

Cognitive Science

This section presents the requirements for programs in:

- **Cognitive Science with Concentration in Philosophical and Conceptual Issues Bachelor of Cognitive Science Honours**
- **Cognitive Science with Concentration in Language and Linguistics Bachelor of Cognitive Science Honours**
- **Cognitive Science with Concentration in the Biological Foundations of Cognition Bachelor of Cognitive Science Honours**
- **Cognitive Science with Concentration in Cognition and Psychology Bachelor of Cognitive Science Honours**
- **Cognitive Science with Concentration in Cognition and Computation Bachelor of Cognitive Science Honours**
- **Cognitive Science Bachelor of Cognitive Science**
- **Stream in Artificial Intelligence and Cognitive Modelling**
- **Post-Baccalaureate Diploma in Cognitive Science**

Program Requirements

Cognitive Science with Concentration in Philosophical and Conceptual Issues

Bachelor of Cognitive Science Honours (20.0 credits)

A. Credits Included in the Major CGPA (15.5 credits)

1. 1.0 credit from:	1.0
CGSC 1001 [0.5]	Mysteries of the Mind
FYSM 1607 [1.0]	Cognitive Science: Thinking and Knowing
PHIL 1301 [0.5]	Mind, World, and Knowledge
2. 1.0 credit in:	1.0
CGSC 2001 [0.5]	Theories in Cognitive Science
CGSC 2002 [0.5]	Methods in Cognitive Science
3. 1.5 credits in:	1.5
CGSC at the 3000-level or above	
4. 0.5 credit from:	0.5
CGSC 1005 [0.5]	Computational Methods in Cognitive Science
COMP 1005 [0.5]	Introduction to Computer Science I
5. 0.5 credit in:	0.5
CGSC 3601 [0.5]	Artificial Intelligence and Cognitive Science
6. 0.5 credit in:	0.5
LING 1001 [0.5]	Introduction to Linguistics I
7. 1.0 credit in:	1.0
LING 2005 [0.5]	Linguistic Analysis
LING 2007 [0.5]	Phonetics
8. 1.0 credit in:	1.0
PHIL 2001 [0.5]	Introduction to Logic
PHIL 2501 [0.5]	Introduction to Philosophy of Mind
9. 0.5 credit from:	0.5
CGSC 3004 [0.5]	Philosophy and Cognitive Science
PHIL 2301 [0.5]	Introduction to the Philosophy of Science

PHIL 2504 [0.5]	Language and Communication
PHIL 3104 [0.5]	The Roots of Analytic Philosophy
PHIL 3301 [0.5]	Issues in the Philosophy of Science
PHIL 3306 [0.5]	Symbolic Logic
PHIL 3501 [0.5]	Philosophy of Cognitive Science
PHIL 3502 [0.5]	Mind and Action
PHIL 3504 [0.5]	Pragmatics
PHIL 3506 [0.5]	Semantics
PHIL 3530 [0.5]	Philosophy of Language
10. 1.5 credits in:	1.5
PSYC 1001 [0.5]	Introduction to Psychology I
PSYC 1002 [0.5]	Introduction to Psychology II
PSYC 2700 [0.5]	Introduction to Cognitive Psychology
11. 0.5 credit from:	0.5
NEUR 1202 [0.5]	Neuroscience of Mental Health and Psychiatric Disease
PSYC 2307 [0.5]	Human Neuropsychology I
12. 1.5 credits from:	1.5
a. Thesis pathway	
CGSC 3908 [0.5]	Honours Seminar in Cognitive Science
CGSC 4908 [1.0]	Honours Thesis
OR	
b. Project pathway	
CGSC 4909 [1.0]	Honours Project
and 0.5 credit in CGSC at the 3000-level or above	
OR	
c. Coursework pathway	
1.5 credits in CGSC at the 3000-level or above	
13. 4.5 credits in the concentration:	4.5
a. 4.0 credits from:	
CGSC 3004 [0.5]	Philosophy and Cognitive Science
PHIL 2301 [0.5]	Introduction to the Philosophy of Science
PHIL 2504 [0.5]	Language and Communication
PHIL 2540 [0.5]	Personal Identity and the Self
PHIL 3104 [0.5]	The Roots of Analytic Philosophy
PHIL 3140 [0.5]	Epistemology
PHIL 3301 [0.5]	Issues in the Philosophy of Science
PHIL 3306 [0.5]	Symbolic Logic
PHIL 3501 [0.5]	Philosophy of Cognitive Science
PHIL 3502 [0.5]	Mind and Action
PHIL 3504 [0.5]	Pragmatics
PHIL 3506 [0.5]	Semantics
PHIL 3530 [0.5]	Philosophy of Language
b. 0.5 credit from:	
PHIL 4055 [0.5]	Lexical Semantics
PHIL 4210 [0.5]	Seminar in Philosophy of Language or Linguistics
PHIL 4220 [0.5]	Seminar in philosophy of Mind or Cognition
PHIL 4230 [0.5]	Seminar in Metaphysics, Epistemology, or Philosophy of Science
PHIL 4503 [0.5]	Special Topic in Philosophy of Computing
PHIL 4505 [0.5]	Formal Semantics

B. Credits not included in the Major (4.5 credits)	
14. 4.5 credits in free electives.	4.5
Total Credits	20.0

Note: normally, students may not offer more than one credit of independent study (eg. CGSC 4801 Independent Study and CGSC 4802 Independent Study) in their total program, including independent study credits taken through other departments.

