

**COURSE SYLLABUS**

**Course Title and Number:**

FMDT003: Functional Anatomy and Pain Science

**Course Description:**

The Fellow in Training must possess a thorough understanding of human anatomy and its relationship to both normal functional movement as well as dysfunction of the neuromusculoskeletal system in order to effectively examine, evaluate, and provide interventions for their clients in a clinical practice setting. This course will involve a detailed analysis of specific anatomic structures and their function as relates to clinical physical therapy practice. Basic mechanics, biomechanics, kinematics, kinetics and functional anatomy of the spine and extremity joints and the foundations of pain neuroscience and relationship to chronic neuromusculoskeletal conditions will be explored and examined.

The course will consist of article reviews, synchronous and asynchronous sessions and analyses in a community of engagement and active learning. The culmination of the course will be student presentation of a reflection paper that will demonstrate the students' breadth of knowledge and understanding of the contributors to the patient's condition that allows for treatment based on classification. To that end, these are a portion of the objectives to set the base foundation of knowledge and skills needed through a more interactive and engaging format.

**Program offering the course:** The McKenzie Institute OMPT Fellowship Program

**Credit hours:** Not applicable

**Course Instructors:** McKenzie Institute USA OMPT Fellowship Faculty

- Joseph Lorenzetti PT, DPT, OCS, Dip MDT, FAAOMPT
- Brian McClenahan, PT, DSc, OCS, Dip. MDT, FAAOMPT

**Clock hours:** 50 hours including pre-course readings and post-course assignments

**Course prerequisites:** None

**Objectives:** At the conclusion of this course, the Fellow-in-Training will be able to:

1. Analyze nociceptive and the peripheral neurogenic pain mechanisms.
2. Describe the three categories of the pain mechanism classification system.
3. Describe the three mechanical diagnosis and therapy classifications.
4. Identify and apply basic concepts for the analysis of normal and abnormal neuromusculoskeletal function.
5. Identify the effects of external force application on growth, development, and healing of musculoskeletal tissues.
6. Define the planes and axes of joint motions.
7. Describe selected skeletal joints in terms of a) Structural characteristics b) Classification systems c) Motions and d) Functions.
8. Analyze motions associated with specific joints in terms of structural characteristics and joint classification.
9. Describe specific muscles and their role in movement and relationship to neuromusculoskeletal dysfunction.
10. Describe and analyze the biomechanics of selected human movements in terms of the component: a) joint motions b) muscles c) force and force systems and d) ergonomics.
11. Identify and compare the type of muscle contraction that occurs during normal body movement.
12. Identify the action of selected muscles on specified joints through the resolution of forces and identification of the origins, insertions, and innervations.
13. Analyze and describe the contributions of specific skeletal muscles to normal, functional movements observed in common daily activities of the upper/lower extremities and spine.
14. Compare and contrast the important osteo and arthrokinematic motions of the major joint systems.
15. Analyze the relationship between the Pain Mechanism Classification System (PMCS) and Mechanical Diagnosis and Therapy (MDT).
16. Apply the MDT and PMCS to a patient case scenario while describing the patient's pathomechanics and functional pathoanatomy.

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**WEEKLY SCHEDULE:**

<b>Week</b>	<b>Sync Sessions (Day/Time)</b>	<b>Asynchronous Topics Pain Science Functional anatomy</b>	<b>Assignments</b> (All readings, assignment instructions, & grading criteria are posted in Schoology)
Week 1: July 31	<b>Case 1 Day/Time TBD</b>	Chronic Pain State Upper cervical	Louw et al. Know Pain Know Gain? A Perspective on Pain neuroscience Education in Physical Therapy. JOSPT 2016
Week 2: Aug 7		Biomedical vs Biopsychosocial Models Mid-Cervical	Bialosky et al. Unraveling the Mechanisms of Manual Therapy: Modeling an Approach. JOSPT 2018
Week 3: Aug 14		Basic science of pain physiology Thoracic	Bourne et al. Basic Anatomy and Physiology of Pain Pathways. Neurosurgery 2014.
Week 4: Aug 21		Chronic Pain subclassification Ribs	Decary et al. Driving the Musculoskeletal Diagnosis Train on the High-Value Track. JOSPT 2020
Week 5: Aug 28		Peripheral neuropathic pain subgroup Shoulder	World of Hurt Pages 105-135
Week 6: Sept 4		Central sensitization subgroup Elbow	World of Hurt pages 188-203
Week 7: Sept 11		Affective subgroup Wrist	<b>Quiz 1 – weeks 1-6 (25 questions)</b> World of Hurt Pages 238-260
Week 8: Sept 18		Motor Autonomic subgroup Hand	World of Hurt Pages 317-334
Week 9: Sept 25	<b>Case 2 Day/Time TBD</b>	Intervention – Pain neuroscience education Lumbar	Nijs et al 2011. How to explain central sensitization to patients with “unexplained” chronic musculoskeletal pain: Practice guidelines. Manual Therapy
Week 10: Oct 2		Intervention – Peripheral neuropathic pain subgroup SIJ	<b>Quiz 2 – weeks 7-9 (15 questions)</b> World of Hurt Pages 135-145
Week 11: Oct 9		Intervention – central sensitization Hip	World of Hurt Pages 203-218
Week 12: Oct 16		Intervention – affective Knee	World of Hurt Pages 261-282
Week 13: Oct 23		Intervention – motor autonomic Ankle	World of Hurt 335-344
Week 14: Oct 30		Intervention – cognitive behavioral therapy/motivational interviewing Foot	Edmond et al. Directional preference, cognitive behavioural interventions, and outcomes among patients with chronic low back pain. Physiother Res Tnt. 2019
Week 15: Nov 6	<b>Case 3 Day/Time TBD</b>	No new content	<b>Quiz 3 – weeks 10-14 (20 questions)</b> Reflection Paper Due 11/10.

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**OUTLINE OF CONTENT:**

Asynchronous content will provide the Fellow in Training a foundation for basic mechanics, biomechanics, kinematics, kinetics and functional anatomy of the spine and extremity joints. Assigned reading from articles and the text: Asynchronous content, articles and assigned readings from *A World of Hurt* will provide the Fellow in Training foundational knowledge in pain science and classifying chronic pain for evidence-based management.

**Description of teaching methods and learning experiences:**

Faculty will utilize technology to provide timely feedback regarding assigned readings, synchronous and asynchronous sessions, quizzes and reflection paper.

**EVALUATION OF STUDENT LEARNING:**

1. Quizzes on readings and PowerPoints (3)
2. Sync Sessions (3)
3. Reflection Paper (1)

Quiz 1 (25 questions)	25 points
Quiz 2 (15 questions)	15 points
Quiz 3 (20 questions)	20 points
Sync Session 1	10 points
Sync Session 2	10 points
Sync Session 3	10 points
Reflection Paper	10 points
<b>Total:</b>	<b>100 points</b>

Grading Guidelines are as follows:

94-100%	A	75-79%	C+
90-93%	A-	70-74%	C-
87-89%	B+	60-69%	D
84-86%	B	below 60%	F
80-83%	B-		

A grade of B is required for successful pass of the course.

**READINGS:**

1. Kolski MC, O'Connor A. *A World of Hurt*. 2015. Thomas Land Publishers, St. Louis.
2. Assigned articles
3. Simon, C. *Joint arthrokinematics manual*, 2012.

**RECOMMENDED TEXT:**

1. Levangie PK, Norkin CC. *Joint Structure and Function A Comprehensive Analysis 5<sup>th</sup> ed.* 2011. FA Davis, Philadelphia.