Movement of a solid body. Rotational motion and moment of inertia.
   2.10. Work and energy. Laws of conservation of energy.

3. Properties of materials
   3.1. States of aggregation of matter: solids and liquids.
   3.2. Elastic deformation. Hooke's law. Types of mechanical deformation. Bending and twisting deformations.
   3.3. Properties and mechanical behavior of materials. Bone tension and fracture. Elasticity of ligaments.
   3.4. Stored energy in elastic materials.
   3.5. Rheological classification of skeletal and muscular structures.
   3.6. Fluid mechanics. Pressure. Pascal's principle. Pressure measurement. Physiological effects of pressure. Impulsive force. Surface tension and capillarity.
   3.7. Ideal fluid. Continuity equation. Bernoulli equation. Magnus effect.
   3.8. Real fluid and viscosity. Poiseuille's law. Turbulence and Reynolds number. Drag force. Dynamic effects of the movement of bodies in fluids.
   3.9. Diffusion and osmosis.

Embryology, Histology and Cytology ..... 3 ECTS

Syllabus

Basic tissues: epithelial, connective (proper connective tissue, adipose tissue, cartilage tissue, bone tissue, blood tissue), muscle and nervous.
Circulatory system: general characteristics and organization.
Respiratory system: general characteristics and histological organization (trachea, bronchi, bronchioles, and alveoli).
Skin and appendages: structure and functions.
Digestive system: general organization of the digestive tract. Histophysiology of the esophagus, stomach, small intestine, and large intestine.
Fundamentals of human embryology: gametogenesis and general embryonic development - 1st, 2nd, 3rd and 4th week.

The main goals of this Unit are:

1. justify the importance of studying embryology, histology, and cytology in the academic training of a physiotherapist;
2. understand the morphology in a functional perspective;
3. provide the fundamentals for critical interpretation concerning histopathology and cytopathology.

Applied Research in Physiotherapy I ..... 6 ECTS

Syllabus

- Types of scientific communication
- Sources of scientific and technical information
- Assessment of information quality
- Information search on generic search engines
- Information search in scientific and technical databases
- Structure and analysis of a scientific article
- Norms of citation and bibliographic referencing
- Automatic referencing tools
- Introduction to the concept of Evidence-Based Physiotherapy
- Evidence levels and hierarchy
- Introduction to epidemiology applied to Physiotherapy
- Frequency and association measures applied to Physiotherapy
- Quality assessment of outcome measures and clinical tests in Physiotherapy

Physiotherapy Methods and Techniques I (Basic Principles of Physiotherapy) ..... 4 ECTS

Syllabus

TP:

1. Introduction to the profession. Historical bases and evolution of the profession. Physiotherapy model and profile of the physiotherapist. Areas of activity in Physiotherapy (neuromuscular, musculoskeletal and cardiorespiratory throughout the life cycle and differentiation of care).
2. Organization of the human body. Major divisions of the human body. Anatomical position, localization terminology. Definition of movements: Flexion/extension/abduction/adduction/internal rotation and external rotation. Anatomical planes and axes. Planes and axes of movement and their application to different movements. Frontal/coronal plane; sagittal plane; horizontal/transverse plane and oblique plane. Frontal/coronal axis; Sagittal axis; Vertical/longitudinal axis and Oblique axis.
3. Introduction to osteology, skeletal tissues, constitution, and function of the bones of the skeleton. Arthrology, terminology of joint action, classification of joints and location.
4. Physiological and accessory mobilization. Passive mobilization assisted active mobilization, active mobilization, and active-resisted mobilization. Dynamic and static muscle contractions. Effects of mobilization on different structures. End of movement (normal and pathological). Physiological joint mobilization. Concept of the joint, General objectives, General principles. Conducting passive movement, The grip, the counter grip, the displacement of the segments and displacement of the articular surfaces.
5. Myology, anatomy and physiology of the muscular system, types of muscle contraction, muscle function and type of joint movement. Classification of muscular action. Definition of agonist/antagonist/synergist and neutralizing action.

6. Massage, definition and principles of application, Components of massage, Effects of massage, Indications, and contraindications. Classical massage: Effleurage; petrissage; tapotement; friction; shivering; intermittent pressure; sliding of planes; rolling of the skin.
7. Equipment and materials most used in physiotherapy and their terminology; maintenance and safety rules when using them. Prevention of the risk of infection and care.
8. General patient care. Vital signs. Pain as a vital sign. Assessment: Objective examination and subjective examination. Intervention plan and evaluation of results. Preventive physiotherapy. Inflammatory and non-inflammatory joint diseases. Vascular, traumatic and tumor diseases. Amputations, prostheses and orthotics. Non-articular inflammations. Primary care in physiotherapy. Bed positions, DD, DL and DV, adapted to the patient's age, pathology and characteristics. Verticalization, indications, benefits, application care and different devices for verticalization. Transfers in bed. With lift/board/therapist/transfer belt. Wheelchair handling.
9. Human gait. Definition, anatomophysiological, biomechanical, kinetic and kinematic principles. Gait assessment parameters: spatial and temporal. Gait cycle. Gait phases: support phase and oscillating/balancing phase. Sub-phases of gait. Support phase: initial heel contact; shock absorption; total foot contact; heel elevation and toe elevation (pre-swing). Swing phase: initial, medium and final swing. Gait assessment instruments. Pathological gait. Dysfunction/Disability/Limitation.

