

FIELDS OF STUDY IN NEUROSCIENCE

OVERVIEW

The Bachelor of Science (BSc) majoring in Neuroscience is made up of **twenty** papers with at least 10 papers required above 100-level. You can find the official regulations [here](#) and the degree diagram at the end of this document.

- **Six** of these papers are **required** (three at 100-level and three at 200-level; blue boxes in degree diagram).
- **Six** are **optional** but must come from **prescribed lists** (yellow grouped papers in degree diagram). *Note at least one of CHEM191 or PHSI 191 at 100-level (hatched blue boxes in degree diagram) must be included.
- Of the remaining **eight** papers, three must be at 200-level or above and up to five can be taken outside of Sciences. *Note if you intend to continue with your study by doing a BSc (Hons) in Neuroscience, you need to take five papers at 300-level.

The additional eight papers you choose will depend on your specific interests. If you want to select papers that are within a field of Neuroscience, some suggestions are listed below. Also included are a list of Māori-focused papers you may wish to consider. These papers will increase your cultural understanding which is important for all University graduates in Aotearoa New Zealand.

In each case, you still need to ensure that you meet the paper's entry prerequisites, and you still need to ensure that your chosen papers can be satisfactorily timetabled.

Optional papers you may be interested in choosing are listed below according to subject areas.

Cellular and Molecular Neuroscience

This area of neuroscience focuses on understanding how neurons function at the level of molecules, genes and signalling pathways. It includes the cellular mechanisms that underpin health and disease in the brain.

Suggested optional papers:

100-level: CHEM 191, BIOC 192, STAT 110, STAT 115

200-level: BIOC 221, BIOC 222, BIOC 223, GENE 222, GENE 223, PHAL 211

300-level: ANAT 332, ANAT 335, ANAT 336, ANAT 337, BIOC 351, BIOC 352, BIOC 353, GENE 314, NEUR 303, PHAL 303, PHSL 341, PHSL 342

Cognitive & Behavioural Neuroscience

This area of neuroscience focuses on understanding how thinking and complex behaviours are controlled by brain networks. It also considers how cognitive processes are impacted by changes in the brain throughout development, aging and brain disease.

Suggested optional papers:

100-level: COMP 120, COMP 151, PSYC 112, STAT 110, STAT 115

200-level: INFO 204, PSYC 210, PSYC 212, SPEX 202,

300-level: ANAT 336, ANAT 337, NEUR 303, PSYC 311, PSYC 313, PSYC 317, PSYC 318, PSYC 323, PSYC 319, ZOOL 314

Evolutionary and Comparative Neuroscience

This area of neuroscience studies how nervous systems evolved across a wide range of different organisms.

Suggested optional papers:

100-level: BIOL 112, HUBS 192, STAT 110, STAT 115,

200-level: ZOOL 222, ZOOL 223

300-level: PSYC 319, ZOOL 314

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Structural, Functional or Developmental Neuroscience

This area of neuroscience focuses on understanding the development of the nervous system during embryonic and postnatal life and the implications disrupted development has on nervous system structure and function. It also considers how changes in the structure and the function of the nervous system are related to neurodevelopmental and neurodegenerative brain disorders.

Suggested optional papers:

100-level: HUBS 192

200-level: ANAT 243

300-level: ANAT 334, ANAT 335, ANAT 336, ANAT 337, NEUR 303, PHSL 341, PHSL 342

Neuropharmacology

Neuropharmacology involves the study of the effects of drugs on the nervous system.

Suggested optional papers:

100-level: CHEM 191, BIOC 192

200-level: BIOC 221, BIOC 222, BIOC 223, PHAL 211

300-level: ANAT 335, BIOC 351, BIOC 353, PHAL 303

Neuroendocrinology

Neuroendocrinology involves understanding how the brain regulates the secretion of hormones into the body and how these hormones feedback to regulate brain function.

Suggested optional papers:

100-level: CHEM 191, BIOC 192, HUBS 192

200-level: ANAT 243

300-level: ANAT 333 NEUR 303, PHSL 341, PHSL 342,

Computational Neuroscience

In this field of study, mathematical tools and theories are used to investigate brain function. Concepts from how brain networks are organised are also used to develop computer programs.

