

## UNIT INFORMATION

<b>UNIT CODE</b>	NP544														
<b>UNIT NAME</b>	Introductory Neuroscience														
<b>ASSOCIATED HIGHER EDUCATION AWARDS</b>	Graduate Certificate in Applied Neuroscience														
<b>DURATION</b>	One semester														
<b>LEVEL</b>	Postgraduate														
<b>UNIT COORDINATOR</b>	Toni Neil														
<b>TEACHING STAFF</b>	Peter Janetzki														
<b>CORE / ELECTIVE</b>	Core														
<b>WEIGHTING</b>	Unit credit points 10 (0.125 EFTSL) Course credit points 40 (0.5 EFTSL)														
<b>DELIVERY MODE</b>	Face to face External														
<b>STUDENT WORKLOAD</b>	<p><i>Face to face</i></p> <table> <tr> <td>Contact hours</td> <td>15 hours</td> </tr> <tr> <td>Reading, study and preparation</td> <td>75 hours</td> </tr> <tr> <td>Assignment preparation</td> <td>60 hours</td> </tr> <tr> <td><b>TOTAL</b></td> <td><b>150 hours</b></td> </tr> </table> <p><i>External</i></p> <table> <tr> <td>Engagement with study materials</td> <td>90 hours</td> </tr> <tr> <td>Assignment preparation</td> <td>60 hours</td> </tr> <tr> <td><b>TOTAL</b></td> <td><b>150 hours</b></td> </tr> </table> <p>Student requiring additional English language support are expected to undertake an additional one hour per week.</p>	Contact hours	15 hours	Reading, study and preparation	75 hours	Assignment preparation	60 hours	<b>TOTAL</b>	<b>150 hours</b>	Engagement with study materials	90 hours	Assignment preparation	60 hours	<b>TOTAL</b>	<b>150 hours</b>
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<b>PREREQUISITES / COREQUISITES / RESTRICTIONS</b>	Nil														

## RATIONALE

Recent discoveries in neuroscience have shifted the paradigm of understanding the human brain. This shift points toward a new understanding of human behaviour and mental wellness and has opened new perspectives in both understanding human behaviour, learning and facilitating mental wellness. The interplay between genetic functioning and the environment (epigenetics) opens exciting new options towards understanding the biological mechanisms that lead to assisting people to operate and function at their optimum in all spheres of their lives. This is further enhanced by recent discoveries in regard to the biology of neural plasticity.

This unit provides foundational scientific underpinnings for the theory of applied neuroscience. It focuses on the key principles of neuroscience, understanding the paradigm shift in neural development and the implications for intrapersonal and interpersonal functioning. It further brings to bear a Christian worldview lens on understandings of the human brain, its functioning and the implications for therapeutic engagement.

## LEARNING DELIVERY PROCESS

Learning outcomes will be addressed through on-line modules, via a virtual classroom, and through self-directed learning activities, and assessments. There will be an online lecture every two weeks (weeks 1, 3, 5, 7, 9 & 11), lasting 2.5 hours per session. The alternative weeks you will work through the modules in your own time and pace, so that you are prepared in time for the online classes.

### Some guidelines for lectures:

- The online lectures will be every two weeks for 2.5 hours.
- You will be expected to attend the 6 online lectures. If for some reason you cannot attend the online lecture, it is expected you watch the recording of it in your own time, as well as completing the relevant weekly activity.
- This forms part of your pass grade regarding the 80% attendance criteria.
- The lectures will involve interaction, so please come prepared to contribute and you will get a lot more out of the lectures.
- Please don't be late as this is disruptive for other students and shows a lack of respect for your peers and the staff.

You will be able to work with your lecturer, during the semester, and your lecturer will be available to answer questions and assist you with resources. You may contact your lecturer by email and on-line forums throughout the semester. There are weekly activities (week 1 to week 11) that will appear on the Moodle page, so please watch for your email notifications and check Moodle weekly. These activities are designed to assist with your engagement with content and its application to your sphere of work.

## STUDENT FEEDBACK

You will be given the opportunity to provide feedback on the unit throughout and at the of semester to enable us to continually improve the subject. Feedback from previous years has been vital in reshaping course and unit content, materials and assessments.

## CONTENT

1. Neuroscience: Past and present:
  - The origins of neuroscience.
  - Brief history of neuroscience.
  - Neuroscience today.
  - Brief history of neuropsychotherapy.
  - The fifth force in psychotherapy – neuroscience and neuropsychotherapy.
2. Internal Inter-connectivity and two hemispheres:
  - *Overview of the brain and the nervous system*
    - Brain.
    - Hemispheres.
    - Layers of the brain.
    - Lobes of the cortex.
    - Sets of two in the nervous system.
  - *Two hemispheres*
    - Right hemisphere (affect regulation, procedural learning, valence tagging).
    - Left hemisphere.
    - Right and left working together.
    - Developmental timeline.
3. The triune brain:
  - Layers of the Brain.
  - Brain Development Timeline.