P:

I. Soft tissue mobilization:

1. Classic massage techniques: Effleurage; petrissage; tapotement; friction; shivering; intermittent pressure; plane sliding; skin rolling.
   1.1 Superficial techniques
   1.2 Deep techniques
   1.3 Practical applications

II. Joint mobilization:

Physiological and accessory joint mobilization

Pathology I..... 3 ECTS

Syllabus

1. Introduction to the study of pathology I
2. Cellular aggression and adaptation
   2.1. Definitions
   2.2. Causes
   2.3. Pathogenesis
   2.4. Morphological changes
      2.4.1. Cellular degeneration
      2.4.2. Cell necrosis
      2.4.3. Types of necrosis
3. Intracellular accumulations
   3.1. Lipids
      3.1.1. Lipid infiltration
      3.1.2. Pathogenesis of lipid infiltration
   3.2. Proteins
   3.3. Glycogen
   3.4. Lipid and carbohydrate complexes
   3.5. Endogenous and exogenous pigments

4. Cellular adaptation
   4.1. Atrophy
   4.2. Hypertrophy
   4.3. Hyperplasia
   4.4. Metaplasia
   4.5. Dysplasia

Skills and objectives:
At the end of the unit, the student should be able to:
1. Understand the mechanisms of cell damage and cell adaptation to damage stimuli
2. Conceptualize etiology and know the different etiological agents with regard to the mechanisms of cellular aggression
3. Understand the cellular adaptive responses to the different etiological agents, considering the various mechanisms of cellular aggression
4. Understand the pathogenetic mechanisms with regard to cellular aggression and adaptive response
5. Know the morphological changes associated with different types of cell damage
6. Understand the functional alterations and the corresponding clinical significance depending on the nature of the morphological alterations

1ST YEAR • 2ND SEMESTER

Anatomophysiology II ..... 5 ECTS

Syllabus

Anatomophysiology II follows on from Anatomophysiology I and adds to and deepens the knowledge acquired. The aim is for students to master the basics of the musculoskeletal system, knowing the main systems of the human body in terms of their anatomical structures and the principles of physiology on which their functioning and interaction is based.

Anatomical terminology. Musculoskeletal system: shoulder and armpit; arm; forearm; hand. Vascularization and innervation of the upper limb. Vertebral column; musculoskeletal system: gluteal region and thigh; leg; foot. Vascularization and innervation of the lower limb. General anatomy of the central nervous system. Cranial nerves and special sensitivities. Physiology of the nervous system: main neuroanatomical pathways. Central, peripheral and vegetative nervous system.

a. Physiology. Nerve impulse transmission. Neurotransmitters; different functions.
b. Sense organs.
c. Ageing.

Cardiovascular System
a. Review of the anatomy of blood vessels.
b. Cardiac physiology. Contraction. Origin and conduction system of the impulse. Nerve regulation.
c. Hemodynamic. Heart failure; rudiments; limitations of the patient with cardiac pathology.
d. Most common cardiac pathologies.
e. Atherosclerosis.

Respiratory System

a. Histology. Défense mechanisms.
b. Respiratory physiology and function.
c. Ventilatory mechanics.
d. Regulation of respiration.

Endocrine system

a. Concept. Constitution. Glands.
b. Hormones.
c. Physiology. Bio-feedback mechanisms.
d. Integration and control.
e. Spontaneous and induced hormonal disturbances and their repercussions.

Haematology and Immune System

a. Circulatory system
b. Blood. Constitution and functions.
c. Haemostasis.
d. Cells and organs of the immune system. Rudiments on immune reactions and their mediators.

Urinary system

a. Organs. Constitution. Anatomical structures.
b. Physiology. Renal functions.
c. Regulation mediated by the kidney.

Reproductive system

a. Organs. Anatomical structures.
b. Physiology. Different organs and their different functions.
c. Regulation.

Physiological Biochemistry ..... 3 ECTS

Syllabus

Theoretical:

1. A brief introduction to the history of biochemistry. Biochemistry and Life.
2. Carbohydrate Metabolism: Glycolysis; Gluconeogenesis; Pentose phosphate pathway; Krebs cycle; Electron transport chain and oxidative phosphorylation; Glycogen metabolism; Diseases.
3. Lipid metabolism: Oxidation and synthesis of fatty acids; Lipogenesis; Mobilization of lipid deposits; Ketone bodies; Cholesterol metabolism; Plasma lipoproteins; Diseases.
4. Protein Metabolism: Amino acid transamination and deamination reactions; Urea cycle; Amino acid synthesis and degradation; Diseases.
5. Enzymology and metabolism.
6. Metabolic Interrelationships: Gastrointestinal digestion and absorption; Entero-hepatic axis; Renal system.
7. Endocrine System.

Practicals:

- Work 3.4. Determination of glucose in human plasma using an enzymatic method
- Work 4.2 (I). Mitochondrial respiration
- Work 4.2 (II). Mitochondrial respiration

- Exercises and clinical cases on Carbohydrate Metabolism
- Work 3.7. Determination of triacylglycerols in serum
- Work 3.6. Quantification of total cholesterol and HDL cholesterol
- Work 4.4 (I). Amino acid metabolism: Determination of glutamic-pyruvic transaminase activity in cardiac muscle
- Paper 4.4 (II). Amino acid metabolism: Determination of glutamic-pyruvic transaminase activity in cardiac muscle
- Work 4.5. Digestion of carbohydrates
- Exercises and clinical cases on Lipid Metabolism
- Exercises and clinical cases on Amino Acid Metabolism, Digestion and the Endocrine System

Clinical Education I ..... 2 ECTS

Syllabus

1. General organization of the internship and evaluation model.
2. Constitution of the clinical report:
   2.1. Clinical history template
   2.2. Physical examination model
   2.3. Model for carrying out therapeutic procedures
3. Universal precautions and prevention of healthcare-associated infections
4. Development of skills within the scope of physiotherapy in a hospital and teaching clinic context.

