COGNITIVE SCIENCE – SPECIALIZATION (COMPUTING) – BACHELOR OF COMPUTING (HONOURS)

COGS-P-BCH (Cognitive Science)
COGS-I-BCH (Cognitive Science with Professional Internship)

Subject: Administered by the School of Computing in cooperation with the Departments of Languages, Literatures, and Cultures, Philosophy, and Psychology.
Plan: Consists of 93.00 units as described below.
Program: The Plan, with sufficient electives to total 120.00 units, will lead to a Bachelor of Computing (Honours) Degree.

Note: Requirements for this program have been modified. Please consult the 2023-2024 (https://queensu-ca-public.courseleaf.com/archive/2023-2024/)*Calendar* for the previous requirements.

Code	Title	Units
1. Core		
A. Complete the following:		
CISC 102	Discrete Structures I	3.00
CISC 121	Introduction to Computing Science I	3.00
CISC 124	Introduction to Computing Science II	3.00
B. Complete 3.00 units from the following:		**3.00**
MATH 110	Linear Algebra	
MATH 112	Introduction to Linear Algebra	
C. Complete the following:		
COGS 100	Introduction to Cognitive Science	3.00
D. Complete the following:		
COGS 201	Cognition and Computation	3.00
E. Complete the following:		
CISC 203	Discrete Structures II	3.00
CISC 204	Logic for Computing Science	3.00
CISC 221	Computer Architecture	3.00
CISC 235	Data Structures	3.00
F. Complete 3.00 units from the following:		**3.00**
STAT 263	Introduction to Statistics	
STAT 268	Statistics and Probability I	
STAT_Options		
G. Complete the following:		
CISC 360	Programming Paradigms	3.00
H. Complete 9.00 units from the following:		**9.00**
CISC_Artificial_Intelligence		
CISC 352	Artificial Intelligence	
COGS 400	Neural and Genetic Cognitive Models	
I. Complete the following:		
CISC 497	Social, Ethical and Legal Issues in Computing	3.00
2. Option		
A. Complete 30.00 units from two of the following option lists:		**30.00**
i. Linguistics		
ii. Philosophy		
iii. Psychology		
B. Complete 9.00 units from the following course list:		**9.00**
COGS_Computing		
C. Complete 6.00 units from the following course lists:		**6.00**
COGS_Computing		
COGS_Linguistics		
COGS_Philosophy		
COGS_Psychology		
NSCI_Options		
Electives		
Elective Courses		27.00
Total Units		**120.00**

Option Lists

i. Linguistics

Code	Title	Units
a. Complete 6.00 units from the following:		**6.00**
LING 100	Introduction to Linguistics	
or		
LING 101 & LING 102	Introduction to Linguistics: Words, Sentences, and Meaning and Introduction to Linguistics: Sounds, Signs, and Perception	
b. Complete 3.00 units from the following:		**3.00**
LING 310	Phonetics	
LING 320	Phonology	
LING 330	Morphology	
c. Complete the following:		
LING 340	Syntax	3.00
d. Complete the following:		

LING 415	Semantics	3.00
Total Units		**15.00**

ii. Philosophy

Code	Title	Units
a. Complete 6.00 units from the following:		**6.00**
PHIL at the 100-level or above		
b. Complete 6.00 units from the following:		**6.00**
PHIL 250	Epistemology and Metaphysics	
or		
PHIL 251 & PHIL 252	Metaphysics and Epistemology	
c. Complete 3.00 units from the following:		**3.00**
PHIL 261	Philosophy of Mathematics	
PHIL 266	Introduction to Probability and Inductive Logic	
PHIL 270	Minds and Machines	
PHIL 311	Philosophy of Psychology	
PHIL 351	Philosophy of Mind	
PHIL 359	Philosophy of Language	
PHIL 381	Philosophy of the Natural Sciences	
Total Units		**15.00**

iii. Psychology

Code	Title	Units
a. Complete the following:		
PSYC 100	Principles of Psychology	6.00
b. Complete the following:		
PSYC 221	Cognitive Psychology	3.00
c. Complete 3.00 units from the following:		**3.00**
PSYC 203	Research Methods in Psychology	
PSYC 271	Brain and Behaviour I	
d. Complete 3.00 units from the following course list:		**3.00**
COGS_Psychology at the 300-level or above		
Total Units		**15.00**

3. Notes

A. Students with no programming experience should review the Introductory Courses (https://www.queensu.ca/academic-calendar/arts-science/schools-departments-programs/computing/) paragraph included on the School of Computing overview page in the *Calendar.*

B. As COGS is a multi-disciplinary subject, several first-year courses are required. With the exception of CISC 102 and CISC 121, 100-level courses may be deferred to later years depending upon the planned progression of subsequent courses. With approval of an advisor, COGS 100 may be taken in Year 2 of the Plan.

C. Many upper-year courses in CISC, LING, PHIL, and PSYC have prerequisites outside the courses required for COGS, and students should take this into account in planning for their optional and elective units. Not all upper-year courses are offered every year.

D. The Plan allows 27.00 units for elective courses. Many disciplines are narrowly focused, and electives are essential to allow students to broaden their education. In the case of COGS, the Plan is already very broad, and students are encouraged to use their electives to further pursue the area(s) of Cognitive Science in which they are most interested.

E. With the approval of the Undergraduate Chair, students who take CISC 500 working on a project directly related to Cognitive Science may count 3.00 units towards COGS_Computing.

F. Students completing the internship (COGS-I-BCH) will be required to complete 117.0 units towards their Bachelor of Computing degree and 9.0 units in COMP internship courses for a total of 126.0 units.

