



# SUBJECT OUTLINE

Subject Name:

**Neurophysiology**

Subject Code:

**MSTN121**

## SECTION 1 – GENERAL INFORMATION

<b>Award/s:</b>	<b>Total Course Credit Points:</b>	<b>Level:</b>
Bachelor of Health Science (Myotherapy)	96	1 <sup>st</sup> Year
<b>Duration:</b>	1 Semester	
<b>Subject Coordinator:</b> Daniela Kurt (Perth Campus)		
<b>Subject is:</b>	<b>Subject Credit Points:</b>	2
Core		

### Student Workload:

<b>No. timetabled hours per week:</b> 3	<b>No. personal study hours per week:</b> 2	<b>Total hours per week:</b> 5
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#### Delivery Mode:

Face to Face (On Campus) 1 x 2 hour lecture 1 x 1 hour tutorial

Intensive Delivery (Summer School) Contact hours are delivered over 5 weeks with 2 x 4 hour days delivered per week  
Content: Combination lecture and tutorial activities

Assessment: Attendance - Weeks 1-5; Consumer Blog Post - Week 3; Final Practical Exam - Week 6; Final Written Exam - Week 6

Full Time

Part Time

**Pre-requisites:** BIOH111

**Co-requisites:** Nil

#### Special Resource Requirements:

One bath-sheet sized towel per student (Clinic towels must not be used)

Clinical equipment kit including:

- Penlight
- Buck reflex hammer
- Tuning fork (128 Hz)



## SECTION 2 – ACADEMIC DETAILS

### Subject Rationale

The aim of this subject is to expand on the students' knowledge and application of neuroscience to the normal and diseased functioning of the human body. The subject has as a prerequisite BIOH111 where the structure and function of the nervous system is introduced. In MSTN121 the students expand their information base in regards to the anatomy and physiology of the nervous system from micro structures within the brain to the macro structures of nerves and their pathways. In addition areas that are important for disease within the nervous system are investigated such as the functional areas of the cerebral cortex, neuroplasticity, the upper and lower motor systems and the brainstem. Students will relate the normal functioning of these areas through analysis to formulate how alterations can and will lead to clinical disorders.

### Learning Outcomes

1. Describe the concepts of neuroplasticity.
2. Identify the pathways taken throughout the body by the major nerves and the anatomical structures they are associated with from a clinical perspective.
3. Demonstrate myotomal, dermatomal, cerebellar and neurodynamic examination techniques.
4. Describe the nerve plexi, including muscle and cutaneous innervations.
5. Describe the molecular biology of the synapse and analyse the factors externally and internally that can contribute to alteration in function and how this may contribute to dysfunction.
6. Discuss concepts of nociceptive and neuropathic pain and pain matrix dysfunction.

### Assessment Tasks

Type	Learning Outcomes Assessed	Session Content Delivered	Due	Weighting
<b>Attendance</b> (80% required)	N/A	N/A	Sessions 1-13	Pass/Fail
<b>Consumer Blog Post</b> (500 words)	1, 6	1-5	Week 6	20%
<b>Final Practical Exam</b> (30 minutes)	3	1-13	Practical Examination Period	35%
<b>Final Written Exam</b> (2 hours)	1-2, 4-6	1-13	Final Examination Period	45%

All written assessments and online quizzes are due at 11:55 p.m. Sunday and submitted through the LMS



**Prescribed Readings:**

1. Butler, D. S. (2000). *The sensitive nervous system*. Noigroup Publications.
2. Lundy-Ekman, L. (2018). *Neuroscience: Fundamentals for rehabilitation* (5th ed.). Elsevier.

**Recommended Readings:**

1. Beck, R. (2008). *Functional neurology for practitioners of manual medicine* (2nd ed.). Churchill-Livingstone; Elsevier.
2. Tortora, G. J., Derrickson, B., Burkett, B., Peoples, G., Dye, D., Cooke, J., & Mellifont, R. (2019). *Principles of anatomy and physiology* (2nd Asia-Pacific ed.). Wiley. [ebook available]