Technical English ..... 3 ECTS

Programa_PT

Overview of Human Anatomy/Physiology

1.1. Levels of structural organization of the human body
1.2. Organ systems of the human body
1.3. Parts of the body
2.1. Physiotherapy and the role of the physiotherapist
2.2. Rehabilitation and mobility equipment
   2.2.1. Personal equipment: mobility aids and assistive devices
   2.2.2. Equipment used in the clinic

Project work (pathologies and specific treatments)

Basic Health Gestures ..... 3 ECTS

Syllabus

Module 1 – Concept Analysis:

- Holism, Holistic View of the Human Being
- Relationship between Health and Illness
- Health Promotion and Disease Prevention – Levels of Prevention

Module 2 – Basic Health Procedures related to:

- Diagnosis, treatment, and specific situations in professional day-to-day practice

- The issue of infection and infectious diseases
- Immune response
- National Vaccination Programme
- Basic infection control precautions
- Hand hygiene

Module 3 – Victim Approach:

- Fundamental human rights
- Informed consent
- Data protection
- Vital signs

Module 4 – Basic Life Support in Adults

Module 5 – Paediatric Basic Life Support

Module 6 – Integrated Medical Emergency System:

- Phases of the IMES
- General notions of first aid

Module 7 – Specific First Aid:

- Haemorrhages
- Bruises
- Wounds
- Grazes
- Lacerations

Module 8 – Specific First Aid:

- Fractures
- Crepitus
- Swelling
- Burns

Module 9 – Specific First Aid:

- Seizures
- Electrocution
- Poisoning

Physiotherapy Methods and Techniques II (Evaluation and Therapeutic Methods) ..... 10 ECTS

Syllabus

Theoretical:

1. Assessment and prescription of physical exercise: Review of terminology; Effects of physical inactivity; Guidelines for regular physical activity; Assessment of muscle function - neurophysiology of muscle contraction. Objective and subjective concept of vigorous and moderate exercise, Henneman size principle, mechanisms of activation of motor units, concept of temporal and spatial summation
2. Muscle conditioning assessment: Muscle fiber typology, types of muscle strength and contraction, tension/stretch ratio, closed and open kinetic chain exercises, conditioning factors in the generation of muscle tension
3. Muscle conditioning assessment: types of training and muscle contraction; metabolic energy pathways for the muscle (phosphogenic, anaerobic and aerobic pathways); Cory's cycle
4. Force production capacity according to the different types of muscle contraction and electromyographic activation, open and closed kinetic chain work

5. Acute physiological responses and adaptations to physical exercise (neuronal, cardiorespiratory, vascular and local adaptations). Concept of calorimetry and oxygen consumption. Central and peripheral fatigue. Delayed Sensation of Muscle Discomfort. Cardio-respiratory system and the response to isometric and dynamic exercise, implications for hypertensive individuals. The principles inherent in training
6. Flexibility: Definition of the concept, factors that limit flexibility, biomechanics and neurophysiology of flexibility, types of flexibility training, the application of flexibility training in the warm-up and return to calm
7. Postural control systems: definition of balance, concept of static and dynamic balance, definition of posture and postural control, systems related to postural control (visual, vestibular and sensorimotor systems)
8. Proprioception: framework, definition, implication of injury, definition of the various sensory receptors involved in proprioception (skin, joint and muscle receptors), description of proprioceptive submodalities, forms of assessment. Neuromuscular training: definition and intervention strategy
9. Clinical communication skills in the context of physiotherapy
10. Clinical examination in physiotherapy. Line of gravity, concept of center of gravity and static and dynamic postural assessment. Postural alterations typical of the elderly. Procedures for assessing dysmetria, goniometry, manual muscle testing, perimetry, neurological assessment and palpation. The concept of validity, reliability and accuracy of measuring instruments. Structured analysis of the assessment of the integrity of the neurological system

Practice:

I. Therapeutic Exercise
1. Exercise in rehabilitation
2. Aerobic training
3. Strength training
4. Flexibility training
5. Balance/proprioceptive training
6. Functional training
7. Gait training

II. Therapeutic Assessment Methods
1. Anamnesis
2. Assessment strategies
3. Ergonomics and static and dynamic postural assessment
4. Palpation
5. Assessment of reflexes, myotomes and dermatomes
6. Motor response and muscle testing
7. Goniometry
8. Perimetry

Pathology II ..... 4 ECTS

Programa_PT

- Children Typical versus non typical development
- Physical examination
- Childhood frequent diseases
- Neuro-muscular diseases
- Obstetric paralysis
- Cerebral paralysis
- Children traumatic injuries
- Hip dislocation

Clinical Education II ..... 3 ECTS

Syllabus

Clinical Education II is divided into 4 areas:

I. Physiotherapy in the outpatient clinic
II. Physiotherapy in School Health
III. Occupational Health Business context
IV. Physiotherapy in Senescence

During the internship, students go through two experiences.

