



AIFIMM Formation srl  
Advanced Institute of  
**Neuro-Myo-Fascial  
Biomechanics**

**AIFIMM Formation S.r.l.**

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**Certified by The CPD Certification Service (UK) – Provider No. 21418**

**CE Broker, Provider ID 50-54885**

**Italian Continuing Education Provider (ECM) No. 1701**

VAT No. IT01412130997

<https://aifimm.it/en/cc/systemic-musculoskeletal-biomechanics>

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## Online Course Program

### **Systemic Musculoskeletal Biomechanics**

*Applied Physics Principles for Clinical Practice*

*An advanced biomechanical model evolved from clinical observations systematized through vector analysis*

#### Official Accreditations

- **United Kingdom – CPD Certified**  
The CPD Certification Service (UK) – Provider No. 21418  
**38 CPD hours** (32h video + 6h study materials)
- **USA – CEU Florida**  
CE Broker – Provider ID 50-54885  
**45 contact hours (4.5 CEU)** – PT & PTA, General Hours  
Tracking 20-1318645 · FPTA Approval CE25-1318645  
Valid for 2025, with renewal already confirmed for 2026 and beyond

An advanced online course providing rehabilitation professionals with a scientifically grounded model for assessing and treating musculoskeletal dysfunctions through applied physics and vector analysis. The systematic approach integrates biomechanical principles, connective tissue mechanics, and force vector analysis to identify primary muscle shortenings, distinguish them from compensatory patterns, and restore functional balance through targeted interventions. Includes 32h of video lessons and 6h of reading materials with complete textbook, demonstrations, and diagnostic tools including the Four Constants (4K) framework.

**Historical Context:** *This biomechanical model evolved from clinical observations first documented by French physiotherapist Françoise Mézières (1947), who identified that muscles work in interconnected chains. Her empirical insights have been systematized through contemporary physics and vector analysis into the comprehensive framework taught in this course.*

## Who This Course Is For

This course is designed for licensed healthcare professionals working in musculoskeletal rehabilitation:

- **Physical Therapists / Physiotherapists (PT)**
- **Osteopaths (DO)**
- **Physicians (MD)** - particularly in Physical Medicine, Rehabilitation, Sports Medicine
- **Chiropractors (DC)** - where regulated as healthcare providers
- **Manual Therapists** with recognized clinical qualification

## Prerequisites:

- Basic knowledge of anatomy and biomechanics
- No prior Mézières Method training required

**Important:** No advanced physics knowledge required - all concepts are explained progressively with clinical applications. The vector analysis and biomechanical principles are taught step-by-step through practical demonstrations.

**Note:** This course is intended for healthcare professionals only. It is not suitable for fitness trainers, massage therapists, or wellness practitioners without formal clinical training.

## What Makes This Course Different

This course teaches you to analyze dysfunction through physics principles, not protocols:

### Identify mechanical causes through vector analysis

- Calculate exactly which muscle vectors are creating joint misalignments
- Distinguish primary shortenings from compensatory patterns using the Four Constants (4K)
- Understand why certain muscles always dominate their antagonists

### Apply targeted interventions based on biomechanical logic

- Use isometric contractions during prolonged active expiration to affect connective tissue
- Position patients to neutralize dominant force vectors
- Sequence treatments to avoid creating new compensations

### Integrate assessment and treatment systematically

- Each evaluation directly informs therapeutic strategy
- RF/WF relationship provides measurable treatment objectives
- The Two Fundamental Equations guide clinical decision-making

## Think in terms of forces, not just anatomy

- Understand muscles as force vectors with magnitude, direction, and sense
- Recognize how connective tissue shortening creates "short ropes" pulling bones
- Predict systemic effects of local interventions

## Distinguish when to treat vs. when to refer

- Equation 1: Primary muscular → direct treatment can resolve
- Equation 2: Primary structural → requires multidisciplinary approach
- Clear criteria for differential diagnosis