Cognitive Science with Concentration in Language and Linguistics Bachelor of Cognitive Science Honours (20.0 credits)

A. Credits Included in the Major CGPA (15.5 credits)	
1. 1.0 credit from:	1.0
CGSC 1001 [0.5] Mysteries of the Mind	
FYSM 1607 [1.0] Cognitive Science: Thinking and Knowing	
PHIL 1301 [0.5] Mind, World, and Knowledge	
2. 1.0 credit in:	1.0
CGSC 2001 [0.5] Theories in Cognitive Science	
CGSC 2002 [0.5] Methods in Cognitive Science	
3. 1.5 credits in:	1.5
CGSC at the 3000-level or above	
4. 0.5 credit from:	0.5
CGSC 1005 [0.5] Computational Methods in Cognitive Science	
COMP 1005 [0.5] Introduction to Computer Science I	
5. 0.5 credit in:	0.5
CGSC 3601 [0.5] Artificial Intelligence and Cognitive Science	
6. 0.5 credit in:	0.5
LING 1001 [0.5] Introduction to Linguistics I	
7. 1.0 credit in:	1.0
LING 2005 [0.5] Linguistic Analysis	
LING 2007 [0.5] Phonetics	
8. 1.0 credit in:	1.0
PHIL 2001 [0.5] Introduction to Logic	
PHIL 2501 [0.5] Introduction to Philosophy of Mind	
9. 0.5 credit from:	0.5
CGSC 3004 [0.5] Philosophy and Cognitive Science	
PHIL 2301 [0.5] Introduction to the Philosophy of Science	
PHIL 2504 [0.5] Language and Communication	
PHIL 3104 [0.5] The Roots of Analytic Philosophy	
PHIL 3301 [0.5] Issues in the Philosophy of Science	
PHIL 3306 [0.5] Symbolic Logic	
PHIL 3501 [0.5] Philosophy of Cognitive Science	
PHIL 3502 [0.5] Mind and Action	
PHIL 3504 [0.5] Pragmatics	
PHIL 3506 [0.5] Semantics	
PHIL 3530 [0.5] Philosophy of Language	
10. 1.5 credits in:	1.5
PSYC 1001 [0.5] Introduction to Psychology I	
PSYC 1002 [0.5] Introduction to Psychology II	
PSYC 2700 [0.5] Introduction to Cognitive Psychology	
11. 0.5 credit from:	0.5

NEUR 1202 [0.5] Neuroscience of Mental Health and Psychiatric Disease	
PSYC 2307 [0.5] Human Neuropsychology I	
12. 1.5 credits from:	1.5
a. Thesis pathway	
CGSC 3908 [0.5] Honours Seminar in Cognitive Science	
CGSC 4908 [1.0] Honours Thesis	
OR	
b. Project pathway	
CGSC 4909 [1.0] Honours Project	
and 0.5 credit in CGSC at the 3000-level or above	
OR	
c. Coursework pathway	
1.5 credits in CGSC at the 3000-level or above	
13. 4.5 credits in the concentration:	4.5
a. 2.5 credits in:	
LING 3004 [0.5] Syntax I	
LING 3005 [0.5] Morphology I	
LING 3007 [0.5] Phonology I	
LING 3505 [0.5] Semantics	
LING 3601 [0.5] Language Processing and the Brain	
b. 1.0 credit from:	
LING 2604 [0.5] Communication Differences and Disabilities I	
LING 3604 [0.5] Communication Differences and Disabilities II	
LING 3504 [0.5] Pragmatics	
LING 3603 [0.5] Child Language	
c. 1.0 credit from:	
LING 4004 [0.5] Syntax II	
LING 4005 [0.5] Morphology II	
LING 4007 [0.5] Phonology II	
LING 4505 [0.5] Formal Semantics	
LING 4510 [0.5] Lexical Semantics	
LING 4601 [0.5] Cognitive Neuroscience of Language	
LING 4603 [0.5] First Language Acquisition	
LING 4605 [0.5] Psycholinguistic Research Methods	
LING 4606 [0.5] Statistics for Language Research	
B. Credits not included in the Major (4.5 credits)	
14. 4.5 credits in free electives	4.5
Total Credits	20.0

Note: Normally, students may not offer more than one credit of independent study (eg. CGSC 4801 [0.5] Independent Study and CGSC 4802 [0.5] Independent Study) in their total program, including independent study credits taken through other departments.

Cognitive Science with Concentration in the Biological Foundations of Cognition Bachelor of Cognitive Science Honours (20.0 credits)

A. Credits Included in the Major GPA (15.5 credits)	
1. 1.0 credit from:	1.0
CGSC 1001 [0.5] Mysteries of the Mind	

FYSM 1607 [1.0]	Cognitive Science: Thinking and Knowing	
PHIL 1301 [0.5]	Mind, World, and Knowledge	
2. 1.0 credit in:		1.0
CGSC 2001 [0.5]	Theories in Cognitive Science	
CGSC 2002 [0.5]	Methods in Cognitive Science	
3. 1.5 credits in:		1.5
CGSC at the 3000-level or above		
4. 0.5 credit from:		0.5
CGSC 1005 [0.5]	Computational Methods in Cognitive Science	
COMP 1005 [0.5]	Introduction to Computer Science I	
5. 0.5 credit in:		0.5
CGSC 3601 [0.5]	Artificial Intelligence and Cognitive Science	
6. 0.5 credit in:		0.5
LING 1001 [0.5]	Introduction to Linguistics I	
7. 1.0 credit in:		1.0
LING 2005 [0.5]	Linguistic Analysis	
LING 2007 [0.5]	Phonetics	
8. 1.0 credit in:		1.0
PHIL 2001 [0.5]	Introduction to Logic	
PHIL 2501 [0.5]	Introduction to Philosophy of Mind	
9. 0.5 credit from:		0.5
CGSC 3004 [0.5]	Philosophy and Cognitive Science	
PHIL 2301 [0.5]	Introduction to the Philosophy of Science	
PHIL 2504 [0.5]	Language and Communication	
PHIL 3104 [0.5]	The Roots of Analytic Philosophy	
PHIL 3301 [0.5]	Issues in the Philosophy of Science	
PHIL 3306 [0.5]	Symbolic Logic	
PHIL 3501 [0.5]	Philosophy of Cognitive Science	
PHIL 3502 [0.5]	Mind and Action	
PHIL 3504 [0.5]	Pragmatics	
PHIL 3506 [0.5]	Semantics	
PHIL 3530 [0.5]	Philosophy of Language	
10. 1.5 credits in:		1.5
PSYC 1001 [0.5]	Introduction to Psychology I	
PSYC 1002 [0.5]	Introduction to Psychology II	
PSYC 2700 [0.5]	Introduction to Cognitive Psychology	
11. 0.5 credit in:		0.5
NEUR 1202 [0.5]	Neuroscience of Mental Health and Psychiatric Disease	
12. 1.5 credits from:		1.5
a. Thesis pathway		
CGSC 3908 [0.5]	Honours Seminar in Cognitive Science	
CGSC 4908 [1.0]	Honours Thesis	
OR		
b. Project Pathway		
CGSC 4909 [1.0]	Honours Project and 0.5 credit in CGSC at the 3000-level or above	
OR		
c. Coursework pathway		
1.5 credits in CGSC at the 3000-level or above		
13. 4.5 credits in the concentration:		4.5
a. 0.5 credit in:		