Ethics and Professional Deontology ..... 3 ECTS

Syllabus

1st Unit – Fundamental concepts for developing ethical reasoning:

1.1. Definitions of ethics, deontology and morality
1.2. The golden rule of ethics
1.3. Communication and humanisation
1.4. Ethics of care

2nd Unit – Professional ethics:

2.1. The four prima facie principles:
  2.1.1. Beneficence
  2.1.2. Non-maleficence
  2.1.3. Justice
  2.1.4. Autonomy
2.2. Ethical decision-making process
2.3. Quality in Physiotherapy and Ethical Principles and Responsibilities of Physiotherapists
2.4. Presentation of clinical cases and application of the Quality Standards and Ethical Principles and Responsibilities of Physiotherapists of the Portuguese Association of Physiotherapists

Pharmacology and General Therapeutics ..... 2 ECTS

Syllabus

1. General principles of Pharmacology, Drug versus medicine
2. Routes of Administration and Dosage Forms
3. Drug's pathways in the body (ADME). Basic pharmacokinetics (absorption, distribution, metabolism and elimination), and clinical pharmacokinetics
4. Pharmacodynamics and general mechanisms of drugs action
5. Drugs acting at the central nervous system: (sedative and hypnotic, psychostimulants and drugs of abuse)
6. Skeletal muscle relaxants
7. Drugs acting on pain control: opioid analgesics and nonsteroidal anti-inflammatory drugs

8. Special Aspects of pregnant, pediatric and geriatric Pharmacology
9. Drug interactions, and adverse drug reactions and pharmacovigilance
10. Sources of drug Information

Physiotherapy Methods and Techniques III (Therapeutic Modalities and Physical Agents) ..... 2 ECTS

Syllabus

The main objective of this course is to deepen theoretical and practical knowledge, concerning to the application of therapeutic techniques, essential for good performance of Physiotherapy in general. The student must know how to apply these techniques correctly and effectively when faced with a clinical case, obtaining the most efficient results.

Concepts:

1. Thermotherapy, Phototherapy and Electrotherapy
   1.1. Concept of Thermotherapy, Phototherapy and Electrotherapy
   1.2. Thermotherapy and Cryotherapy
   1.3. Phototherapy
   1.4. Electrotherapy
2. Functional Taping
   2.1. Functional taping for the upper limb
   2.2. Functional taping for the lower limb
3. Hydrotherapy
   4.1. Physical Properties of Water
   4.2. Method of Halliwick
   4.3. Method of Bad Ragaz
      4.3.1. Proprioceptive Neuromuscular Facilitation
   4.4. Relaxation Methods in Hydrotherapy

Human Kinetics ..... 5 ECTS

Syllabus

Theoretical Component:

1. Elementary notions of kinesiology
2. Neuromotor control of movement
3. Bone system
4. Joints
5. Skeletal muscle
6. Segmental kinesiology – Biomechanics of the upper limb
7. Segmental kinesiology – Spinal biomechanics
8. Segmental kinesiology – Shoulder and pelvic girdle
9. Segmental kinesiology – Biomechanics of the lower limb

Practical Component:

1. Introduction to kinesiology

2. Arthrology in kinesiology
3. Myology in kinesiology
4. Kinematic analysis strategies and instruments
5. Identification of structures, muscular imbalances and kinematic analysis of the shoulder girdle, elbow, wrist, hand, spine, pelvic girdle, hip, knee, ankle, foot and gait analysis

Pathology III ..... 5 ECTS

Syllabus

NEUROLOGY
CP 1. Anatomophysiology of the SN; neurological syndromes and diseases
CP 2. Cranial neuropathy
CP 3. Cerebral vascular disease
CP 4. Inflammatory/demyelinating diseases
CP 5. Neurodegenerative diseases
CP 6. Spinal cord diseases
CP 7. Neuromuscular diseases
RHEUMATOLOGY
CP 8. Introduction and classification of rheumatic diseases. Rheumatoid Arthritis
CP 9. Seronegative arthropathies
CP 10. Osteoarthrosis. Osteoporosis
CP 11. Connective tissue diseases
CP 12. Microcrystalline, infectious and reactive arthropathies
CP 13. Chronic Pain Syndromes. Fibromyalgia
GENITO-URINARY AND OBSTETRIC PATHOLOGY
CP 14. Anatomophysiology of the pelvis and perineum
CP 15. Pelvic floor dysfunctions. Urinary incontinence
CP 16. Pregnancy and childbirth
ORTHOTRAUMATOLOGY
CP 17. Orthopedic and traumatic pathology of the spine
CP 18. Traumatology of the upper limb
CP 19. Orthopedic pathology of the Upper limb
CP 20. Traumatology of the Lower limb
CP 21. Orthopedic pathology of the lower limb
PNEUMOLOGY
CP 22. Hypoventilation Syndromes
CP 23. Thoracic Cage Deformities
CP 24. Principles of Non-Invasive Ventilation
CP 25. Lung Cancer
CP 26. Respiratory Endoscopy
CP 27. Orphan Respiratory Diseases
CP 28. Mucociliary Dysfunction
CP 29. Mucociliary Clearance Devices
CP 30. Respiratory System in Exercise
CP 31. Cardio-Respiratory Stress Test

Clinical Education III ..... 3 ECTS

Syllabus

Clinical Education III is divided into 4 areas:

I. Physiotherapy in the outpatient clinic
II. Physiotherapy in School Health
III. Occupational Health Business context
IV. Physiotherapy in Senescence

During the internship, students go through two areas that they have not attended in Clinical Education II.