## What You'll Receive

- **32 hours of HD video instruction** across 18 progressive modules
- **Complete textbook included:** *Musculoskeletal Biomechanics* by Mauro Lastrico (English PDF)
- **28 downloadable clinical resources** including vector analysis charts and assessment tools
- **12-month unlimited access** to review and integrate concepts at your pace
- **Certificate of Completion** (38 CPD hours UK / 45 contact hours Florida)
- **Email support** for clinical and technical questions

## COURSE CONTENT

The following theoretical foundations are taught progressively throughout the course. You will learn these concepts step-by-step with practical applications, **mastering both the assessment techniques and therapeutic interventions for each principle.**

## THEORETICAL FOUNDATIONS

### Core Principle: The Skeleton is Passive, Muscles are Active

This course teaches a fundamental biomechanical principle: in the absence of specific pathologies, muscles determine skeletal position through their force vectors. When connective tissue within muscles shortens structurally, it creates persistent mechanical forces that the skeleton must follow.

You will learn to analyze and treat dysfunction through three integrated levels:

1. **Local Vector Analysis** - Identify specific shortened muscles causing joint misalignment
2. **Regional Compensation Patterns** - Trace how local problems create predictable adaptations
3. **Systemic Integration** - Understand whole-body responses and treatment sequencing

The following concepts are taught progressively with immediate clinical application:

### 1. MUSCLE MECHANICS

## Understanding Structural Shortening vs. Increased Tone

This section teaches you to distinguish between temporary increases in muscle tone and permanent structural changes in connective tissue - a critical distinction for effective treatment.

### 1.1 The Two Components of Muscle Tissue

#### Contractile Component (Actin-Myosin)

- High elasticity coefficient - returns to original length after contraction
- Responds to neural input
- Affected by relaxation techniques and neural interventions

#### Connective Tissue Component (Endomysium, Perimysium, Epimysium)

- Lower elasticity coefficient - maintains deformation after sustained force
- Site of structural shortening through collagen remodeling
- Requires specific mechanical stimulus (isometric work in lengthened position) to restore

### 1.2 The RF/WF Principle - The Core of Dysfunction

**Resistant Force (RF)** = Internal resistance from shortened connective tissue **Working Force (WF)**  
= Available force for functional movement

When  $RF > WF$ , the system enters dysfunction. You will learn to:

- Assess this relationship through joint range and tissue resistance
- Apply therapeutic techniques to reduce RF
- Monitor changes in the RF/WF ratio as objective outcome measure

### 1.3 Clinical Application: Breaking the Self-Perpetuating Circuit

Misalignment → Increased tone to maintain balance → Connective tissue shortening → Worsened misalignment

You will master techniques to interrupt this cycle:

- Isometric contractions during prolonged active expiration
- Progressive positioning to reduce compensatory escape
- Integration of breathing patterns to facilitate release

**Key Distinction:** This approach targets the connective tissue component where structural shortening occurs, not just the contractile elements that traditional stretching affects.

## 2. BODY EQUILIBRIUM

### Aligning Centers of Mass, Not Fighting Gravity

This section corrects common misconceptions about posture and teaches you to work with mechanical forces rather than against them.

## **2.1 Gravity is Not the Enemy**

There are no "anti-gravity" muscles. Gravity is simply the interaction between masses. The therapeutic goal is not to fight gravity but to align segmental centers of mass vertically so forces distribute uniformly across joint surfaces.

## **2.2 Force Distribution and Joint Compression**

When centers of mass align vertically:

- Forces G (gravity) and R (ground reaction) distribute evenly
- Joint surfaces experience uniform pressure
- Minimal muscular effort maintains position

When centers are displaced:

- Forces concentrate on restricted areas
- Compression zones develop
- Excessive muscular tone required → increases RF

## **2.3 Clinical Assessment and Treatment**

You will learn to:

- Identify displaced centers of mass through observation and palpation
- Calculate moment arms creating rotational forces
- Position patients to restore alignment without creating new compensations
- Use the patient's body weight advantageously during treatment

**Example:** A 5kg head displaced 3cm forward creates a 15kg·cm moment that posterior cervical muscles must counter continuously, leading to chronic shortening.

