SIMON FRASER UNIVERSITY S.07-117

Senate Committee on University Priorities

Memorandum

TO: Senate

FROM: John Waterhouse
Chair, SCUP
Vice President, Academic

RE: Proposal for Cognitive Science Minor Program, Faculty of Arts and Social Science (SCUP 07-55)

DATE: September 27, 2007

At its September 26, 2007 meeting SCUP reviewed and approved the proposal from the Faculty of Arts and Social Sciences for a Cognitive Science Minor Program.

Motion

That Senate approve and recommend to the Board of Governors, the Cognitive Science Minor Program in the Faculty of Arts and Social Sciences.

encl.

cc. D. Mellow

SFU

SCUP 07-55

OFFICE OF THE
ASSOCIATE VICE PRESIDENT ACADEMIC AND ASSOCIATE PROVOST

MEMO

To:	**Senate Committee On University Priorities**
FROM	Bill Krane, Chair Senate Committee on Undergraduate Studies
RE	Faculty of Arts and Social Sciences - Cognitive Science Minor Program
DATE	September 14, 2007

Action undertaken by the Senate Committee on Undergraduate Studies at its meeting of September 11, 2007 gives rise to the following recommendation:

Motion:

"that SCUP approve and recommend to Senate the Cognitive Science Minor Program."

The relevant documentation for review by SCUP is attached.

2.

1.

FASSCC 07-07

SIMON FRASER UNIVERSITY

Cognitive Science Program

Memorandum

TO: Peggy Lacasse / Diane Gibson
Faculty of Arts and Social Sciences
Curriculum Committee

FROM: Dr. Fred Popowich, Director
Cognitive Science Program

RE: Cognitive Science Minor

DATE: July 6, 2007

On Wednesday Dec 6, 2006, the Cognitive Science Steering Committee recommended the attached proposal for a Minor in Cognitive Science. Attached is the current draft, as a follow up to the Notice of Intent that was approved by SCUP last fall.

Based on feedback received from the Cognitive Science Steering Committee, we have further reduced the lower level requirements for the minor from 30-35 credit hours, contained in the original notice of intent, to 21-31 credit hours. This further addressed the FASS program development sub-committee's concern about the extra workload involved to complete the minor.

The attached draft proposal was distributed to Computing Science, Linguistics, Philosophy, and Psychology in January 2007, and then to the Faculty of Arts and Social Sciences on June 1st who then provided us with feedback related to some proposed changes in their own curricula, which we have incorporated into the proposal.

Would you please place this proposal on the agenda of the next meeting of the Faculty of Arts and Social Sciences Curriculum Committee, in addition to the calendar changes which we submitted yesterday.

Thanks

Dr. Fred Popowich, Director
Cognitive Science Program

3.

Full Program Proposal

Executive Summary

The Minor in Cognitive Science is designed to complement the current Major in Cognitive Science that is offered in the Faculty of Arts and Social Sciences. Students have expressed an interest in a minor for over a decade, and we now have the resources required to offer this program at SFU Burnaby with the recent hiring of a full time faculty member in Cognitive Science.

SFU has a strong history of interdisciplinary research, and the interest in Cognitive Science is increasing, as reflected by the awarding of the Tier 1 Canadian Research Chair in Cognitive Science to Dr. Jeff Pelletier, and the recent hiring of Dr. Mark Blair as a tenure track faculty member in Cognitive Science. The proposed program will strengthen the existing Cognitive Science program by explicitly including in the program, students who are majoring in other disciplines who might not otherwise get involved in the program.

As with the Major, the core Cognitive Science courses required by the Minor are all offered by the Cognitive Science Program, with additional courses drawn from Computing Science, Linguistics, Philosophy and Psychology. Unlike the Major, the Minor only requires 5 upper division courses.

The key objectives of the Minor are to provide a student with the same core Cognitive Science material that they would have if they were to obtain a Major in Cognitive Science, plus provide an investigation of two of the related disciplines (as opposed to the more detailed investigation of three related fields that they would obtain were they to take the Major). Students with a Minor in Cognitive Science would be in a good position to apply to graduate programs in Cognitive Science.