Suggested optional papers:

100-level: COMO 101, COMP 120, COMP 150/160, COMP 151, STAT 110, STAT 115,

200-level: COMO 204, INFO 204

300-level: ZOOL 314

Applied and Translational Neuroscience

This broad area of neuroscience studies neural systems/networks using approaches such as brain imaging. The clinical implications and disease states that result from brain system dysfunction are also studied.

Suggested optional papers:

100-level: STAT 110, STAT 115, PHSI 191, PHSI 132

200-level: PHSI 232, SPEX 202

300-level: ANAT 335, ANAT 336, ANAT 337, PHSL 335, PHSL 336, PSYC 323

Māori-focused Papers

In these papers you will develop knowledge regarding te ao Māori and appreciation of biculturalism within the framework of Te Tiriti o Waitangi.

100-level: MAOR 102, MAOR 108, MAOR 120

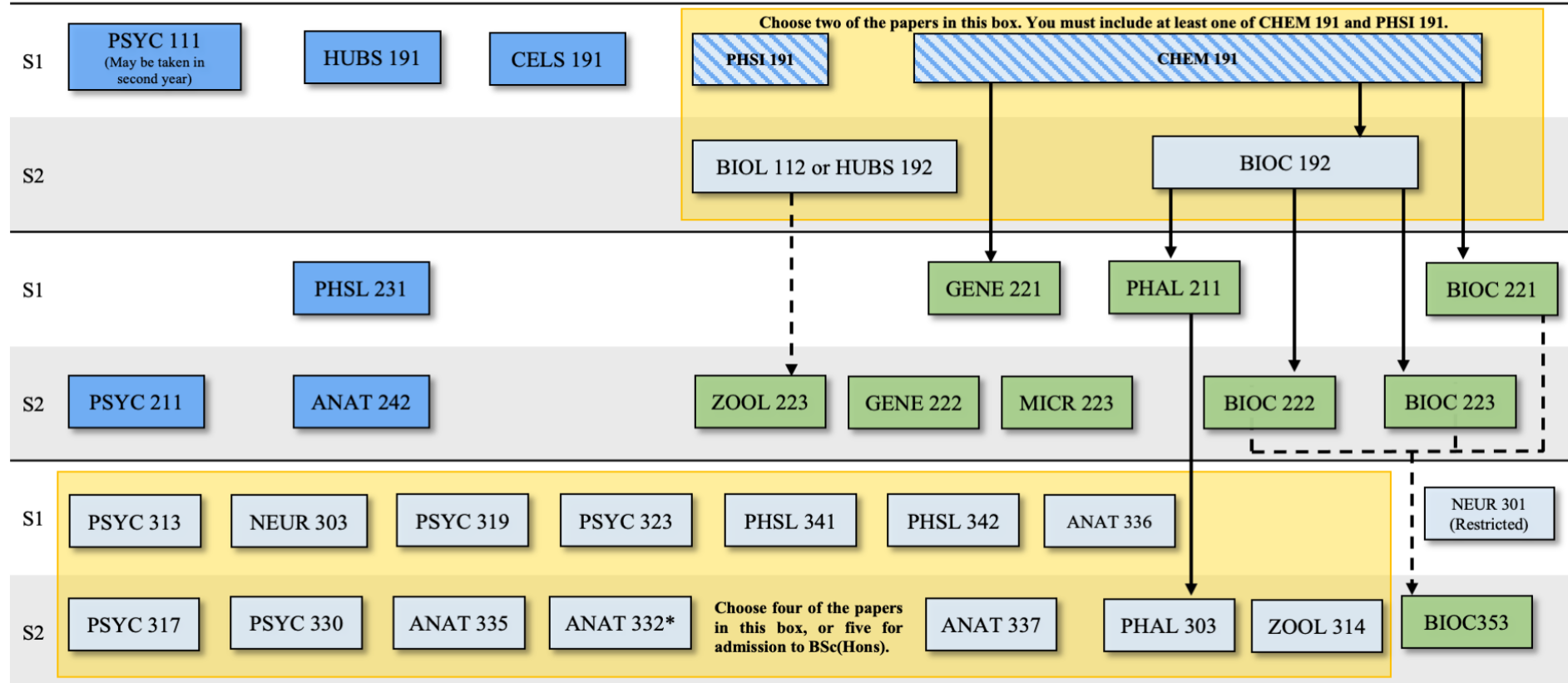
200-level: MAOH 201, PUBH 204, SPEX 206

NEUROSCIENCE

Te Kaupapa Pūtaiao Io

Neuroscience Major

Neuroscience Programme
neuroscience@otago.ac.nz
www.otago.ac.nz/neuroscience



Prerequisites

- It is assumed that you have passed the major subject requirements in preceding semesters.
- Arrows indicate prerequisites that are not fulfilled by just the major subject requirements. Dashed arrows indicate that more than one paper can serve as the prerequisite.
- For neuroscience students, the prerequisite(s) for:
 - *ANAT 332 is a B+ or better in ANAT 242;
 - PSYC 211 is PSYC 111
 - ZOO 223 are CELS 191 and (BIOL 112 or (HUBS 191 or 192 with at least a B)).

BSc requirements

A total of 360 points (20 papers) with at least 180 points (10 papers) above 100-level.




Note: No more than three 300-level papers with the same subject code (other than NEUR) may count towards the major subject requirements. Very occasionally, one of these papers may not be on offer in any given year, when a lecturer is on RSL.

Required, Optional, and Recommended Papers for the Neuroscience Major

- Required papers.
- Chosen papers – number that must be taken specified in the yellow boxes (may take more if desired).
- Recommended papers – additional papers that support the neuroscience major (not required).

Considering Postgraduate Study in Neuroscience?