- 4 Lobes of the Cortex.
4. The brain as a working system:
    - Brain function and the bottom up approach.
    - Surviving systems and defences.
    - Thriving systems.
    - *The limbic system*
      - Parts of the limbic system.
      - Functions of parts.
  5. The central nervous system:
    - Central Nervous System and the Peripheral nervous System.
    - The sensory division and the motor division.
    - Exteroceptive and interoceptive.
    - Somatic nervous system and autonomic nervous system.
    - Sympathetic nervous system and the parasympathetic nervous system.
  6. Understanding the working of the autonomic nervous system:
    - The polyvagal system.
    - Sympathetic and parasympathetic branches.
    - Regulation/dysregulation.
    - Window of tolerance.
    - Coping and defences.
  7. Neurochemicals, neural networks, and neural plasticity:
    - The neuron and types of neurons.
    - Types of neuroglia.
    - Grey matter and white matter.
    - Mirror neurons.
    - Neuralplasticity.
    - Neural looping.
  8. The stress response system:
    - *The brain under stress*
      - The HPA axis.
      - Adrenocorticotrophic Hormone & The Pituitary.
      - The polyvagal system and the spinal cord.
      - Cytokines, Immune System & the Hypothalamus.
    - The body under stress.
    - The adrenal system.
  9. Genetics and epigenetics:
    - Chromosomes, genes and alleles.
    - Genes and the environment.
  10. The neuroscience of memory and learning; memory, learning & spirituality:
    - Change and learning.
    - Memory encoding.
    - Procedural learning.
    - Relational schemas and attachment.
    - Molecules to spirituality.
  11. Right brain to right brain interaction:
    - Valence tagging.
    - Transference and countertransference.
  12. Lifestyle factors and neurological health:
    - Lifestyle factors impacting neurological health.
    - Lifestyle and mental health.

## LEARNING OUTCOMES

On completion of this unit, students will have *demonstrated* that they have:

1. Investigated the development of the brain, the concept of “bottom-up” development and the implications of this for practice.
2. Examined the interplay between the genetic makeup and environment for shaping neural activation and the implications in terms of working in the people-helping domain.
3. Developed a core understanding of the neural systems, structures, stress response and neurochemicals, and how they facilitate patterns of emotions and behaviours and provide the guidelines to facilitate change.
4. Examined the research evidence regarding the neuroscience of memory and ways to facilitate changes in memory systems.
5. Critically reflected on the role of the environment, including that engendered by a Christian worldview, to facilitate neural change.
6. Critically reflected on the impact and significance of neuroscientific advances on our understandings of the human condition and the journey to wholeness, including Christian worldview perspectives.
7. Communicated at an appropriate tertiary standard with special attention to correct grammars, punctuation, spelling, vocabulary, usage, sentence structure, logical relations, style, referencing, and presentation.

## ASSESSMENT TASKS

**ALL ASSESSMENTS MUST BE PASSED IN ORDER TO PASS THE UNIT.**

### TASK 1A: WEEKLY ACTIVITIES

You are required to engage in the weekly activities via Moodle, which are designed to reinforce your learning as well as creating a platform for collaborative learning by shared engagement.

Word Length/Duration: N/A  
 Weighting: Pass or Fail  
 Learning Outcomes: 1-7  
 Assessed: Weeks 1 - 12  
 Method of Submission: Moodle

### TASK 1B: META-REFLECTION

You are to write a meta-reflection that synthesises your significant learnings in relation to applying neuroscience to their field of training/interest.

Word Length/Duration: 2,500 words  
 Weighting: 50%  
 Learning Outcomes: 1-7  
 Assessed: Week 14  
 Method of Submission: Turnitin

### TASK 2: CASE STUDY REPORT

You are to write a case study demonstrating your understanding of neurobiology and its implications for applied neuroscience practice.

Word Length/Duration: 3,000 words  
 Weighting: 50%  
 Learning Outcomes: 1-5, 7  
 Assessed: Week 16  
 Method of Submission: Turnitin

## ASSESSMENT ALIGNMENT

Assessment Task	Learning Outcomes	Content	Course Outcomes	Graduate Attributes
Task 1A	1-7	1-10	K1, S5	3, 7
Task 1B	1-7	1-10	K1, S5, S7	3, 5-7
Task 2	1-7	1-12	K1, K4, S5, S6, S7	3, 5-7

## SPECIALIST FACILITIES OR EQUIPMENT

Nil.

## PRESCRIBED TEXTS

Dingman, M. (2019). *Your brain explained*. Nicholas Brealey Publishing.

## RECOMMENDED READINGS

### BOOKS

Barker, R., & Cicchetti, F. (2018). *Neuroanatomy and neuroscience at a glance* (5<sup>th</sup> ed.). Wiley.

Jeeves, M. (2013). *Minds, brains, souls and gods: A conversation on faith, psychology and neuroscience*. IVP Academic.

Kandel, E., Schwartz, J., Jessell, T., Siegelbaum, S., & Hudspeth, A. (Eds.). (2013). *Principles of neural science* (5th ed.). McGraw-Hill Medical.

McHenry, B., Sikorski, A. M., & McHenry, J. (2014). *A counselor's introduction to neuroscience*. Routledge.

Montgomery, A. (2013). *Neurobiology essentials for clinicians: What every therapist needs to know*. Norton.

Sporns, O. (2011). *Networks of the brain*. MIT Press.

### JOURNALS ARTICLES

Rossouw, P. J. (2013). The neuroscience of talking therapies: Implications for therapeutic practice. *The Australian Journal of Counselling Psychology*, 13 (1), 40-50.

### JOURNALS

*International Journal of Neuropsychotherapy*

*Journal of Psychology and Theology*

### OTHER

In addition to the resources above, students should have access to a Bible, preferably a modern translation such as The Holy Bible: The New International Version 2011 (NIV 2011) or The Holy Bible: New King James Version (NKJV).

These and other translations may be accessed free on-line at <http://www.biblegateway.com>. The Bible app from LifeChurch.tv is also available free for smart phones and tablet devices.

SAMPLE