The Minor will be attractive to students that are currently majoring in one of Computing Science, Linguistics, Philosophy or Psychology, who want to have a broader education in related disciplines. It would also be possible for students in other disciplines to complete the Minor in a timely fashion, and it would provide these students with a wider selection of employment or research opportunities after graduation.

Our goal is to have the full proposal approved and in place by January 2008, to allow students who are completing their studies in April 2008 to apply for this credential.

Curriculum

The proposed Minor in Cognitive Science will provide an interdisciplinary program of study giving students the foundations of Cognitive Science, together with a significant amount of advanced work in this field.

Cognitive Science draws upon research in the related disciplines of Computing Science, Linguistics, Philosophy and Psychology to address issues related to human cognition. While students have been able to Major in Cognitive Science for over two decades at SFU, the Minor is intended for students who do not wish to Major in Cognitive Science, but who want recognition for successful completion of foundational Cognitive Science courses, and selected advanced Cognitive Science topics. Students having a Minor in Cognitive Science could also use this credential as the basis of an application for graduate studies in Cognitive Science, together with a Major in a Cognitive Science related discipline.

The core Cognitive Science material is provided in the courses COGS 100, COGS 200, COGS 300 and COGS 310. The course descriptions (in Appendix A) outline the contributions of each of these courses. These are the same courses as required by the Major, so a student completing the Minor will cover the same core material as a Major – a key objective of the proposed Minor.

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The expected class size for COGS 100, which is currently offered twice a year is 80 students. Since it is a designated breadth course at Simon Fraser University, it is taken by a wide range of students, most of whom are not doing a degree in cognitive science. Expected class sizes for the other courses, which will each be offered once a year, will be 20-30 students.

Below are the courses and curriculum requirements associated with the Minor. All of the courses either already exist, or have been approved for inclusion in the 2007-2008 calendar.

Lower Division Requirements

(21 – 31 credit hours)

COGS 100-3 Exploring the Mind
COGS 200-3 Foundations in Cognitive Science

A student must fulfill the requirements listed below for two of the four disciplines. When provided a choice between different 200 level courses, a student should consider which course can be used as a pre-requisite for a subsequent 300 level course.

Computing Science

Students must complete one of
CMPT 125-3 Introduction to Computing Science and Programming II
CMPT 126-3 Introduction to Computing Science and Programming

and all of
MACM 101-3 Discrete Mathematics I
CMPT 225-3 Data Structures and Programming

Linguistics

LING 220-3 Introduction to Linguistics

and one of
LING 221-3 Introduction to Phonology
LING 222-3 Introduction to Syntax

Philosophy

PHIL 100W-3 Knowledge and Reality
PHIL 201-3 Epistemology
PHIL 210-3 Natural Deductive Logic

Psychology

PSYC 100-3 Introduction to Psychology I
PSYC 102-3 Introduction to Psychology II
PSYC 201-4 Introduction to Research Methods in Psychology
PSYC 221-3 Introduction to Cognitive Psychology
PSYC 280-3 Introduction to Biological Psychology

Upper Division Requirements

(15-16 credit hours)

COGS 300-3 Selected Topics in Cognitive Science
COGS 310-3 Consciousness

A student must complete 3 courses from the following selection of courses, including at least one course in each of the two disciplines selected previously at the lower division level.

Computing Science

CMPT 310-3 Artificial Intelligence Survey
CMPT 411-3 Knowledge Representation
CMPT 412-3 Computational Vision
CMPT 413-3 Computational Linguistics
CMPT 414-3 Model-based Computer Vision

CMPT 417-3 Intelligent Systems
CMPT 418-3 Computational Cognitive Architecture
CMPT 419-3 Special Topics in Artificial Intelligence

Note: 400 level courses require consent of instructor.