## **2.4 The Therapeutic Strategy**

Rather than strengthening "weak" muscles or stretching "tight" ones:

- Reposition centers of mass to reduce mechanical demands
- Decrease need for compensatory muscle activation
- Allow the system to maintain balance with minimal RF

# **3. VECTOR ANALYSIS**

## **From Anatomy to Forces: The Language of Biomechanics**

This section teaches you to see muscles not as anatomical structures but as force vectors that mathematically determine skeletal position.

### 3.1 The Three Elements of a Vector

Every muscle generates force with:

- **Magnitude** - Cross-sectional area determines force potential
- **Direction** - Line from origin to insertion
- **Sense** - The pull direction during contraction

Clinical application: A 2cm<sup>2</sup> muscle will always dominate a 1cm<sup>2</sup> antagonist. This is physics, not pathology.

### 3.2 Vector Dominance Principles

**Why certain muscles always win:**

- Larger cross-sectional area = greater force magnitude
- Multiple insertion points = force distribution
- Mechanical advantage from lever arms
- Shortened connective tissue = constant active vector

**Example:** Psoas (16-20cm<sup>2</sup>) dominates over abdominals (8-10cm<sup>2</sup>) in the sagittal plane, explaining universal tendency toward lumbar lordosis.

### 3.3 Vector Decomposition in Practice

You will learn to:

- Break complex muscle actions into component vectors
- Calculate resultant forces on each joint
- Identify which vector component needs treatment
- Predict movement of bones based on vector sum

### 3.4 Clinical Decision Making Through Vectors

**Assessment:** Which vectors are shortened and dominant? **Treatment priority:** Target largest dominant vectors first **Positioning:** Neutralize dominant vectors while activating weak ones **Sequencing:** Prevent vector imbalance in other planes during correction

**Key Skill:** Transform anatomical observation into mechanical analysis - see forces, not just muscles.

## 4. DISTRICT APPLICATIONS

You will learn to apply vector analysis principles systematically **and treat dysfunctions** in:

**4.1 Vertebral Column - Sagittal Plane** Analysis of vector dominances modifying physiological curves **and specific techniques to restore normal lordosis and kyphosis.**

**4.2 Vertebral Column - Frontal and Rotational Plane** Study of asymmetric shortenings producing lateral convexities and vertebral rotations, **with targeted interventions to rebalance spinal alignment**. *Note: Assessment must be performed in supine position to reveal true structural shortenings*

**4.3 Upper Limb** Vector evaluation of the scapulohumeral complex **and treatment protocols for shoulder dysfunction and upper limb pathologies**.

**4.4 Lower Limb** Analysis of muscle dominances in the hip-knee-foot chain **and therapeutic strategies to restore proper kinetic chain function**.

**4.5 The Hyoid Bone - Systemic Connector** Understanding the hyoid as a mechanical node connecting TMJ, cervical spine, and shoulder girdle, **with specific techniques to address this critical junction that affects multiple systems**.

**4.6 Integration Principle** You will master how each district influences others through mechanical connections, **learning to sequence your treatments to achieve systemic improvement without creating new compensations**.

## **5. FROM ANALYTICAL UNDERSTANDING TO SYSTEMIC INTERPRETATION**

### **5.1 The Three Causes of Muscle Shortening**

You will learn to identify and **therapeutically address** three distinct origins of increased basal tone that lead to structural shortening:

#### **Psychosomatic System:**

- Muscle tension as physical expression of emotional states
- Techniques addressing both physical and psychological components
- Recognition of when psychological support is needed

#### **Neurophysiological System:**

- Antalgic reflexes (protective muscle guarding)
- Distinguishing "a priori" protection (preventing potential pain) from "a posteriori" (responding to existing pain)
- Strategies to gradually desensitize while respecting necessary protection

#### **Biomechanical System:**

- Misaligned centers of mass creating perpetual compensation
- Self-perpetuating circuits of tension
- Direct mechanical interventions to restore alignment

All three systems converge on increased RF through elevated basal tone leading to connective tissue shortening.

### **5.2 The Four Constants (4K) - Diagnostic Framework**

Every musculoskeletal symptom presents four observable constants:

**1K: Mechanical Conflict** - Symptom originates from intra-articular mechanical conflict **2K: Asymmetric Vectors** - Shortened muscle vectors cause joint misalignment  
**3K: Connective Tissue** - The connective component maintains the shortening **4K: Global Compensation** - The body reorganizes systemically to manage local dysfunction

These constants guide your clinical reasoning from symptom to cause.