Applied Research in Physiotherapy II ..... 4 ECTS

Syllabus

1. Introduction to quantitative methodologies
2. Types of data and measurement scales
3. Construction of questionnaires
4. Development of measurement instruments
5. Informed consent and questionnaire application
6. Psychometric properties of scales
7. Introduction to the SPSS environment
8. Introduction and editing of data in SPSS
9. Data analysis
    - 9.1. Descriptive and inferential statistics
    - 9.2. Univariate data analysis
        - 9.2.1. Frequency table
        - 9.2.2. Location and dispersion measures
        - 9.2.3. Missing data and aberrant values
        - 9.2.4. Graphical representations
    - 9.3. Bivariate data analysis
        - 9.3.1. Contingency tables
        - 9.3.2. Association measures

Physiotherapy Methods and Techniques IV (Musculoskeletal Physiotherapy) ..... 4 ECTS

Syllabus

Theoretical-Practical Component:

1. General aspects of neuromusculoskeletal examination
2. Subjective examination of the neuromusculoskeletal patient

3. Physical examination of the neuromusculoskeletal patient
4. General principles of neuromusculoskeletal management
5. Function and dysfunction of joint
6. Principles of joint treatment
7. Function and dysfunction of muscle
8. Principles of muscle treatment
9. Function and dysfunction of nerve
10. Principles of nerve treatment
11. Multimodal assessment of pain

Practical Component:

1. Neuromusculoskeletal examination
   1.1. Upper limb
   1.2. Lower limb
   1.3. Spine
2. Neuromusculoskeletal management
   2.1. Upper limb
   2.2. Lower limb
   2.3. Spine
3. Muscular chains
4. Clinical neurodynamics
5. TMJ assessment and treatment

Nutrition ..... 4 ECTS

Syllabus

1. Biological bases of Nutrition and Food
2. Healthy eating and the Mediterranean Food Wheel
   2.1. Food/nutritional care in everyday life
   2.2. Hydration
   2.3. Mediterranean Food Rules
   2.4. Meals: importance and composition
3. Energy and nutrient requirements
   3.1. Macro and micronutrients: importance, food sources and classification
   3.2. Pregnancy
   3.3. Breastfeeding
   3.4. Athletes
   3.5. The elderly
4. Assessing food intake: techniques and assessment methods

Auxiliary Diagnostic Processes ..... 4 ECTS

Syllabus

1. Complementary means of diagnosis using imaging:
   - Conventional radiology and research methods (X-ray)
   - Ecography

- Computerised axial tomography (CAT)
- Magnetic resonance imaging (MRI)
- Functional MRI
- PET Scan
- Endoscopy, Nasofibroscopy, Videofluoroscopy of swallowing and other imaging tests

2. Laboratory tests and interpretation of the analytical report:
   - Hematology
   - Biochemistry
   - Body fluids
   - Acid-base balance
   - Liver function
   - Endocrinology
   - Cardiology
   - Inflammatory and tumour markers
3. Laboratory diagnosis associated with the most common infections:
   - Bacterial infections
   - Mycoses
   - Parasitosis
   - Viral infections
   - Interpretation of the analytical bulletin relating to previous infections

Psychology of Communication and Interpersonal Relations ..... 3 ECTS

Syllabus

I. Communication and Interpersonal Processes

A. Introduction to the Psychology of Communication
   - Basic concepts of communication
   - Barriers to effective communication
   - The problem of functions
   - Referential function
   - Interpersonal and expressive functions
   - Function of self- and heteroregulation and verification
   - Function of coordinating interactive sequences
   - Meta-communication function

B. Models of Communication
   - The origins of the study of communication
   - Models and theories of communication:
     · Behavioral theory
     · Emotional theory
     · Psychosocial theory
   - Culture, personality, perception, power relations and language
   - Use for a positive purpose (building healthy relationships)
   - Use for a negative purpose (bullying or discrimination)
   - Persuasive communication
   - Effective communication
   - The process of influence
   - Communication errors

C. Interpersonal Relations in Health
   - Theories of interpersonal relationships
   - The neuropsychophysiological construction of empathy
   - Empathy and its importance in patient care
D. Non-Verbal Communication
   - Emotional facial expression and its interpretation
   - The Brain-Face-Emotion triangle
   - The role of active listening
E. Conflict management
   - Resolution strategies
   - Assertive communication
F. The neuropsychophysiology of pain and illness
   - Emotional impact of pain and illness
   - Psychological support strategies
G. Communication and Technology
   - The influence of technology on communication
   - New types of communication
   - The consequences of technology on communication
   - Social networks and the internet
   - Implications and applications in a psychosocial context

II. Communication, Interpersonal Relations and Measurement
H. Techniques and instruments for measuring verbal and non-verbal communication

Psychomotricity ..... 3 ECTS

Syllabus

1. Psychomotricity
   1.1. A brief historical review of Psychomotricity
   1.2. Fundamental concepts and notions in Psychomotricity
2. Ontogenesis of Motricity
   2.1. Pre-embryonic period
   2.2. Embryonic period
   2.3. Fetal period
   2.4. Neonatal period
3. Motor development
   3.1. Perceptual-motor development
   3.2. Reflex movement phase
   3.3. Rudimentary movement phase
   3.4. Specialized movement skills
   3.5. Study of Motricity and its importance in the child's psychological development
   3.6. Movement as a form of behavior
4. Psychotonic approach
   4.1. Psychism, Motricity and Tone
5. Psychomotor Disorders and Disabilities

Clinical Education IV ..... 6 ECTS

Syllabus

a. General care to the patient
b. Neuro-musculoskeletal assessment (goniometry, muscle testing, postural and ergonomic assessment, gait analysis, perimetry and assessment of limb length; assessment of sensitivity, assessment according to various methods: Cyriax, Maitland, Mulligan)
c. Clinical intervention adapted to the program lectured so far
d. Organization and prioritization of healthcare
e. Operating model and dynamics of clinical services
f. Working in a multidisciplinary health team
g. Therapeutic alliance
h. Reflection and intervention in physiotherapy
i. Clinical records and communication in physiotherapy
j. Ethics and professional deontology