Linguistics

LING 321-3 Phonology
LING 322-3 Syntax
LING 324-3 Semantics
LING 330-3 Phonetics
LING 350-3 First Language Acquisition

Philosophy

PHIL 302-3 Topics in Epistemology and Metaphysics
PHIL 314-3 Topics in Logic I
PHIL 341-3 Philosophy of Science
PHIL 343-3 Philosophy of Mind
PHIL 344-3 Philosophy of Language I

Psychology

PSYC 303-3 Perception
PSYC 325-4 Memory and Mind
PSYC 330-3 Attention
PSYC 335-3 Sensation I
PSYC 382-3 Cognitive Neuroscience
PSYC 383-3 Psychopharmacology
PSYC 385-3 Evolutionary Psychology

Learning Methodologies

The same learning methodologies used for the Major in Cognitive Science will be used for the Minor in Cognitive Science. All COGS classes are lecture based, and there are currently no plans to develop COGS distance education courses. Note, however, that some of the non-COGS courses taken as part of the Minor have labs and/or tutorials, and others can be taken via distance education.

Faculty

The resources required to implement the program are already present in the Cognitive Science Program. The Program has one full time faculty member (Dr. Mark Blair), the Canadian Research Chair Tier One in Cognitive Science (Dr. Jeff Pelletier), one additional faculty member who was jointly appointed with linguistics (Dr. Nancy Hedberg), the Director (Dr. Fred Popowich), and an administrative assistant (Shamina Senaratne). No special equipment or space is required for the Minor, other than the office space associated with the Cognitive Science office. CVs for the above mentioned faculty members are provided in Appendix B.

Program Consultations and Evaluations

This draft proposal has been assembled with input from members of the Cognitive Science Steering Committee, who have home departments from Computing Science, Education, Interactive Arts and Technology, Kinesiology, Linguistics, Philosophy, and Psychology. In January 2007, a draft of the full proposal was distributed to Computing Science, Linguistics, Philosophy and Psychology. The minor changes from these four departments, reflecting upcoming changes to their own program changes, were then incorporated into draft document, to result in the current document.

The proposal has been provided to the following external groups for comment:

- Cognitive Systems Program, UBC
- Cognitive Science, Carleton University

Comments received appear in Appendix C, along with comments from related programs at Simon Fraser University.

On-going review of the Minor program will be achieved in the same manner as the Major, through the participation of the interdisciplinary steering committee for Cognitive Science which includes members from all the related SFU disciplines. All Cognitive Science courses will have student evaluations. A member of the Cognitive Science student association will continue to provide feedback to the Cognitive Science steering committee on matters related to the curriculum. We will also expand our Cognitive Science Alumni program to get feedback from students once they have graduated.

Admission

All GPA requirements associated with the Minor will be the same as those required for the current Major in Cognitive Science.

Students majoring in one of the Cognitive Science related disciplines should be able to complete the additional course requirements associated with the Minor within the same time frame that would normally be required for completion of their degree.

Other

If approved, the proposed Minor will be the first credential of its sort in British Columbia. McGill and UNB to the best of our knowledge are the only other Canadian universities having a Minor in Cognitive Science.

Cognitive Science currently has over 30 Majors. We anticipate the number of Minors in the program to eventually match the number of Majors. We feel this goal is achievable based on our interactions with students at various recruiting events, and based on our discussions with students in the SFU Cognitive Science student society.

Every year, there have been e-mails from current SFU students as well as prospective students enquiring about a minor in cognitive science. As reflected in the minutes of past meetings of the COGS student society, there has been student interest in a minor for several years. Back in the late 1990s, there were initial discussions in the Cognitive Science steering committee about the creation of a Minor, but at the time, the program did not have the infrastructure necessary to promote such a proposal. Now that the program has support staff, it is in a position to offer such a program.

With respect to the labour market demand, a student with a Minor in Cognitive Science would have a substantial number of courses in each of Computing Science, Linguistics, Philosophy and Psychology, and thus could be a candidate for employment in positions requiring experience in any one of these areas.

No additional budget is required for offering the Minor in Cognitive Science.

Appendix A. Course Descriptions/Outlines

COGS 100 Course Outline

COGS 100-3: Introduction to Cognitive Science

An introduction to Exploring the Mind. Cognitive Science is an interdisciplinary field that has arisen from the convergence on a common set of questions by philosophy, computer science, artificial intelligence, linguistics, psychology, and neuroscience. Cognitive scientists view the human mind as a complex system that receives, stores, retrieves, transforms, and transmits information. Each discipline makes its own distinctive contribution to the goal of formulating a computational theory of the human mind. Previously, each discipline sought to understand the mind from its own perspective, benefiting little from progress in other fields because of different methods employed. With the advent of Cognitive Science, however, common interests and theoretical ideas have overcome methodological differences, and interdisciplinary interaction has become the hallmark of this field.