### 5.3 The Two Fundamental Equations

**Equation 1 - Primary Muscular** No structural alterations → Muscles cause skeletal deformation  
→ Direct treatment can resolve

**Equation 2 - Primary Structural**

Structural alterations present → Muscles compensate → Requires multidisciplinary approach

This distinction determines your entire treatment strategy.

### 5.4 Integrated Clinical Application

You will develop skills to:

- Apply the 4K framework to identify primary problems
- Use the Two Equations to determine treatment approach
- Recognize when compensation is protective and shouldn't be eliminated
- Sequence interventions to prevent destabilization
- Integrate breathing patterns (prolonged active expiration during isometric work)

## EXECUTIVE SUMMARY

### The Clinical Model

This course teaches a systematic approach to musculoskeletal dysfunction based on applied physics: muscles create force vectors that position bones. When connective tissue within muscles shortens structurally, these forces become persistent, pulling the skeleton out of alignment.

### Core Therapeutic Principle

Every intervention must balance two requirements:

1. **Local precision** - Identify and treat the specific shortened muscle causing misalignment
2. **Systemic awareness** - Ensure corrections don't destabilize other districts

### Treatment Methodology

#### Assessment Phase

- Identify primary vs. compensatory shortenings using the 4K framework
- Determine which equation applies (primary muscular vs. structural)
- Map force vectors and their systemic effects

## **Intervention Phase**

### *Manual Component:*

- Position patient to place specific tension on shortened chains
- Control compensatory escape patterns
- Guide precise execution

### *Active Patient Work:*

- Isometric contractions in maximum lengthening
- Maintained during prolonged active expiration
- Progressive intensity based on tissue response

## **Clinical Decision Framework**

### **Primary Muscular (Equation 1):**

- Direct treatment of muscle shortening can resolve symptoms
- Focus on reducing RF through connective tissue lengthening
- Monitor systemic responses

### **Primary Structural (Equation 2):**

- Muscle shortening is compensatory
- Coordinate with appropriate specialists
- Manage muscular components while addressing structural cause

## **Expected Outcomes**

Practitioners completing this course will:

- Identify mechanical causes using vector analysis
- Apply the 4K diagnostic framework
- Execute treatment sequences without creating new problems
- Integrate this approach with existing methods
- Recognize when multidisciplinary referral is needed

# **DETAILED CURRICULUM**

## **Course Structure**

**Total Duration:** 31 hours 37 minutes of video + 6 hours of reading materials  
**Format:** 18 video modules with downloadable PDFs  
**Access:** 12 months unlimited

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## SECTION I: THEORETICAL FOUNDATIONS AND ASSESSMENT

*Modules 1-4 (8 hours 30 minutes)*

### **Module 1 - Introduction Part 1**

**Duration:** 3 hours 2 minutes

#### **Topics Covered:**

- Historical evolution from empirical observation to physics-based model
- Physics and vectorial analysis applied to posture
- Basic principles of musculo-fascial biomechanics
- Static and dynamic balance concepts
- Vertebral sinusoid and segmental organization
- Postural assessment: standing and supine evaluations 🔍 *Includes live demonstration*

#### **Downloadable PDFs:**

- Françoise Mézières.pdf
  - Originality of the Mézières Method.pdf
  - Muscle Mechanics.pdf
  - Vector Analysis 1 & 2.pdf
  - Body Equilibrium.pdf
  - Dorsolumbar Lordosis.pdf
  - Thoracic Kyphosis.pdf
  - Cranio-cervico-dorsal Lordosis.pdf
  - Sagittal Plane Synthesis.pdf
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### **Module 2 - Introduction Part 2**

**Duration:** 1 hour 55 minutes

#### **Topics Covered:**

- Linear and non-linear physics in human biomechanics
- Complex systemic behavior of muscular chains
- Causes of postural asymmetry
- Antalgic and compensatory reflexes
- Force couples in function and dysfunction
- Dynamic palpatory assessment in various positions 🔍 *Includes live demonstration*