G. A maximum of 6.00 units from courses offered by other Faculties and Schools may be counted toward the program and/or Plan requirements. This includes courses in BMED, COMM, GLPH, HSCI, LAW, NURS, and courses offered by Smith Engineering.

Cognitive Science Course Lists

The following lists contain courses offered through other Departments. In accordance with Academic Regulation **2.6** (Access to Classes), students do not have enrolment priority in all of these courses. Access to these courses may only be made available during the Open Enrolment period, and then only if space permits.

CISC_Artificial_Intelligence

Code	Title	Units
Artificial Intelligence Options		
CISC 351	Advanced Data Analytics	3.00
CISC 371	Nonlinear Data Analysis	3.00
CISC 372	Advanced Data Analytics	3.00
CISC 451	Topics in Data Analytics	3.00
CISC 452	Neural and Genetic Computing	3.00
CISC 453	Topics in Artificial Intelligence	3.00
CISC 455	Evolutionary Optimization and Learning	3.00
CISC 467	Fuzzy Logic	3.00

CISC 473	Deep Learning	3.00
CISC 474	Reinforcement Learning	3.00

COGS_Computing

Code	Title	Units
Cognitive Science Computing Options		
CISC 220	System-Level Programming	3.00
CISC 223	Software Specifications	3.00
CISC 226	Game Design	3.00
CISC 271	Linear Data Analysis	3.00
CISC 325	Human-Computer Interaction	3.00
CISC 332	Database Management Systems	3.00
CISC 340	Digital Systems	3.00
CISC 365	Algorithms I	3.00
CISC 454	Computer Graphics	3.00
CISC 457	Image Processing and Computer Vision	3.00
CISC 465	Semantics of Programming Languages	3.00
CISC 486	Game Development	3.00
CISC 496	Game Development Project	3.00
CISC 500	Undergraduate Thesis	6.00

COGS_Linguistics

Code	Title	Units
Cognitive Science Linguistics Options		
LING 100	Introduction to Linguistics	6.00
LING 101	Introduction to Linguistics: Words, Sentences, and Meaning	3.00
LING 102	Introduction to Linguistics: Sounds, Signs, and Perception	3.00
LING 310	Phonetics	3.00
LING 320	Phonology	3.00
LING 330	Morphology	3.00
LING 340	Syntax	3.00
LING 415	Semantics	3.00

COGS_Philosophy

Code	Title	Units
Cognitive Science Philosophy Options		
PHIL 111	What is Philosophy?	6.00
PHIL 115	Fundamental Questions	6.00
PHIL 250	Epistemology and Metaphysics	6.00
PHIL 251	Metaphysics	3.00
PHIL 252	Epistemology	3.00
PHIL 261	Philosophy of Mathematics	3.00
PHIL 270	Minds and Machines	3.00
PHIL 311	Philosophy of Psychology	3.00
PHIL 351	Philosophy of Mind	3.00
PHIL 359	Philosophy of Language	3.00
PHIL 381	Philosophy of the Natural Sciences	3.00
PHIL 451	Current Issues in Epistemology	3.00
PHIL 452	Current Issues in Metaphysics I	3.00
PHIL 464	Topics in Philosophy of Mind	3.00

COGS_Psychology

Code	Title	Units
Cognitive Science Psychology Options		
PSYC 100	Principles of Psychology	6.00
PSYC 203	Research Methods in Psychology	3.00
PSYC 251	Developmental Psychology	3.00
PSYC 271	Brain and Behaviour I	3.00
PSYC 305	Introduction to Comparative Cognition	3.00
PSYC 320	Selected Topics in Cognitive Neuroscience	3.00
PSYC 321	Psycholinguistics	3.00
PSYC 323	Laboratory in Attention	3.00
PSYC 350	Selected Topics in Developmental Psychology	3.00
PSYC 352	Cognitive and Language Development	3.00
PSYC 353	Atypical Development	3.00
PSYC 355	Comparative Cognition: Cognitive Origins Laboratory	3.00
PSYC 365	Selected Topics in Behavioural Neuroscience	3.00
PSYC 370	Brain and Behaviour II	3.00
PSYC 420	Advanced Topics in Cognitive Psychology	3.00
PSYC 422	Advanced Topics in Attention	3.00
PSYC 423	Driving, Deepfakes, and Disinformation: Applications of Visual Cognition	3.00
PSYC 442	Culture and Cognition	3.00
PSYC 452	Developmental Psycholinguistics	3.00

NSCI_Options

Code	Title	Units
Neuroscience Options		
NSCI 323	Foundational Neuroscience	3.00
NSCI 324	Systems Neuroscience	3.00
NSCI 401	Introduction to Theoretical Neuroscience	3.00

STAT_Options

Code	Title	Units
Statistic Course Options		
BIOL 243	Introduction to Statistics	3.00
CHEE 209	Analysis of Process Data [1]	3.50
COMM 162	Managerial Statistics	3.00
ECON 250	Introduction to Statistics	3.00

GPHY 247	Introduction to Statistics	3.00
KNPE 251	Introduction to Statistics	3.00
NURS 323	Introduction to Statistics	3.00
POLS 285	Introduction to Statistics	3.00
PSYC 202	Statistics in Psychology	3.00
SOCY 211	Introduction to Statistics	3.00
STAM 200	Introduction to Statistics	3.00
STAT 263	Introduction to Statistics	3.00

[1] Note that the unit weighting system in Smith Engineering differs from that in the Faculty of Arts and Science. Therefore, upon acceptance of any course from Smith Engineering, the unit weighting towards Arts and Science degree requirements shall be at the discretion of the Associate Dean (Academic). Usually, a one-term course shall count as 3.00 units and a two-term course as 6.00 units.