

<p><b>Course Name:</b>  <b>KNPE 493/3.0</b></p> <p>Special Topics in  Kinesiology  Winter 2023 Topic:  Locomotor Neuromechanics</p>	<p><b>Course Instructor:</b>  Anthony Chen</p>	<p><b>Contact Hours:</b>  Lectures: 1 x 3 hrs / 12 weeks</p>										
		<p><b>Prerequisite:</b>  Level 4 in a KINE plan</p>										
		<p><b>Exclusion:</b></p>										
<p><b>Course Description:</b></p> <p>The purpose of this course is to provide you with a comprehensive understanding of the mechanics, energetics, and control of human locomotion. We will explore current theories in biomechanics and motor control, as well as the foundational behavioral and sensorimotor evidence that underpin these theories. A focus will be placed on applying this understanding to the rehabilitation of movement disorders and the design and control of robotic assistive devices.</p>		<p><b>Course Texts:</b></p> <p>Course notes will be placed on onQ.</p>										
<p><b>Learning Outcomes:</b></p> <ul style="list-style-type: none"> <li>• Understand the relationship and interplay between the mechanics of the body and the control of the nervous system</li> <li>• Understand why metabolic energy cost is considered not only an important outcome of movement, but also a relevant control objective</li> <li>• Understand why the mechanics, energetics, and control of locomotion are important to consider when designing rehabilitation strategies and assistive devices</li> <li>• To develop basic programming and signal processing knowledge used in neuromechanical research</li> <li>• To develop scientific communication skills through interpreting, presenting, and discussing scientific literature in Neuromechanics</li> <li>• To develop research skills through developing a locomotor research project</li> </ul>	<p><b>Course Evaluation:</b></p> <table> <tr> <td>Article reflections (4 x 5%)</td> <td>20%</td> </tr> <tr> <td>Peer evaluation participation (22 x 0.5%)</td> <td>10%*</td> </tr> <tr> <td>Student Presentations (2 x 15%)</td> <td>30%</td> </tr> <tr> <td>Term Project (A: 10%, B: 15%, C:15%)</td> <td>40%</td> </tr> <tr> <td colspan="2">*1% Bonus for Full Completion</td> </tr> </table>		Article reflections (4 x 5%)	20%	Peer evaluation participation (22 x 0.5%)	10%*	Student Presentations (2 x 15%)	30%	Term Project (A: 10%, B: 15%, C:15%)	40%	*1% Bonus for Full Completion	
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**Course Outline**

Mechanics of Locomotion: What role do passive dynamics play in gait?	Wearables for Ecological Locomotion: How can we assess real-world locomotion?
Energetics of Locomotion: Why is locomotion costly and how does this effect our gait?	Gait Retraining in Locomotion: How can we correct and restore gait?
Sensory Contribution to Locomotion: What role do sensory system play in gait?	Robotic Assistive Aids in Locomotion: How can we enhance gait?