Subject Content		
Week	Lectures	Tutorials
1.	<p><b>Introduction</b> (Subject Outline / Subject Aims / Assessment / Teaching Resources)</p> <p><b>Introduction to Neurophysiology</b></p> <ul style="list-style-type: none"> <li>➤ Review of the structure and function of the nervous system</li> <li>➤ Physical and electrical properties of cells in the nervous system</li> </ul>	<ul style="list-style-type: none"> <li>➤ Practicing diagnostics from neurological evaluation using flow chart and case studies</li> <li>➤</li> </ul>
2.	<p><b>Synapses and Synaptic Transmission</b></p> <ul style="list-style-type: none"> <li>➤ Synapse physiology</li> <li>➤ Neurotransmitter agonists and antagonists</li> </ul>	<ul style="list-style-type: none"> <li>➤ Review of neurological exam testing</li> </ul>
3.	<p><b>Neuropathic Pain, Pain Matrix Dysfunction, and Pain Syndromes</b></p> <ul style="list-style-type: none"> <li>➤ Chronic pain</li> <li>➤ Neuropathic pain</li> </ul>	<ul style="list-style-type: none"> <li>➤ Introduction to examining cortical sensory function</li> </ul>
4.	<p><b>The Motor System</b></p> <ul style="list-style-type: none"> <li>➤ Sensory contribution to movement control</li> <li>➤ Motor output</li> <li>➤ Skeletal muscle structure and function</li> <li>➤ Motor neuron tracts</li> <li>➤ Motor neuron lesions</li> </ul>	<ul style="list-style-type: none"> <li>➤ Introduction to motor testing procedures</li> </ul>
5.	<p><b>Neuroplasticity</b></p> <ul style="list-style-type: none"> <li>➤ Habituation</li> <li>➤ Experience-dependent plasticity</li> <li>➤ Long-term potentiation and depression</li> </ul>	<ul style="list-style-type: none"> <li>➤ Review of neurological examination procedure</li> </ul>
6.	<p><b>Somatosensory System</b></p> <ul style="list-style-type: none"> <li>➤ Sensory receptor types</li> </ul>	<ul style="list-style-type: none"> <li>➤ Introduction to sensory testing procedures</li> </ul>



	<ul style="list-style-type: none"> <li>➤ Dermatomes and sensory innervation</li> <li>➤ Sensory pathways</li> </ul>	
7.	<p><b>Somatosensation: Clinical Applications</b></p> <ul style="list-style-type: none"> <li>➤ Lesions of the central and peripheral nervous system</li> <li>➤ Pain physiology and science</li> </ul>	<ul style="list-style-type: none"> <li>➤ Review of neurological examination procedure</li> </ul>
<p><b>NON-TEACHING WEEK</b> (note that make-up classes may be scheduled in this week)</p> <p><b>Semester 1</b> – This aligns with the week after Easter so it may fall between Weeks 6 to 8</p> <p><b>Semester 2</b> – The non-teaching week falls between Weeks 7 and 8</p>		
8.	<p><b>Basal Nuclei</b></p> <ul style="list-style-type: none"> <li>➤ Nuclei and circuitry</li> <li>➤ Executive, social, behavioural and emotional functions</li> <li>➤ Basal nuclei disorders</li> </ul> <p><b>Cerebellum and Movement</b></p> <ul style="list-style-type: none"> <li>➤ Anatomy and function of cerebellum</li> <li>➤ Cerebellum disorders</li> </ul>	<ul style="list-style-type: none"> <li>➤ Introduction cerebellar testing</li> </ul>
9.	<p><b>Autonomic Nervous System</b></p> <ul style="list-style-type: none"> <li>➤ Role of medulla, pons, hypothalamus, thalamus and limbic system</li> <li>➤ Sympathetic nervous system</li> <li>➤ Parasympathetic nervous system</li> </ul>	<ul style="list-style-type: none"> <li>➤ Review of neurological examination procedure</li> </ul>
10.	<p><b>The Peripheral Nervous System: Upper Body</b></p> <ul style="list-style-type: none"> <li>➤ Peripheral nerves</li> <li>➤ Cervical Plexus: Structure, muscle innervations and cutaneous distribution</li> <li>➤ Brachial Plexus: Structure, muscle innervations and cutaneous distribution</li> </ul>	<ul style="list-style-type: none"> <li>➤ Introduction to neurodynamic testing</li> </ul>
11.	<p><b>The Peripheral Nervous System: Lower Body</b></p> <ul style="list-style-type: none"> <li>➤ Lumbar plexus: Structure, muscle innervations and cutaneous distribution</li> <li>➤ Sacral plexus: Structure, muscle innervations and cutaneous distribution</li> </ul>	<ul style="list-style-type: none"> <li>➤ Review of neurological examination procedure</li> </ul>
12.	<p><b>Structure, Function and Assessment Of Cranial Nerves: Part 1</b></p> <ul style="list-style-type: none"> <li>➤ CN1-7</li> </ul>	<ul style="list-style-type: none"> <li>➤ Introduction to cranial nerve examination</li> <li>➤</li> </ul>
13.	<p><b>Structure, Function and Assessment Of Cranial Nerves: Part 2</b></p> <ul style="list-style-type: none"> <li>➤ CN8-12</li> </ul>	<ul style="list-style-type: none"> <li>➤ Review of neurological examination procedure</li> </ul>
14.	<b>Non-Teaching Week/Practical Examination Week 1</b>	



	Note that make-up classes may be scheduled in this week
<b>15.</b>	<b>Non-Teaching Week/Practical Examination Week 2</b> Note that make-up classes may be scheduled in this week
<b>16.</b>	<b>Final Examination Week 1</b> Students are required to sit examinations using the Respondus Lockdown Browser software per the <a href="#">Examination Policy – Higher Education</a> . Refer to your local campus calendar for exam opening and closing times.
<b>17.</b>	<b>Final Examination Week 2</b> Students are required to sit examinations using the Respondus Lockdown Browser software per the <a href="#">Examination Policy – Higher Education</a> . Refer to your local campus calendar for exam opening and closing times.