### Downloadable PDFs:

- Muscle Chains and Complex Systems.pdf
  - Muscle Shortening.pdf
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### Module 3 - Static Postural Assessment

**Duration:** 1 hour 59 minutes

#### Topics Covered:

- Frontal and rotational evaluations in standing, forward flexion, and supine positions 🔍  
*Includes live demonstration*

### Downloadable PDF:

- Static Objective Examination.pdf
- 

### Module 4 - Goals & Tools of the Mézières Method

**Duration:** 1 hour 34 minutes

#### Topics Covered:

- Muscle force couples and their roles
- Definition of treatment goals
- Myofascial release techniques
- Therapeutic diaphragmatic breathing setup 🔍 *Includes live demonstration*

### Downloadable PDFs:

- Mézières Method.pdf
  - Therapeutic Setup.pdf
- 

## SECTION II: SAGITTAL PLANE CORRECTIONS

*Modules 5-6 (3 hours 55 minutes)*

### Module 5 - Supine Posture - Sagittal Plane Corrections

**Duration:** 2 hours 18 minutes

#### Correction Targets:

- Skull, hyoid bone, and cervical-lumbar curves
- Thoracic kyphosis, scapulo-humeral, and pelvic alignment 🔍 *Includes live demonstration*

**Downloadable PDF:**

- Hyoid Bone.pdf
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 **Module 6 - Functional Differential Evaluation**

**Duration:** 1 hour 37 minutes

**Topics Covered:**

- Muscular influences on spinal and scapular structures
- Assessment of rotational and lateral deviations
- Upper limb and pelvic vectorial analysis 🔍 *Includes live demonstration*

**Downloadable PDFs:**

- Three-dimensional Plane.pdf
  - Latissimus Dorsi Muscle Patterns.pdf
  - Functional Evaluation.pdf
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## **SECTION III: FRONTAL AND ROTATIONAL PLANE CORRECTIONS**

*Modules 7-9 (5 hours 51 minutes)*

 **Module 7 - Supine Frontal Plane - Muscle-Skeletal Reactions**

**Duration:** 1 hour 38 minutes

**Topics Covered:**

- Natural skeletal reactions in the frontal plane
  - Passive mobilizations of thoracic and lumbar vertebrae 🔍 *Includes live demonstration*
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 **Module 8 - Corrective Maneuvers - Supine Frontal & Rotational Planes**

**Duration:** 2 hours 5 minutes

**Application to:**

- Cranio-sacral axis, cervical, thoracic, lumbar sections
- Hyoid-scapular-spinal coordination

- Upper limbs and pelvic vector control 🔍 *Includes live demonstration*
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## **Module 9 - Clinical Application of Corrections**

**Duration:** 2 hours 8 minutes

### **Topics Covered:**

- Selection of treatment strategies
- Myofascial and skeletal correction techniques
- Management of compensatory patterns 🔍 *Includes simulation and live demonstration*

### **Visual Material:**

- Simulated Solution 2.png
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## **SECTION IV: LOWER LIMBS AND SPECIFIC TECHNIQUES**

*Modules 10-12 (5 hours 36 minutes)*

## **Module 10 - Elevated Lower Limbs - Global Corrections**

**Duration:** 1 hour 26 minutes

### **Focus Areas:**

- Quadratus lumborum and leg elevation angles
  - Whole-body alignment from elevated-leg positioning 🔍 *Includes live demonstration*
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## **Module 11 - Hip & Knee Pathologies - Legs Elevated Work**

**Duration:** 1 hour 37 minutes

### **Topics Covered:**

- Vector analysis of the hip and knee
- Therapeutic approaches for related dysfunctions 🔍 *Includes live demonstration*

### **Downloadable PDFs:**

- Coxofemoral Joint.pdf
  - Knee.pdf
-

## **Module 12 - Seated Corrections & Foot Disorders**

**Duration:** 2 hours 33 minutes

### **Topics Covered:**

- Postural adjustments in seated position
- Tibio-tarsal and foot biomechanics
- Management of lower limb and foot pathologies 🔍 *Includes live demonstration*