NEUR 1203 [0.5]	Neuroscience of Mental Health and Neurological Disease	
b. 3.0 credits in:		
NEUR 2001 [0.5]	Introduction to Research Methods in Neuroscience	
NEUR 2002 [0.5]	Introduction to Statistics in Neuroscience	
NEUR 2201 [0.5]	Cellular and Molecular Neuroscience	
NEUR 2202 [0.5]	Neurodevelopment and Plasticity	
NEUR 3001 [0.5]	Data Analysis in Neuroscience I	
NEUR 3002 [0.5]	Data Analysis in Neuroscience II	
c. 1.0 credit from:		
NEUR 2801 [0.5]	Neuroscience and Creativity	
NEUR 3204 [0.5]	Neuropharmacology	
NEUR 3206 [0.5]	Sensory and Motor Neuroscience	
NEUR 3207 [0.5]	Systems Neuroscience	
NEUR 3303 [0.5]	The Neuroscience of Consciousness	
PSYC 3307 [0.5]	Human Neuropsychology II	
PSYC 3709 [0.5]	Language Processing and the Brain	
B. Credits Not Included in the Major CGPA (4.5 credits)		
14. 4.5 credits in free electives.		4.5
Total Credits		20.0

Note: normally, students may not offer more than one credit of independent study (eg. CGSC 4801 Independent Study and CGSC 4802 Independent Study) in their total program, including independent study credits taken through other departments.

Cognitive Science with Concentration in Cognition and Psychology Bachelor of Cognitive Science Honours (20.0 credits)

A. Credits Included in the Major CGPA (15.5 credits)		
1. 1.0 credit from:		1.0
CGSC 1001 [0.5]	Mysteries of the Mind	
FYSM 1607 [1.0]	Cognitive Science: Thinking and Knowing	
PHIL 1301 [0.5]	Mind, World, and Knowledge	
2. 1.0 credit in:		1.0
CGSC 2001 [0.5]	Theories in Cognitive Science	
CGSC 2002 [0.5]	Methods in Cognitive Science	
3. 1.5 credits in:		1.5
CGSC at the 3000-level or above		
4. 0.5 credit from:		0.5
CGSC 1005 [0.5]	Computational Methods in Cognitive Science	
COMP 1005 [0.5]	Introduction to Computer Science I	
5. 0.5 credit in:		0.5
CGSC 3601 [0.5]	Artificial Intelligence and Cognitive Science	
6. 0.5 credit in:		0.5
LING 1001 [0.5]	Introduction to Linguistics I	
7. 1.0 credit in:		1.0
LING 2005 [0.5]	Linguistic Analysis	
LING 2007 [0.5]	Phonetics	

8. 1.0 credit in:	1.0
PHIL 2001 [0.5]	Introduction to Logic
PHIL 2501 [0.5]	Introduction to Philosophy of Mind
9. 0.5 credit from:	0.5
CGSC 3004 [0.5]	Philosophy and Cognitive Science
PHIL 2301 [0.5]	Introduction to the Philosophy of Science
PHIL 2504 [0.5]	Language and Communication
PHIL 3104 [0.5]	The Roots of Analytic Philosophy
PHIL 3301 [0.5]	Issues in the Philosophy of Science
PHIL 3306 [0.5]	Symbolic Logic
PHIL 3501 [0.5]	Philosophy of Cognitive Science
PHIL 3502 [0.5]	Mind and Action
PHIL 3504 [0.5]	Pragmatics
PHIL 3506 [0.5]	Semantics
PHIL 3530 [0.5]	Philosophy of Language
10. 1.5 credits in:	1.5
PSYC 1001 [0.5]	Introduction to Psychology I
PSYC 1002 [0.5]	Introduction to Psychology II
PSYC 2700 [0.5]	Introduction to Cognitive Psychology
11. 0.5 credit from:	0.5
NEUR 1202 [0.5]	Neuroscience of Mental Health and Psychiatric Disease
PSYC 2307 [0.5]	Human Neuropsychology I
12. 1.5 credits from:	1.5
a. Thesis pathway	
CGSC 3908 [0.5]	Honours Seminar in Cognitive Science
CGSC 4908 [1.0]	Honours Thesis
OR	
b. Project pathway	
CGSC 4909 [1.0]	Honours Project
and 0.5 credit in CGSC at the 3000-level or above	
OR	
c. Coursework pathway	
1.5 credits in CGSC at the 3000-level or above	
13. 4.5 credits in the concentration:	4.5
a. 2.0 credits in:	
PSYC 2001 [0.5]	Introduction to Research Methods in Psychology
PSYC 2002 [0.5]	Introduction to Statistics in Psychology
PSYC 3000 [1.0]	Design and Analysis in Psychological Research
b. 0.5 credit in PSYC at the 2000-level or above	
c. 2.0 credits from:	
PSYC 3700 [1.0]	Cognition (Honours Seminar)
PSYC 3307 [0.5]	Human Neuropsychology II
PSYC 3506 [0.5]	Cognitive Development
PSYC 3508 [0.5]	Child Language
PSYC 3702 [0.5]	Perception
PSYC 3709 [0.5]	Language Processing and the Brain
NEUR 3303 [0.5]	The Neuroscience of Consciousness
B. Credits Not Included in the Major CGPA (4.5 credits)	