Physiotherapy in Specific Conditions I ..... 8 ECTS

Syllabus

Theoretical-practical (TP):
I. Paediatric Physiotherapy
II. Pelvic Floor Physiotherapy
III. Oncologic Physiotherapy

Practical (PL):
I. Paediatric Physiotherapy
II. Women's Health Physiotherapy
III. Lymphatic Drainage

Management, Entrepreneurship and Innovation in Physiotherapy ..... 3 ECTS

Syllabus

1. **Introduction and Entrepreneurship and innovation fundamentals**
   - Entrepreneurship and innovation concepts
   - Where do good startup ideas come from?
   - The personal skills inventory and its applicability
2. **Jobs to be Done Theory, Frameworks and Tools**
   - Introduction to the theory
   - Jobs to be Done process
   - Jobs to be Done discovery cycle
   - Jobs to be Done interview

3. **Strategic Analysis & Competitive Environment**
   - Competition rules in today's world
   - Tools and techniques for strategic analysis
   - How to use the Market Map and IMP Trend Radar for competitive environment analysis
4. **Value Propositions Design and Testing**
   - The concept of Value Proposition
   - Value Proposition design
   - Introduction to hypothesis testing in business
   - Introduction to pretotyping
   - Pretotypes crafting
5. **Designing and Testing Business Models**
   - What is a business model?
   - How to design a business model?
   - Business model crafting
   - Introduction to discovery-driven planning
6. **Organizations and business models lifecycle**
   - The life cycle of organizations and their business models: from initial idea to maturity
7. **Legislation applicable to Physiotherapy units/clinics**
8. **Innovation in Physiotherapy**
   - Evolution of Healthcare Models
   - Business creation opportunities in Physiotherapy
   - Trends for the future of Physiotherapy
   - Knowing the consumer
9. **Physiotherapy Business Strategy**
   - The Strategic Process
   - External Analysis
   - Internal Analysis
   - Strategic Planning and Execution Tools/Methodologies for Management Control
10. **Creation of a Value Proposition in Physical Therapy**
11. **Design of a Physiotherapy Business Model**
12. **Customer Experience and Relationship Management**
13. **Marketing in Physiotherapy**

Physiotherapy Methods and Techniques V (Neurological Physiotherapy) ..... 10 ECTS

Syllabus

Theoretical-practical:

I. Functional division of the nervous system (NS)
II. Ascending and descending pathways of the nervous system
III. Somatosensory system, vision and balance
IV. Structures of the NS and relevance to physiotherapist intervention: cerebral cortex, brainstem, reticular formation, basal nuclei, nucleus rubrum, cerebellum, spinal cord, vestibular system
V. Central pattern generators (CPGs) and locomotion
VI. Reorganisation of the CNS after injury and its consequences
VII. Neuroplasticity and relevance
VIII. Main therapeutic approaches: Bobath concept; Constraint-induced movement; Motor Learning according to Carr & Shepherd; Proprioceptive Neuromuscular Facilitation

IX. Complementary therapeutic approaches to physiotherapist intervention: motor imagery; virtual reality and mirror therapy. Self-management and telerehabilitation teaching programmes

Practical:

I. Assessment and intervention in adults with neuromotor conditions: assessment and intervention methods/strategies in patients with tone changes

II. Assessment and intervention in children with neuromotor conditions: assessment and intervention in children with Cerebral Palsy and other neuromotor conditions: assessment methods and techniques, neurodevelopmental treatment concept - Bobath; Therapeutic riding

Prophylaxis and Epidemiology ..... 3 ECTS

Syllabus

Learning Objectives:

LO1 – Understand the role of epidemiology in clinical practice and public health and prophylactic measures, at individual and collective levels

LO2 – Describe health and disease measures, to know how to calculate them and apply them correctly

LO3 – Describe the main epidemiological designs, indicate their correct applicability and interpret their results. To know how to differentiate in practice the main epidemiological designs

LO4 – Know the steps of an epidemiological investigation. Differentiate the most common types of errors; understand the concept of data validity; explain the concept of confounding variable. Recognize the most common errors in epidemiological studies

LO5 – Define the most common concepts and applications of statistical association and causality. Understand the meaning of the different postulates in the study of causality

Syllabus:

PC1. Importance of epidemiology in health. History and concept. Objectives and uses of epidemiology. Natural history of the disease. Prophylaxis and prophylactic measures. Epidemiology in clinical practice and public health

PC2. Measuring health and disease: measures of frequency (prevalence; probability of incidence and incidence rate); measures of association (OR, RR and r)

PC3. Typology of epidemiological research: experimental, quasi-experimental and observational studies (descriptive and analytical). Professional performance based on scientific evidence

PC4. Planning of studies – some challenges: systematic errors; random errors; confusion. Validity of information

PC5. Causal inference. Models and causality criteria

3RD YEAR • 2ND SEMESTER

Integrated Physiotherapy Clinic ..... 6 ECTS

1. Physiotherapy in neurological conditions: traumatic brain injury, multiple sclerosis, vertebrae-medullary trauma and Parkinson's disease: etiology; classification; deficits and complications; prognosis; assessment and intervention in physiotherapy in the different stages of the pathology/disease evolution; guidelines and recommendations from scientific societies