### **Downloadable PDF:**

- Foot.pdf
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## **SECTION V: SPECIFIC DISTRICTS AND DYNAMIC ASSESSMENT**

*Modules 13-15 (5 hours 1 minute)*

## **Module 13 - Temporomandibular Joint (TMJ)**

**Duration:** 2 hours 18 minutes

### **Topics Covered:**

- Distinguishing primary vs. secondary muscular shortening
- Differential diagnosis of TMJ-related dysfunctions
- Role of craniofacial posture in systemic balance 🔍 *Includes live demonstration*

### **Downloadable PDF:**

- TMJ.pdf
- 

## **Module 14 - Dynamic Assessment**

**Duration:** 1 hour 45 minutes

### **Topics Covered:**

- Active and passive dynamic testing protocols
- Gait analysis with physiological and compensatory patterns 🔍 *Includes live demonstration*

### **Downloadable PDF:**

- Dynamic Examination.pdf
-

## **Module 15 - Treating Subluxations - Shoulder & Sternoclavicular**

**Duration:** 58 minutes

### **Focus Areas:**

- Humeral head, sternoclavicular, scapular subluxations
  - Recognition and treatment of regional dysfunctions 🔍 *Includes live demonstration*
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## **SECTION VI: CLINICAL REASONING AND SPECIAL CASES**

*Modules 16-18 (3 hours 4 minutes)*

## **Module 16 - Clinical Reasoning**

**Duration:** 1 hour 29 minutes

### **Topics Covered:**

- Symptomatic vs causal intervention frameworks
- Local vs referred pain analysis
- Tools: dermatomes, innervation maps, static & dynamic tests
- From assessment to full treatment planning 🔍 *Includes live demonstration*

### **Downloadable PDF:**

- The Symptom.pdf
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## **Module 17 - Scoliosis**

**Duration:** 48 minutes

### **Topics Covered:**

- Classification and evaluation of scoliosis
- Therapeutic strategies for spinal asymmetries 🔍 *Includes live demonstration*

### **Downloadable PDF:**

- Scoliosis.pdf
- 

## **Module 18 - Case Studies & Final Insights**

**Duration:** 27 minutes

## Topics Covered:

- Clinical evolution across treatment timeline
  - Protocols for initial consultation
  - Clinical photography as monitoring tool
  - Review of key takeaways and consolidation 🔍 *Includes case discussions*
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## Complementary Reading Materials

**Estimated time:** 6 hours

**Format:** Downloadable PDFs

**Content:** Original scientific handouts including theoretical summaries, clinical notes, vector analysis, and muscle chain mechanics

## Skills Developed

Upon course completion, the professional will have acquired:

- Clinical reasoning based on vectorial biomechanics
- Whole-body assessment and palpatory sensitivity
- Recognition of muscular patterns altering joint geometry
- Use of isometric elongation in therapeutic settings
- Management of postural, orthopedic, and functional conditions through systemic treatment

## Instructors AIFiMM

### **Mauro Lastrico, PT**

*Scientific Director - AIFiMM*

- 40+ years clinical experience in complex musculoskeletal dysfunction
- Direct training with Françoise Mézières (Paris, 1988-89)
- Author: *Musculoskeletal Biomechanics* (included in course materials)
- Systematized empirical observations into physics-based clinical model
- 300+ courses delivered to 6,000+ healthcare professionals

### **Laura Manni, PT**

*Educational Coordinator - AIFiMM*

- 40+ years specializing in spinal disorders and systemic dysfunction
- Advanced training with Françoise Mézières (Paris, 1988-89)
- Expert in clinical application and teaching methodology

- Developed systematic assessment protocols used throughout Italy
- Co-developer of online international curriculum

### **Teaching Philosophy**

Both instructors emphasize understanding mechanical principles over memorizing protocols. Their extensive clinical experience ensures practical application of every concept taught.

**Note on Clinical Application:** While this course provides comprehensive theoretical and practical training, clinical outcomes depend on individual practitioner skill and patient presentation. This approach integrates with, rather than replaces, evidence-based practice guidelines.