14. 4.5 credits in free electives.	4.5
Total Credits	20.0
Note: Normally, students may not offer more than one credit of independent study (eg. CGSC 4801 [0.5] Independent Study and CGSC 4802 [0.5] Independent Study) in their total program, including independent study credits taken through other departments.	
Cognitive Science with Concentration in Cognition and Computation	
Bachelor of Cognitive Science Honours (20.0 credits)	
A. Credits Included in the Major CGPA (15.5 credits)	
1. 1.0 credit from:	1.0
CGSC 1001 [0.5]	Mysteries of the Mind
FYSM 1607 [1.0]	Cognitive Science: Thinking and Knowing
PHIL 1301 [0.5]	Mind, World, and Knowledge
2. 1.0 credit in:	1.0
CGSC 2001 [0.5]	Theories in Cognitive Science
CGSC 2002 [0.5]	Methods in Cognitive Science
3. 1.5 credits in:	1.5
CGSC at the 3000-level or above	
4. 0.5 credit in:	0.5
COMP 1005 [0.5]	Introduction to Computer Science I
5. 0.5 credit in:	0.5
CGSC 3601 [0.5]	Artificial Intelligence and Cognitive Science
6. 0.5 credit in:	0.5
LING 1001 [0.5]	Introduction to Linguistics I
7. 1.0 credit in:	1.0
LING 2005 [0.5]	Linguistic Analysis
LING 2007 [0.5]	Phonetics
8. 1.0 credit in:	1.0
PHIL 2001 [0.5]	Introduction to Logic
PHIL 2501 [0.5]	Introduction to Philosophy of Mind
9. 0.5 credit from:	0.5
PHIL 2301 [0.5]	Introduction to the Philosophy of Science
PHIL 2504 [0.5]	Language and Communication
PHIL 3104 [0.5]	The Roots of Analytic Philosophy
PHIL 3301 [0.5]	Issues in the Philosophy of Science
PHIL 3306 [0.5]	Symbolic Logic
PHIL 3501 [0.5]	Philosophy of Cognitive Science
PHIL 3502 [0.5]	Mind and Action
PHIL 3504 [0.5]	Pragmatics
PHIL 3506 [0.5]	Semantics
PHIL 3530 [0.5]	Philosophy of Language
CGSC 3004 [0.5]	Philosophy and Cognitive Science
10. 1.5 credits in:	1.5
PSYC 1001 [0.5]	Introduction to Psychology I
PSYC 1002 [0.5]	Introduction to Psychology II
PSYC 2700 [0.5]	Introduction to Cognitive Psychology
11. 0.5 credit from:	0.5
PSYC 2307 [0.5]	Human Neuropsychology I
NEUR 1202 [0.5]	Neuroscience of Mental Health and Psychiatric Disease

12. 1.5 credits from:	1.5
a. Thesis pathway	
CGSC 3908 [0.5]	Honours Seminar in Cognitive Science
CGSC 4908 [1.0]	Honours Thesis
OR	
b. Project pathway	
CGSC 4909 [1.0]	Honours Project
and 0.5 credit in CGSC at the 3000-level or higher	
OR	
c. Coursework pathway	
1.5 credits in CGSC at the 3000-level or higher	
13. 4.5 credits in the concentration:	4.5
a. 0.5 credit in:	
COMP 1006 [0.5]	Introduction to Computer Science II
b. 0.5 credit in COMP at the 1000-level or higher	
c. 2.0 credits from:	
COMP 2401 [0.5]	Introduction to Systems Programming
COMP 2402 [0.5]	Abstract Data Types and Algorithms
COMP 2404 [0.5]	Introduction to Software Engineering
COMP 2406 [0.5]	Fundamentals of Web Applications
COMP 2804 [0.5]	Discrete Structures II
COMP 3008 [0.5]	Human-Computer Interaction
d. 1.0 credit in COMP at the 2000-level or higher	
e. 0.5 credit in COMP at the 3000-level or higher	
B. Credits not included in the Major CGPA (4.5 credits)	
14. 4.5 credits in free electives	4.5
Total Credits	20.0

Note: Normally, students may not offer more than one credit of independent study (eg. CGSC 4801 Independent Study and CGSC 4802 Independent Study) in their total program, including independent study credits taken through other departments.

Cognitive Science Bachelor of Cognitive Science (15.0 credits)

A. Credits Included in the Major CGPA (9.0 credits)

1. 1.0 credit from:	1.0
CGSC 1001 [0.5]	Mysteries of the Mind
FYSM 1607 [1.0]	Cognitive Science: Thinking and Knowing
PHIL 1301 [0.5]	Mind, World, and Knowledge
2. 1.0 credit in:	1.0
CGSC 2001 [0.5]	Theories in Cognitive Science
CGSC 2002 [0.5]	Methods in Cognitive Science
3. 1.5 credits in CGSC at the 3000-level or above	1.5
4. 0.5 credit from:	0.5
CGSC 1005 [0.5]	Computational Methods in Cognitive Science
COMP 1005 [0.5]	Introduction to Computer Science I
5. 1.5 credits in:	1.5
LING 1001 [0.5]	Introduction to Linguistics I
LING 2005 [0.5]	Linguistic Analysis
LING 2007 [0.5]	Phonetics
6. 1.0 credit in:	1.0

PHIL 2001 [0.5]	Introduction to Logic
PHIL 2501 [0.5]	Introduction to Philosophy of Mind
7. 0.5 credit from:	0.5
CGSC 3004 [0.5]	Philosophy and Cognitive Science
PHIL 2301 [0.5]	Introduction to the Philosophy of Science
PHIL 2504 [0.5]	Language and Communication
PHIL 3104 [0.5]	The Roots of Analytic Philosophy
PHIL 3301 [0.5]	Issues in the Philosophy of Science
PHIL 3306 [0.5]	Symbolic Logic
PHIL 3501 [0.5]	Philosophy of Cognitive Science
PHIL 3502 [0.5]	Mind and Action
PHIL 3504 [0.5]	Pragmatics
PHIL 3506 [0.5]	Semantics
PHIL 3530 [0.5]	Philosophy of Language
8. 1.5 credits in:	1.5
PSYC 1001 [0.5]	Introduction to Psychology I
PSYC 1002 [0.5]	Introduction to Psychology II
PSYC 2700 [0.5]	Introduction to Cognitive Psychology
9. 0.5 credit from:	0.5
NEUR 1202 [0.5]	Neuroscience of Mental Health and Psychiatric Disease
PSYC 2307 [0.5]	Human Neuropsychology I
B. Credits Not Included in the Major CGPA (6.0 credits)	
10. 6.0 credits in free electives	6.0
Total Credits	15.0

Stream in Artificial Intelligence and Cognitive Modelling (1.5 credits)

The stream in Artificial Intelligence and Cognitive Modelling has limited enrollment and is restricted to students who are registered in the B.Cog.Sc. or B.Cog.Sc. Honours program, have attained third-year standing, have a Major CGPA of 8.00 or above, and Departmental approval.