2. Physiotherapy in musculoskeletal conditions: osteoporosis, arthrosis, rheumatoid arthritis, ankylosing spondylitis, fibromyalgia, compressive neuropathies: definition, signs/symptoms, risk factors/etiology, pathophysiology, diagnosis; assessment and intervention guidelines
3. Physiotherapy in medical-surgical conditions: introduction to physiotherapy in a hospital environment; the physiotherapist in medical and surgical hospitalization; physiotherapy assessment and treatment:
   (1) in total hip arthroplasty
   (2) in total knee arthroplasty
   (3) in reverse shoulder arthroplasty
   (4) after upper or lower limb amputation
   (5) in the person with immobility syndrome
4. Physiotherapy in Senescence: population aging and social demography; aging theories; main changes resulting from the aging process; physical activity and exercise in aging: physical activity and exercise guidelines adapted to the elderly population; assessment instruments adapted to the elderly population; planning and implementing a physical exercise program for the elderly population

Clinical Education V ..... 10 ECTS

Syllabus

- Clinical intervention in different contexts: clinic, community
- Clinical intervention in different areas: musculoskeletal, respiratory, neurological, pediatric
- It includes supervised clinical practice where students will have to apply the physiotherapy assessment and treatment techniques they have learned to real clinical cases in different contexts. Assessment will include the student's practical performance, the preparation of an internship dossier and in-depth analysis of case studies

Physiotherapy in Specific Conditions II ..... 4 ECTS

Syllabus

Sports Physiotherapy

1. Definition and severity of sports injury
   1.1. Risk factors: extrinsic and intrinsic
   1.2. Origin of injury: macro and microtrauma
2. Sports in specific populations
   2.1. Sports injuries in children and young people
   2.2. The female athlete triad
3. Clinical cases in sports with most incidence
   3.1. Ankle sprain
   3.2. Anterior Cruciate Ligament Ligamentoplasty
   3.3. Plantar Fasciitis
   3.4. Muscle rupture of Triceps Surae and Achilles tendon
   3.5. Tendinopathies
   3.6. Patellofemoral syndrome
4. Different classifications of muscle injuries
5. Evaluations and therapeutic techniques of sports injuries in upper limb:
   5.1. Triangular fibrocartilage complex (cubital variance)
   5.2. Epicondylitis / Epitrocleitis
   5.3. Shoulder's conflicts and instability
   5.4. Superior labrum anterior-to-posterior (SLAP) lesion

6. Vertebral column injuries
   6.1. Spondylosis and spondylolisthesis
   6.2. Scoliosis
   6.3. Scheuermann Disease
7. Pubalgia treatment

Metabolic and Integumentary Physiotherapy

I. Scars

1) Anatomophysiology of the integumentary system
2) Pathophysiology of scars – classification
3) Assessment of scars – instruments and scales
4) Physiotherapy intervention on scars: manual and technological approach

II. Adipose tissue and intervention in obesity/localized fat

1) Adipose tissue: function and lipolysis
2) Body's fuel sources and metabolism
3) Assessment of body composition
4) Exercise prescription in people with obesity/localized fat
5) Technological approach to reduce body fat through lipolysis: microcurrent, lipolytic laser, radiofrequency, among others

Vestibular System

1. Vestibular system: The basics
   1.1. Role of the vestibular system
   1.2. Sensorial integration
   1.3. Signs and symptoms associated with vestibular dysfunction
2. Anatomy of the vestibular system
   2.1. Mechanisms of visual fixation
   2.2. Anatomy of the inner, middle and external ear
   2.3. Structure of the membranous and bony labyrinth
   2.4. Otolith and semi-circular canal functional pairs
3. Physiology of the vestibular system
   3.1. Physiology of the ampullary crest and stimulation mechanisms
   3.2. Mechanism for horizontal vestibular-ocular reflex
   3.3. Ewald's Laws
   3.4. Unilateral dysfunction and pathological peripheral nystagmus
   3.5. Unilateral dysfunction and its respective changes in vestibular-ocular reflex
   3.6. Physiology of the otoliths and otolithic maculae
4. Basic concepts of central processing of vestibular input
   4.1. Vestibular Nuclei
   4.2. Vestibular-spinal reflexes
   4.3. Cervical reflexes
5. Pathology of the vestibular system
   5.1. Differences between central and peripheral vestibular pathology
   5.2. Unilateral hypofunction
   5.3. Bilateral hypofunction
   5.4. Fluctuating diseases (Menière's disease and vestibular migraine)
   5.5. Benign paroxysmal positional vertigo
   5.6. Differential diagnosis
6. Vestibular testing
   6.1. Ocular-motor and functional tests
   6.2. Balance tests
   6.3. Specialized test (differential diagnosis)

7. Treatment for vestibular hypofunction
   7.1. Habituation exercises
   7.2. Visual fixation exercises
   7.3. Basic concepts of balance training for vestibular patients

Physiotherapy Methods and Techniques VI (Cardio-Respiratory Physiotherapy) ..... 10 ECTS

Syllabus

Theoretical Classes

1. Respiratory physiology: organization of the respiratory system and lung mechanics
2. Respiratory physiology: alveolar ventilation, pulmonary blood flow, and ventilation/perfusion ratio
3. Chronic obstructive lung diseases
4. Restrictive lung diseases
5. Pulmonary rehabilitation: assessment and intervention
6. Cardiovascular physiology: organization and functions of the cardiovascular system
7. Cardiovascular diseases (coronary artery disease and heart failure)

Practice 1: Respiratory Physiotherapy

1. Thoracic regional mobilization – Assisted and resisted manual reeducation
2. Slow inspiratory techniques: EDIC – exercises at inspiratory controlled flow
3. Slow expiratory techniques (ELTGOL, ELTGO)
4. Forced expiratory techniques
5. Respiratory physiotherapy in pediatrics – Forced inspiratory and expiratory techniques
6. Airway clearance techniques