This course examines how the mind carries out functions such as memory, language, and vision. The major themes common to the understanding of the cognitive science of memory, language and vision including nature and nurture, categories and representations, concept formation and categorization, problem solving, computations, and different types of mental representations will be discussed together with the role of language in mental activity. Training in cognitive science prepares students admirably well for many of the careers that are major growth fields of the twenty-first century, including: computer science and communication, information processing and data retrieval, human-computer interaction and computational linguistics, psychology, psycholinguistics, and cognitive linguistics.

PREREQUISITE: None. Open to all students. Students with credit for COGS 200 may not take COGS 100 for further credit.

REQUIRED TEXTS:
Mindware: Introduction to the Philosophy of Cognitive Science.
Andy Clark. Oxford University Press, 2000 ISBN: 0195138570

COURSE REQUIREMENTS:
Students will be expected to keep up with all course readings and to participate in class discussions.
Grades are earned through assignments (25%), quizzes (25%), a midterm exam (20%), and a comprehensive final (30%).

COGS 200-3: Foundations in Cognitive Science

COURSE DESCRIPTION

This course is an in-depth introduction to the major empirical methods and theoretical frameworks for exploring the mind. It introduces students to some of the major results in cognitive science and fleshes out several of the foundational debates that have fueled investigations in the past fifty years. Taking an interdisciplinary approach, the course illustrates how a convergence of ideas from psychology, philosophy, linguistics, and computer science has led to deep explanations of the topics listed below, as well as clarified some research questions that are being actively investigated today.

COURSE TOPICS

Mind as a computer, cognitive processes as algorithms, computational models of the mind, nature of language and communication, nature of beliefs, mental representations, human vision, concept learning, categorization, rationalism/empiricism, role of experience/prior knowledge in learning, consciousness, level of analysis (neural substrate or higher level mental knowledge), formal versus non-formal theories of mind, processing of statistical/structural information, mental knowledge from substantive stored information or mathematical abstractions (=rules)

PREREQUISITE: COGS 100. Students who have taken COGS 200 before 1998 may take this course for further credit.

REQUIRED TEXTS:

Jay Friedenberg and Gordon Silverman. 2005. *Cognitive Science: An Introduction to the study of Mind.*
Published by Sage, ISBN 1-4129-2568-1.
Also: supplementary readings may be required in a custom courseware.

COURSE REQUIREMENTS

Students will be expected to keep up with all course readings and to participate in class discussions. Grades are earned through assignments (25%), quizzes (25%), a midterm exam (20%), and a comprehensive final (30%).

COGS 300 Calendar Description

COGS 300-3 Selected Topics in Cognitive Science

Description:

An interdisciplinary exploration of recent work on some special topic in cognitive science (such as vision, reasoning, connectionism, etc.) Prerequisite: lower division cognitive science course requirements.

COGS 310-3: Consciousness

COURSE DESCRIPTION

Consciousness is often called "the last great mystery of science". Even the very definition of consciousness is hotly debated. This course will review cognitive scientists' attempts to understand the qualities, boundaries, purposes and origins of human consciousness. Philosophy, Psychology, Neuroscience, and Computing will provide the data for this dramatic struggle between intuition and fact on this journey of scientific and self discovery. The aim of the course is to give students a thorough grounding in the current state of the scientific understanding of consciousness, and a chance to exercise their reading, writing, debating, and critical thinking skills.

PREREQUISITE: COGS 100 and COGS 200 (or permission of instructor)

REQUIRED TEXTS:

Consciousness: An Introduction, Susan Blackmore
Oxford University Press, USA ISBN 019515343X

COURSE REQUIREMENTS:

Students will be expected to keep up with all course readings and to participate in class discussions. Grades are earned through participation(10%), short assignments (25%), quizzes (25%) and a research paper (40%).