Students enrolled in the stream must satisfy the requirements for the Bachelor of Cognitive Science or the Bachelor of Cognitive Science (Honours), including the credit requirement for their Concentration (Honours) through appropriate choice of courses.

1. 1.5 credits in:	1.5
CGSC 3603 [0.5]	Artificial Intelligence: Philosophical and Ethical Issues
CGSC 4601 [0.5]	Cognitive Architectures
CGSC 4605 [0.5]	Hyperdimensional Cognitive Models
Total Credits	1.5

Post-Baccalaureate Diploma in Cognitive Science (4.0 credits)

Admission to this program requires the permission of the Department of Cognitive Science. Normally, students are required to have completed an undergraduate degree with a minimum B average or higher to be admitted. Applications will be reviewed on a case-by-case basis. Students with prior studies in Cognitive Science must consult with the department when choosing courses, to

ensure the residency requirement (Section 2.2.2/3.4.1) is met.

Requirements:

1. 0.5 credit from:	0.5
CGSC 2001 [0.5] Theories in Cognitive Science	
CGSC 2002 [0.5] Methods in Cognitive Science	
2. 1.0 credit in:	1.0
CGSC 3601 [0.5] Artificial Intelligence and Cognitive Science	
CGSC 3908 [0.5] Honours Seminar in Cognitive Science	
3. 1.5 credits in CGSC at the 3000-level or above	1.5
4. 1.0 credits from:	1.0
CGSC 4908 [1.0] Honours Thesis	
CGSC 4909 [1.0] Honours Project	
Total Credits	4.0

Regulations

In addition to the program requirements listed in this section, students must satisfy the academic regulations of the university, and the faculty regulations for the Bachelor of Cognitive Science.

Academic Regulations and Requirements for the Bachelor of Cognitive Science Degree

The regulations presented below apply to all Bachelor of Cognitive Science programs. In addition to the requirements presented here, students must satisfy the University regulations common to all undergraduate students including the process of Academic Continuation Evaluation (consult the *Academic Regulations of the University* section of this Calendar).

First-Year Seminars

B.Cog.Sc. degree students are strongly encouraged to include a First-Year Seminar (FYSM) during their first 4.0 credits of registration. Students are limited to 1.0 credit in FYSM (one 1.0-credit FYSM or two 0.5-credit FYSMs) and can only register in a FYSM while they have first-year standing in their B.Cog.Sc. program.

Change of Program Within the B.Cog.Sc. Degree

Students may transfer to a program within the B.Cog.Sc. degree. Applicants must normally be *Eligible to Continue* (EC) in their year level, in addition to meeting the CGPA thresholds described in Section 3.1.9 of the *Academic Regulations of the University*. Other applications for change of program will be considered on their merits; students may be admitted to the new program if they are *Eligible to Continue* (EC) or on *Academic Warning* (AW).

Applications to declare or change programs within the B.Cog.Sc. degree must be made online through Carleton Central by completing a Change of Program Elements (COPE) application form within the published deadlines. Acceptance into a program or into a program element or option is subject to any enrolment limitations, specific program, program element or option requirements, as published in the relevant Calendar entry.

Minors, Concentrations, and Specializations

Students may apply to the Registrar's Office to be admitted to a minor, concentration or specialization during their first or subsequent years of study. Acceptance into a minor, concentration or specialization is subject to any specific requirements of the intended Minor, Concentration or Specialization as published in the relevant Calendar entry. Acceptance into a Concentration, or Specialization requires the student to be meeting the minimum CGPAs defined in Section 3.1.9 Changes of Program and Degree, in the *Academic Regulations of the University*.

Mention : français

Students registered in the B.Cog.Sc. may earn the notation *Mention : français* by completing part of their requirements in French and by demonstrating a knowledge of the history and culture of French Canada. The general requirements are listed below.

Students in the B.Cog.Sc. Honours program must present:

1. 1.0 credit in the French language;
2. 1.0 credit devoted to the history and culture of French Canada;
3. 1.0 credit at the 2000- or 3000-level and 1.0 credit at the 4000-level taken in French. These credits may come from any of Philosophy, Psychology, Computer Science, Linguistics, Neuroscience, or Cognitive Science, without restriction.

Students in the B.Cog.Sc. program must present:

1. 1.0 credit in the French language;
2. 1.0 credit devoted to the history and culture of French Canada
3. 1.0 credit at the 2000- or 3000-level taken in French. This credit may come from any of Philosophy, Psychology, Computer Science, Linguistics, Neuroscience, or Cognitive Science, without restriction.

Courses taught in French (Item 3, above) may be taken at Carleton, at the University of Ottawa on the Exchange Agreement, or at a francophone university on a Letter of Permission. Students planning to take courses on exchange or on a Letter of Permission should take careful note of the residence requirement for a minimum number of Carleton courses in their programs. Consult the *Academic Regulations of the University* section of this Calendar for information regarding study on Exchange or Letter of Permission.

Regulations

Post-Baccalaureate Diploma

In addition to the requirements presented here, students must satisfy the University regulations (see the Academic Regulations of the University section of this Calendar).

Definition

A post-baccalaureate diploma is defined as a stand-alone undergraduate credential intended to:

- qualify a candidate for consideration for entry into a master's program, or

- bring a candidate who already possesses a bachelor's degree up to a level of a bachelor's degree of 20.0 credits or more in another discipline, or
- provide a candidate who already possesses a twenty-credit bachelor's degree in the same discipline the opportunity to bring their previous studies to current equivalents and/or to examine alternative areas, or
- provide a candidate with a professional undergraduate credential for which the prior completion of an undergraduate degree program is appropriate.

Program Requirements

- A post-baccalaureate diploma is normally constituted of a minimum of 3.0 credits to a maximum of 5.0 credits of advanced undergraduate courses.
- A minimum of 3.0 residency credits counting toward the post-baccalaureate diploma.

English as a Second Language Requirement

In addition to the program requirements, completion of English as a Second Language (ESLA) courses may be required from the following sequence: ESLA 1300, ESLA 1500, ESLA 1900. No credits from this sequence will be counted toward the post-baccalaureate diploma.