Practice 2: Cardiorespiratory Assessment

1. Subjective and objective assessment: vital signs, inspection, assessment of breathing pattern, and chest circumferences
2. Percussion, diaphragmatic excursion
3. Lung auscultation
4. Pulmonary function tests: exploring the spirometry
5. Peak flow meter, assessment of respiratory muscle strength: maximal inspiratory pressure (MIP), maximal expiratory pressure (MEP)
6. Field tests: 6-minute walking test, incremental and endurance shuttle walk tests, step tests, upper extremity functional assessment

Practice 3: Cardiac Rehabilitation

1. Introduction to Cardiac Rehabilitation (CR)
2. Risk stratification in cardiovascular populations. Pharmacological therapy. Physiotherapist's role in the CR phases
3. Assessment of cardiorespiratory fitness in cardiovascular disease patients. Maximal vs. submaximal tests. Cardiopulmonary exercise test and VO_2max
4. Muscle strength assessment in cardiovascular patients
5. Autonomic dysfunction in cardiovascular patients. Assessment of heart rate variability and cardiac auscultation
6. Guidelines for prescribing exercise in cardiovascular diseases
7. Prescription of strength training for cardiac patients

Applied research in Physiotherapy III ..... 5 ECTS

1. Defining research questions
2. Planning an investigation: essential steps in developing a research protocol
3. Types of studies, sampling and selection of participants
4. Preparing the data collection session
5. Introduction and descriptive analysis of data in SPSS
6. Statistical inference
    6.1. Basics of statistical inference
    6.2. Procedures to consider when applying tests
    6.3. One Sample, Two Independent Sample, and Two Paired Sample Tests
7. Regression Models
    7.1. Simple linear regression
8. Structure of an Oral Scientific Communication
9. Ethics in research
10. Structure of a Research Project

Clinical Education VII ..... 25 ECTS

Syllabus

During the internship, students should always bear in mind that care can/should encompass the client, the family, the group and the community. In order to become a capable physiotherapist in the area of care provision and management, in the development of the profession and in building an awareness that contributes to strengthening professional identity, the student must be able to:

- Understand and integrate the workings and dynamics of the service
- Establish appropriate therapeutic relationships in the different areas of intervention, understanding the interrelationship between the different health professionals, collaborating in different contexts
- Demonstrate the ability to integrate and relate to the multidisciplinary team
- Understand the organization and prioritization of health care, linking it when necessary with other professionals and services
- Recognize and accept the responsibility and risks associated with the practice of physiotherapy, discussing the implications and consequences; integrate the principles of ethics and professional deontology into the practice of care, developing their awareness and identity
- Develop the ability to communicate effectively and congruently with different situations, adapting communication to the different players (users/clients/family/caregivers), taking into account their values, educational level, culture and religion
- Develop the ability to communicate effectively with the different professionals in the team
- Integrate the principles of ethics and professional deontology into the practice of care, developing their awareness and identity
- Demonstrate up-to-date theoretical and practical knowledge and be able to integrate it into clinical practice and, when necessary, be able to seek assistance in areas that are unfamiliar or in which they do not feel comfortable
- Be able to use multiple sources of information related to physiotherapy practice, research and education, applying clinical decision-making models appropriate to different contexts
- Correctly interpret clinical documentation from other health professionals

- Demonstrate skills in the assessment, planning and execution of physiotherapy care, integrating the best available scientific evidence, in accordance with the client's/user's objectives and values
- Select/apply appropriate assessment measures to the clinical case
- Develop, articulate and justify the hypothesis/differential diagnosis in Physiotherapy
- Plan and carry out therapeutic interventions (assessment, treatment, education) in a competent manner, integrating the best scientific evidence to achieve the established objectives
- Apply the methodologies for recording physiotherapy practices recommended by the institution
- Conduct client/family/caregiver-centered conversations regarding the treatment plan
- Carry out an appropriate prognosis according to the physiotherapy assessment
- Develop their activity autonomously, but always under the supervision of the supervising teacher
- Effectively manage the time and resources available for the patient's intervention, according to clinical experience
- Develop clinical reasoning in order to minimize errors and promote the best results for clients/users, taking clinical experience into account
- Demonstrate a critical-reflective attitude towards clinical teaching, practice, interpersonal and organizational relations, seeking to continuously improve the quality of the intervention
- Collaborate with the different stakeholders (users/clients/family/caregivers/other professionals) in order to determine an acceptable, realistic, culturally framed and client/user/family/caregiver-centered intervention plan
- Empower the client/user to achieve the highest level of functionality and well-being and active involvement in their own care
- Demonstrate care, compassion and empathy in interventions with clients
- Produce a synthetic, organized, logical, legible record with appropriate technical language, which ensures the correct transmission of the user's information in accordance with the procedures in force in the Service
- Develop health education/promotion strategies for the patient/community, providing comprehensive and specific physiotherapy care
- Use the individual work method

4TH YEAR • 2ND SEMESTER

Clinical Education VII ..... 25 ECTS

Syllabus

During the internship, students should always bear in mind that care can/should encompass the client, the family, the group and the community. In order to become a capable physiotherapist in the area of care provision and management, in the development of the profession and in building an awareness that contributes to strengthening professional identity, the student must be able to:

- Understand and integrate the workings and dynamics of the service
- Establish appropriate therapeutic relationships in the different areas of intervention, understanding the interrelationship between the different health professionals, collaborating in different contexts
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- Use the individual work method

Graduation Project ..... 5 ECTS

Syllabus

1. Development of the research project in physiotherapy