The postgraduate programmes available in neuroscience include: the PGDipSci, BSc(Hons), MSc, and PhD. For BSc(Hons), you must take five 300-level chosen papers. NEUR 301 counts as one of the five and is highly recommended to students with excellent grades who intend to undertake postgraduate study. You can find more information at: www.otago.ac.nz/neuroscience/postgraduate.

Level	Paper Code	Paper Title	Points
100-level	CELS 191	Cell and Molecular Biology	18
	HUBS 191	Human Body Systems 1	18
	PSYC 111	Brain and Behaviour	18
	Either CHEM 191 or PHSI 191	The Chemical Basis of Biology and Human Health Biological Physics	18
	One other paper from:		
	BIOC 192	Foundations of Biochemistry	
	BIOL 112	Animal Biology	
200-level	HUBS 192	Human Body Systems 2	18
	CHEM 191	The Chemical Basis of Biology and Human Health	
	PHSI 191	Biological Physics	
	ANAT 242	Neurobiology	18
	PHSL 231	Neurophysiology	18
	PSYC 211	Brain and Cognition	18
	BIOC 221	Molecular Biology	
	BIOC 222	Proteins in Industry and Medicine	
	BIOC 223	Cellular Biochemistry and Metabolism	
	GENE 221	Molecular and Microbial Genetics	
	GENE 222	Genes, Chromosomes, and Populations	
	MICR 223	Infection and Immunity	
	PHAL 211	Introductory Pharmacology	
	ZOOL 223	Animal Physiology	
300-level	Four (or 5 for Hons entry) of:		72
	ANAT 332	Cell Biology	
	ANAT 335	Neurobiology	
	ANAT 336	Selected Topics in Neurobiology (first semester)	
	ANAT 337	Selected Topics in Neurobiology (second semester)	
	NEUR 303	Neuroendocrinology	
	PHAL 303	Neuropharmacology	
	PHSL 341	Molecular, Cellular and Integrative Neurophysiology I	
	PHSL 342	Molecular, Cellular and Integrative Neurophysiology II	
	PSYC 313	Cognition and Neuropsychology	
	PSYC 317	Biopsychology	
	PSYC 319	Comparative Cognition	
	PSYC 323	Sensation and Perception	
	PSYC 330	Drugs, Behaviour, Addiction, and Policy	
	ZOOL 314	Neurobiology	
NEUR301 (Hons admission)	Current Topics in Neuroscience		
BIOC 353	Molecular Basis of Health and Disease		
Plus	144 further points; must include 54 points at 200-level or above. Up to 90 points may be taken from outside Science.		144
Total			360
	 Required papers	<u>Contact</u>	
	 Chosen papers	Programme Administrator	
	 Recommended papers	neuroscience@otago.ac.nz	