Continuation

All post-baccalaureate diploma students are expected to complete their diploma requirements within two calendar years after the date of initial registration. After this period student may be withdrawn.

Graduation

- A candidate for a post-baccalaureate diploma must have an overall CGPA of at least 6.5 to graduate.
- A candidate for a post-baccalaureate diploma must obtain a grade of C- or higher in each course taken in fulfillment of the program requirements.
- Students should consult with the Department, School or Institute when planning their diploma and selecting courses.

Co-operative Education

For more information about how to apply for the Co-op program and how the Co-op program works please visit the Co-op website.

All students participating in the Co-op program are governed by the Undergraduate Co-operative Education Policy.

Undergraduate Co-operative Education Policy

Admission Requirements

Students can apply to Co-op in one of two ways: directly from high school, or after beginning a degree program at Carleton.

If a student applies to a degree program with a Co-op option from high school, their university grades will be reviewed two terms to one year prior to their first work term to ensure they meet the academic requirements after their first or second year of study. The time at which the evaluation takes place depends on the program of study.

Students will automatically receive an admission decision via their Carleton email account.

Students who did not request Co-op at the time they applied to Carleton can request Co-op after they begin their university studies. To view application instructions and deadlines, please visit carleton.ca/co-op.

To be admitted to Co-op, a student must successfully complete 5.0 or more credits that count towards their degree, meet the minimum CGPA requirement(s) for the student's Co-op option, and fulfil any specified course prerequisites. To see the unique admission and continuation requirements for each Co-op option, please refer to the specific degree programs listed in the Undergraduate Calendar.

Participation Requirements

COOP 1000

Once a student has been given admission or continuation confirmation to the co-op option s/he must complete and pass COOP 1000 (a mandatory online 0.0 credit course). Students will have access to this course a minimum of two terms prior to their first work term and will be notified when to register.

Communication with the Co-op Office

Students must maintain contact with the co-op office during their job search and while on a work term. All email communication will be conducted via the students' Carleton email account.

Employment

Although every effort is made to ensure a sufficient number of job postings for all students enrolled in the co-op option of their degree program, no guarantee of employment can be made. Carleton's co-op program operates a competitive job search process and is dependent upon current market conditions. Academic performance, skills, motivation, maturity, attitude and potential will determine whether a student is offered a job. It is the student's responsibility to actively conduct a job search in addition to participation in the job search process operated by the co-op office. Once a student accepts a co-op job offer (verbally or written), his/her job search will end and access to co-op jobs will be removed for that term. Students that do not successfully obtain a co-op work term are expected to continue with their academic studies. The summer term is the exception to this rule. Students should also note that hiring priority is given to Canadian citizens for co-op positions in the Federal Government of Canada.

Registering in Co-op Courses

Students will be registered in a Co-op Work Term course while at work. The number of Co-op Work Term courses that a student is registered in is dependent upon the number of four-month work terms that a student accepts.

While on a co-op work term students may take a maximum of 0.5 credit throughout each four-month co-op work term. Courses must be scheduled outside of regular working hours.

Students must be registered as full-time before they begin their co-op job search. All co-op work terms must be

completed before the beginning of the final academic term. Students may not finish their degree on a co-op work term.

Work Term Assessment and Evaluation

To obtain a Satisfactory grade for the co-op work term students must have:

1. A satisfactory work term evaluation by the co-op employer;
2. A satisfactory grade on the work term report.

Students must submit a work term report at the completion of each four-month work term. Reports are due on the 16th of April, August, and December and students are notified of due dates through their Carleton email account.

Workplace performance will be assessed by the workplace supervisor. Should a student receive an unsatisfactory rating from their co-op employer, an investigation by the co-op program manager will be undertaken. An unsatisfactory employer evaluation does not preclude a student from achieving an overall satisfactory rating for the work term.

Graduation with the Co-op Designation

In order to graduate with the co-op designation, students must satisfy all requirements for their degree program in addition to the requirements according to each co-op program (i.e. successful completion of three or four work terms).

Note: Participation in the co-op option will add up to one additional year for a student to complete their degree program.

Voluntary Withdrawal from the Co-op Option

Students may withdraw from the co-op option of their degree program during a study term ONLY. Students at work may not withdraw from the work term or the co-op option until s/he has completed the requirements of the work term.

Students are eligible to continue in their regular academic program provided that they meet the academic standards required for continuation.

Involuntary or Required Withdrawal from the Co-op Option

Students may be required to withdraw from the co-op option of their degree program for one or any of the following reasons:

1. Failure to achieve a grade of SAT in COOP 1000
2. Failure to pay all co-op related fees
3. Failure to actively participate in the job search process
4. Failure to attend all interviews for positions to which the student has applied
5. Declining more than one job offer during the job search process
6. Continuing a job search after accepting a co-op position
7. Dismissal from a work term by the co-op employer
8. Leaving a work term without approval by the Co-op manager

9. Receipt of an unsatisfactory work term evaluation
10. Submission of an unsatisfactory work term report

Standing and Appeals

The Co-op and Career Services office administers the regulations and procedures that are applicable to all co-op program options. All instances of a student's failure during a work term or other issues directly related to their participation in the co-op option will be reported to the academic department.

Any decision made by the Co-op and Career Services office can be appealed via the normal appeal process within the University.

International Students

All International Students are required to possess a Co-op Work Permit issued by Immigration, Refugees and Citizenship Canada before they can begin working. It is illegal to work in Canada without the proper authorization. Students will be provided with a letter of support to accompany their application. Students must submit their application for their permit before being permitted to view and apply for jobs on the Co-op Services database. Confirmation of a position will not be approved until a student can confirm they have received their permit. Students are advised to discuss the application process and requirements with the International Student Services Office.

Bachelor of Cognitive Science Honours: Co-op Admission and Continuation Requirements

- Maintain full-time status in each study term;
- Be eligible to work in Canada (for off-campus work);
- Have successfully completed COOP 1000 .

In addition to the following:

1. Registered as a full-time student in the Bachelor of Cognitive Science Honours program;
2. Obtained third-year standing;
3. Successfully completed, by the start-date of the first work term, CGSC 2001;
4. Obtained an Overall CGPA of at least 8.50. This CGPA must be maintained throughout the duration of the degree.

