

SCAN Foundations

PSYCH 511.003 Spring 2025

2025-12-05

Foundations of Social, Cognitive, and Affective Neuroscience (SCAN)

Instructor

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Meeting Location and Time

467 Moore Thursdays, 1-4 PM

About the course

The first scientific psychologists were physiologists fascinated by the possibility of understanding the mind by studying the brain. In this course, we will explore the historical roots and contemporary challenges associated with the study of biological approaches to complex adaptive behavior. In doing so, we will read and examine critically primary source readings that discuss basic patterns and processes of brain structure and function. The goal is to provide students with a basic foundation of knowledge about the structures and functions of the nervous system that can provide the basis for future study.

This course is one of two required courses for the [Specialization in Cognitive and Affective Neuroscience \(SCAN\)](#).

Prerequisites

Undergraduate coursework in neuroscience or physiological psychology such as the equivalents of PSYCH 260 or BIO 469/470.

January 13-17

Thursday, January 16

Topics

- Structure of the course
- Levels of analysis
- Causality in brain and behavior
- Does neuroscience need behavior? If so, what does psychology need?

Readings

- Required:
 - Krakauer et al. (2017)
 - Parada and Rossi (2018)
- Optional:
 - Siddiqi et al. (2022)
 - Churchland and Sejnowski (1988)
 - Favela (2020)
 - Ross and Bassett (2024)

Materials

- [Slides](#)
- [Exercise 01](#) assigned | [PDF](#) |

January 20-24

Wednesday, January 22

- [Exercise 01](#) write-up due | [Canvas dropbox](#) |

Thursday, January 23

Topics

- Neuroanatomy lab

Readings

- [Neuroanatomy notes](#)

Materials

- [Slides](#). [PDF](#)
- [Allen Brain Atlas](#).
- [Exercise 02](#) distributed | [PDF](#) |

January 27-31

Wednesday, January 29

- [Exercise 02](#) due | [Canvas dropbox](#) |

Thursday, January 30

Topics

- Cellular neuroscience I
 - Anatomy
 - Physiology
 - * Resting potential

Readings

- [Cellular neuroscience notes](#) | [PDF](#) |
- Optional:
 - Zeng and Sanes (2017)
 - Oliveira et al. (2015)
 - Distéfano-Gagné et al. (2023)

Materials

- [Slides](#) | [PDF](#) |
- [Exercise 03](#) distributed. | [PDF](#) |

February 3-7

Thursday, February 06

Topics

- Cellular neuroscience II
 - Action potential
 - Synaptic transmission
- [Exercise 04](#) assigned. | [PDF](#) |

Readings

- [Cellular neuroscience notes](#)

Materials

- [Slides](#)

February 10-14

Wednesday, February 12

- [Exercise 03](#) write-up due. | [Canvas dropbox](#) |

Thursday, February 13

Topics

- Neurochemistry
 - Neurotransmitters
 - Hormones
- Neurocomputing

Readings

- [Neurochemistry notes](#)
- Optional: Sarkar et al. (2016).

Materials

- [Slides](#)
- [Exercise 05](#) distributed | [PDF](#) |

February 17-21

Wednesday, February 19

- [Exercise 04](#) write-up due | [Canvas dropbox](#) |

Thursday, February 20

Topics

- Methods in neuroscience

Readings

- Watch: MITCBMM (2019)
- Review: “Cognitive Psychology and Cognitive Neuroscience/Behavioural and Neuroscience Methods” (n.d.)
- Recommended:
 - Cohen (2017)
 - Hillman (2014)
- Optional:
 - Koch et al. (2022)

Materials

- [Methods notes](#)
- [Exercise 06](#) distributed | [PDF](#) |

February 24-28

Wednesday, February 26

- [Exercise 05](#) write-up due | [Canvas dropbox](#) |

Thursday, February 27

Topics

- Evolution of the nervous system

Readings

- Required:
 - Charvet and Finlay (2012)
 - Hofman (2014)
- Optional:
 - Castrillon et al. (2023)

Materials

- [Notes](#)
- [Exercise 07](#) distributed | [PDF](#) |

March 3-7

Wednesday, March 05

- [Exercise 06](#) write-up due | [Canvas dropbox](#) |
- [Final project](#) proposal due

Thursday, March 06

Topics

- Development of the nervous system

Readings

- Required:
 - Cao, Huang, and He (2017)
 - Blumberg and Adolph (2023)
- Optional:
 - Larsen et al. (2023)
 - Rakic (2009)

Materials

- [Notes](#)
- [Exercise 06](#) distributed | [PDF](#) |

March 10-14 *Spring Break*

March 17-21

Wednesday, March 19

- [Exercise 07](#) write-up due | [Canvas dropbox](#) |

Thursday, March 20

NO CLASS

March 24-28

Wednesday, March 26

- [Exercise 08](#) write-up due | [Canvas dropbox](#) |

Thursday, March 27

Topics

- Perception & action

Readings

- Khalsa et al. (2018)
- Shenoy, Sahani, and Churchland (2013)

Materials

- [Perception notes](#)
- [Action notes](#)

March 31 - April 4

Thursday, April 03

Topics

- Cognition & Language

Readings

- Miller and Cohen (2001)
- Tuckute, Kanwisher, and Fedorenko (2024)

Materials

- [Notes](#)

April 7-11

Thursday, April 10

Topics

- Neuroscience of emotion

Readings

- Malezieux, Klein, and Gogolla (2023)
- Watabe-Uchida, Eshel, and Uchida (2017)

Materials

- [Notes](#)

April 14-18

Thursday, April 17

Topics

- Disorder & disease I

Readings

- Howes, Bukala, and Beck (2023)
- Volk et al. (2015)

Materials

- [Notes](#)

April 21-25

Thursday, April 24

Topics

- Disorder & disease II

Readings

- Moncrieff et al. (2022)
- Namkung, Kim, and Sawa (2017)

Materials

- [Notes](#)

April 28 - May 2

Thursday, May 01

Topics

- Student presentations
 - Madison Miles: *A brief overview of psychotropic medications*
 - Yifei Gong: *When meaning shifts and language switches: Investigating the role of domain-general inhibitory control in bilingual prediction errors*
- Beethoven and the Cerebral Symphony

Materials

- [Slides](#)

May 4-9

Thursday, May 08

- [Final Project](#) write-up due | [Canvas dropbox](#)

References

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