B.Cog.Sc. Honours students must successfully complete three (3) work terms to obtain the Co-op Designation.

Work Term Report Course: CGSC 3999 [0.0]

Work/Study Pattern:

Year 1		Year 2		Year 3		Year 4		Year 4	
Term	Pattern	Term	Pattern	Term	Pattern	Term	Pattern	Term	Pattern
Fall	S	Fall	S	Fall	S	Fall	S	Fall	S
Winter	S	Winter	S	Winter	S	Winter	W	Winter	
Summer		Summer		Summer	W	Summer	W	Summer	

Legend

S: Study

W: Work

Admissions Information

Admission Requirements are for the 2024-25 year only, and are based on the Ontario High School System.

Holding the minimum admission requirements only establishes eligibility for consideration. The cut-off averages for admission may be considerably higher than the minimum. See also the **General Admission and Procedures** section of this Calendar. An overall average of at least 70% is normally required to be considered for admission. Some programs may also require specific course prerequisites and prerequisite averages and/or supplementary admission portfolios. Higher averages are required for admission to programs for which the demand for places by qualified applicants exceeds the number of places available. The overall average required for admission is determined each year on a program by program basis. Consult admissions.carleton.ca for further details.

Note: Courses listed as *recommended* are not mandatory for admission. Students who do not follow the recommendations will not be disadvantaged in the admission process.

Admissions Information

Admission requirements are based on the Ontario High School System. Prospective students can view the admission requirements through the Admissions website at admissions.carleton.ca. The overall average required for admission is determined each year on a program-by-program basis. Holding the minimum admission requirements only establishes eligibility for consideration; higher averages are required for admission to programs for which the demand for places by qualified applicants exceeds the number of places available. All programs have limited enrolment and admission is not guaranteed. Some programs may also require specific course prerequisites and prerequisite averages and/or supplementary admission portfolios. Consult admissions.carleton.ca for further details.

Note: If a course is listed as *recommended*, it is not mandatory for admission. Students who do not follow the recommendations will not be disadvantaged in the admission process.

Degrees

- Bachelor of Cognitive Science (B.Cog.Sci.) (Honours)
- Bachelor of Cognitive Science (B.Cog.Sci.)

Admission Requirements

First Year

The Ontario Secondary School Diploma (OSSD) or equivalent including a minimum of six 4U or M courses. The six 4U or M courses must include a 4U course in English (or *anglais*). Applicants submitting an English language test to satisfy the requirements of the English Language Proficiency section of this Calendar may use that test to also satisfy the 4U English prerequisite requirement.

The cut-off average for admission will be set annually and will normally be above the minimum requirement.

Advanced Standing

Applications for admission beyond first year will be assessed on their merits. Applicants must normally be

Eligible to Continue in their year level, in addition to meeting the CGPA thresholds described in Section 3.1.9 of the *Academic Regulations of the University*. Advanced standing will be granted only for those subjects that are assessed as being appropriate for the program and stream selected.

Co-op Option

Direct Admission to the First Year of the Co-op Option

Applicants must:

1. meet the required overall admission cut-off average and prerequisite course average. These averages may be higher than the stated minimum requirements;
2. be registered as a full-time student in the Bachelor of Cognitive Science Honours;
3. be eligible to work in Canada (for off-campus work placements).

Meeting the above requirements only establishes eligibility for admission to the program. The prevailing job market may limit enrolment in the co-op option. Students should also note that hiring priority is given to Canadian citizens for co-op positions in the Public Service Commission.

Note: continuation requirements for students previously admitted to the co-op option and admission requirements for the co-op option after beginning the program are described in the Co-operative Education Regulations section of this Calendar.

Admissions Information

Admission Requirements are for the 2024-25 year only, and are based on the Ontario High School System. Holding the minimum admission requirements only establishes eligibility for consideration. The cut-off averages for admission may be considerably higher than the minimum. See also the **General Admission and Procedures** section of this Calendar. An overall average of at least 70% is normally required to be considered for admission. Some programs may also require specific course prerequisites and prerequisite averages and/or supplementary admission portfolios. Higher averages are required for admission to programs for which the demand for places by qualified applicants exceeds the number of places available. The overall average required for admission is determined each year on a program by program basis. Consult admissions.carleton.ca for further details.

Note: Courses listed as *recommended* are not mandatory for admission. Students who do not follow the recommendations will not be disadvantaged in the admission process.

Diploma

- **Post-Baccalaureate Diploma in Cognitive Science**

Admission to this program requires the permission of the Department of Cognitive Science. Normally, students are required to have completed an undergraduate degree with a minimum B average or higher to be admitted. Applications will be reviewed on a case-by-case basis. Students with prior studies in Cognitive Science must consult with the department when choosing courses, to

ensure the residency requirement (Section 2.2.2/3.4.1) is met.

Cognitive Science (CGSC) Courses

CGSC 1001 [0.5 credit]

Mysteries of the Mind

Challenges faced in understanding the mind, and some of the approaches cognitive science has brought to bear on them. Topics may include the nature of knowledge, how we learn, the extent to which human thinking is rational, biases in thinking, and evolutionary influences on cognition.

Lectures three hours per week.

CGSC 1005 [0.5 credit]

Computational Methods in Cognitive Science

Introduction to computational methods, with an emphasis on programming. Topics and assignments will focus on applications in cognitive science. No prior computing experience required.

Includes: Experiential Learning Activity

Lecture three hours and tutorial one and a half hours a week.

CGSC 2001 [0.5 credit]

Theories in Cognitive Science

An integrated background of the discipline of Cognitive Science, with an historical overview (1940's onward) and examination of the extent to which the discipline has assimilated the collective knowledge of contributing disciplines (e.g., psychology, philosophy, linguistics, artificial intelligence and neuroscience).

Prerequisite(s): second-year standing and FYSM 1607 or CGSC 1001, or permission of the Department.

Lectures three hours a week.

CGSC 2002 [0.5 credit]

Methods in Cognitive Science

Selected topics in cognitive science covered from the perspectives of psychology, computer science, linguistics, philosophy, and other related disciplines. Students may be required to complete independent research projects.

Includes: Experiential Learning Activity

Prerequisite(s): CGSC 1001 or FYSM 1607, second year standing, or permission of the Department. Restricted to students enrolled in B.Cog.Sc. programs.

Seminars and tutorials six hours per week.

CGSC 3004 [0.5 credit]

Philosophy and Cognitive Science

An examination of the significance and role of philosophy in cognitive science. Topics may include: philosophical methods for studying the mind, prospects for naturalizing consciousness and intentionality, assessing competing models of the mind.

Prerequisite(s): CGSC 2001 and PHIL 2501, and third-year standing.

Seminar three hours per week.

CGSC 3201 [0.5 credit]

Cognitive Processes

An examination of research findings on cognitive processes. Topics may include attention, speech perception, memory, intelligence, reasoning, learning, working memory, reading, and mathematics.

Prerequisite(s): third-year standing, and CGSC 2001 or PSYC 2700.

Seminar three hours per week.

CGSC 3301 [0.5 credit]

Language and Cognitive Science

Issues related to language and cognitive science are examined through a detailed consideration of selected topics.

Prerequisite(s): third-year standing, and CGSC 2001.

Seminar three hours per week.

CGSC 3501 [0.5 credit]

Cognitive Neuroscience

Issues related to the role of cognitive neuroscience research in cognitive science are examined through a detailed consideration of selected topics.

Prerequisite(s): third-year standing and CGSC 2001.

Seminar, three hours per week.

CGSC 3601 [0.5 credit]

Artificial Intelligence and Cognitive Science

An introduction to the contribution of artificial intelligence and computer modeling of cognitive processes to cognitive science.

Includes: Experiential Learning Activity

Precludes additional credit for CGSC 4001.

Prerequisite(s): third-year standing and CGSC 2002 and (CGSC 1005 or COMP 1005). Restricted to students enrolled in B.Cog.Sc. Honours.

Seminars and labs six hours per week.

CGSC 3603 [0.5 credit]**Artificial Intelligence: Philosophical and Ethical Issues**

Topics examined through the lens of philosophy and cognitive science may include humans' obligations towards AI, sentient AI, implications of AI for models of cognition, designing ethical AI systems, implications of using AI in healthcare, and social inequality and job displacement related to AI.

Also listed as PHIL 3503.

Prerequisite(s): CGSC 2001 or PHIL 2501 and third-year standing in Cognitive Science or Philosophy.

Seminar 3 hours per week.

CGSC 3704 [0.5 credit]**Cognitive Science and the Digital Humanities**

Exploration of the roles of human and artificial cognition in the digital humanities. Topics may include virtual and augmented reality as applied to the humanities, cognitive issues in hypertext and hypermedia; linguistic and philosophical considerations in digital media, cognitive narratology, and artificial intelligence.

Also listed as DIGH 3704.

Prerequisite(s): CGSC 2001 or DIGH 2001 and third-year standing.

Seminar three hours per week.

CGSC 3908 [0.5 credit]**Honours Seminar in Cognitive Science**

Major theories and empirical approaches within Cognitive Science are examined through a detailed consideration of selected topics. Students are required to complete independent research projects to prepare for their fourth-year honours theses.

Includes: Experiential Learning Activity

Precludes additional credit for CGSC 3001 (no longer offered) and CGSC 3002 (no longer offered).

Prerequisite(s): third year standing, CGSC 2001 and CGSC 2002, and enrolment in B. Cog. Sc. Honours with a CGPA in the major requirements of 8.0.

Seminars and tutorials six hours per week.

CGSC 3999 [0.0 credit]**Co-operative Work Term**

Includes: Experiential Learning Activity

CGSC 4601 [0.5 credit]**Cognitive Architectures**

Cognitive architectures and how to evaluate them against human data; how to create cognitive models using cognitive architectures such as ACT-R.

Prerequisite(s): third-year standing, CGSC 2001, and (CGSC 1005 or COMP 1005).

Also offered at the graduate level, with different requirements, as CGSC 5601, for which additional credit is precluded.

Seminar three hours per week, tutorial one and a half hours per week.

CGSC 4605 [0.5 credit]**Hyperdimensional Cognitive Models**

Modelling cognition using artificial intelligence techniques such as reinforcement learning, vector-symbolic models, neural networks, and/or machine learning.

Prerequisite(s): third-year standing, (CGSC 1005 or COMP 1005), CGSC 2001, and CGSC 3601.

Also offered at the graduate level, with different requirements, as CGSC 5605, for which additional credit is precluded.

Seminar three hours per week, tutorial one and a half hours per week.

CGSC 4801 [0.5 credit]**Independent Study**

A reading or research course for selected students who wish to investigate a particular topic of interest.

Normally students may not offer more than one credit of independent study in their total program (including independent study credits taken through other departments).

Includes: Experiential Learning Activity

Prerequisite(s): third- or fourth-year standing and permission of the Department.

CGSC 4802 [0.5 credit]**Independent Study**

A reading or research course for selected students who wish to investigate a particular topic of interest.

Normally students may not offer more than one credit of independent study in their total program (including independent study credits taken through other departments).

Includes: Experiential Learning Activity

Prerequisite(s): third- or fourth-year standing and permission of the Department.

CGSC 4900 [0.5 credit]**Special Topics in Cognitive Science**

The topic of this course will vary from year to year.
Students may register in more than one section of CGSC 4900 but may register in each section only once.
Prerequisite(s): each section will have its own prerequisites and permission of the department if is required.
Seminar three hours per week.

CGSC 4908 [1.0 credit]**Honours Thesis**

Interdisciplinary thesis. In developing a thesis, students must consult the Undergraduate Supervisor. Only the Undergraduate Supervisor can assign a supervisor or grant approval to register in this course. Faculty regulations governing Honours Research Essays and Honours Theses apply.
Includes: Experiential Learning Activity
Precludes additional credit for CGSC 4909.
Prerequisite(s): fourth year standing, CGSC 3908, and enrolment in B.Cog.Sc. Honours with a major CGPA of 8.0.

CGSC 4909 [1.0 credit]**Honours Project**

Interdisciplinary project. Students engage in one or more group research projects.
Includes: Experiential Learning Activity
Precludes additional credit for CGSC 4908.
Prerequisite(s): 4th year standing, enrolment in B. Cog. Sc. Honours.
Seminar