Cognitive Science is an interdisciplinary inquiry concerned with understanding the nature and development of such intelligent capacities as perception, language, reasoning, learning and problem solving, whether these capacities are realized in biological or artificial systems.

Inquiry about cognition is by its very nature interdisciplinary, integrating methodological, theoretical and practical foci of Biology, Computer science, philosophy and psychology into a single course of study. It is a goal of all the MSU colleges which house participating departments to make available strong interdisciplinary degree programs. The proposed program is a strong interdisciplinary program which makes available to students a degree in a cutting edge subject.

For General Education or Cultural Diversity Courses Only

<table>
<thead>
<tr>
<th>General Education Course:</th>
<th>Cultural Diversity Course:</th>
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<tbody>
<tr>
<td>GE Category #</td>
<td>GE Category Name (Maximum of 3 Categories)</td>
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* For Writing Intensive Courses, attach a description of the kind and quantity of writing.

* For Upper Division Courses, include a description of the respects in which it is broad and general rather than narrow and specific, and so suitable as GE.

Attach paper copies of the following:
a. Syllabus or course outline.
b. Course's student learning outcomes associated with each GE competency or CD designation.
c. List of strategies to be used to assess students' achievement of each GE competency or CD designation.

For New Courses

<table>
<thead>
<tr>
<th>Instructional Type:</th>
<th>Lecture</th>
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<td>Course will be offered:</td>
<td>Fall Semester</td>
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<td>Spring Semester</td>
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<td>Summer Session</td>
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* Course content or title is similar to courses in other departments. (Attach copy of letter of agreement with other program(s) contacted. Indicate the nature of the discussions and/or resolution of differences or potential conflicts.)

Attach paper copies of the following:
a. Syllabus or course outline.
b. Course's student learning outcomes.
c. A list of resources required to offer and support this course.
d. A description of how teaching this course will affect department staffing.
e. If 400/500 level course, an explanation of added expectations of graduate students.
<table>
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<tr>
<th><strong>Department</strong></th>
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Revised September 2002
Minnesota State University, Mankato
Curriculum Proposal

***For Program Proposals***

Attach paper copies of the following:

a. Student learning outcomes for the program.
b. Minutes from department and college curriculum meetings in which action was taken on this proposal.
c. Program Assessment Plan. Forms are available on the Academic Affairs Web site:
   http://www.mnsu.edu/academic/forms/
d. List of program requirements for New programs, or a list of Current and Proposed program requirements for Redesigned programs.
e. A list of resources required to offer and support this program.
f. A description of how offering this program will affect department staffing.
g. A list of additional library holdings required for this program.

Please include rationale for any proposed changes in number of program credits:

***For Programs Requiring MnSCU Approval***

If any of the following changes are proposed, please fill out and attach MnSCU Program Approval Forms, which are available on the Academic Affairs Web site:
   http://www.mnsu.edu/academic/Curriculum/crrrformsprocess.html

1. Creation of an entirely new program.

2. Redesign of existing programs, which takes any of the following forms:
   - Addition or deletion of a program option. Options are part of program design in which 30-50% of the courses are required as part of a common core for all students, and which offers curriculum alternatives greater than 30% of the total number of credits in the major. Options are appropriate to baccalaureate or masters programs.
   - Addition or deletion of a program emphasis. Emphases are part of program design in which more than 50% of the courses are required as part of a common core for all students, and which offers curriculum alternatives with a minimum of nine credits. Emphases are appropriate to associate and baccalaureate programs.
   - Change in program name.
   - Change in program CIP #.
   - Change in TOTAL program credits.
   - Change in degree award. For example, changing a B.A. to B.S.
   - Creation of a new degree award in a related academic area. Examples include creation of a certificate program from an existing degree program, or a new degree program from an existing degree program (e.g., Art History BA from Art BA.)

3. Relocation of an existing program. This is a proposal to move an existing program from one site to be exclusively offered at another site, and requires closing the program offered at the original site. For example, a program offered both on-campus and through extended campus is to be offered only at the extended campus site.

4. Replication of an existing program. This is a proposal to offer an existing program at a new site, which may be an existing MnSCU-approved site, or another campus of the same institution. Replicated programs are offered at both the original site and the new location.

5. Suspension or reinstatement of a program. This proposal suspends admission of students into an existing program, and is good for three years. Reinstatement proposals request the reopening of student admissions into a given program.

6. Closure of a program. This proposal requests closure of an existing program and its from an institution's official inventory of academic programs. Unless a department seeks to re-open a suspended program, it should be closed within three years of suspension.
<table>
<thead>
<tr>
<th>Student Learning Outcomes (performance, knowledge, attitudes)</th>
<th>Related College Goals</th>
<th>Related University Goals</th>
<th>Method(s) of Assessment (What is the assessment?)</th>
<th>Who Assessed (Students from what courses - population)</th>
<th>When Assessed (dates)</th>
<th>Standard of Mastery/Criterion of Achievement</th>
<th>What is Hoped to Be Learned?</th>
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<tbody>
<tr>
<td>1. Graduates will understand and be able to clearly and critically analyze and communicate the interdisciplinary nature of the study of mental phenomena.</td>
<td>AH 2, 4,7</td>
<td>Focused undergraduate pre-professional, professional, and liberal arts programs</td>
<td>Portfolio</td>
<td>Cognitive Science Program Seniors</td>
<td>Yearly</td>
<td>95% of assessed students will demonstrate satisfactory or better mastery.</td>
<td>We hope to learn whether the curriculum as designed supports students in achieving their program’s goals.</td>
</tr>
<tr>
<td>2. Graduates will understand and be able to clearly and critically analyze and communicate the conceptual complexities posed by various reductive and explanatory theories of mental phenomena.</td>
<td>AH 2, 4,7</td>
<td>Focused undergraduate pre-professional, professional, and liberal arts programs</td>
<td>Portfolio</td>
<td>Cognitive Science Program Seniors</td>
<td>Yearly</td>
<td>95% of assessed students will demonstrate satisfactory or better mastery.</td>
<td>We hope to learn whether the curriculum as designed supports students in achieving their program’s goals.</td>
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</tbody>
</table>
| 3. Graduates will understand and be able to clearly and critically analyze and communicate the biological and computational conceptual complexity of mental phenomena. | AH 2, 4,7  
SET 1, 2, 3, 4  
SBS 1, 2, 3, 7 | Focused undergraduate pre-professional, professional, and liberal arts programs | Portfolio | Cognitive Science Program Seniors | Yearly | 95% of assessed students will demonstrate satisfactory or better mastery. | We hope to learn whether the curriculum as designed supports students in achieving their program’s goals. |
|---|---|---|---|---|---|---|---|
| 4. Graduates will be able to apply conceptual, analytical, and theoretical tools in a variety of interpersonal, laboratory and disciplinary contexts. | AH 2, 4,7  
SET 1, 2, 3, 4  
SBS 1, 2, 3, 7 | Focused undergraduate pre-professional, professional, and liberal arts programs | Portfolio | Cognitive Science Program Seniors | Yearly | 95% of assessed students will demonstrate satisfactory or better mastery. | We hope to learn whether the curriculum as designed supports students in achieving their program’s goals. |
| 5. Graduates will be able to program and use computers. | AH 2, 4,7  
SET 1, 2, 3, 4  
SBS 1, 2, 3, 7 | Focused undergraduate pre-professional, professional, and liberal arts programs | Portfolio | Cognitive Science Program Seniors | Yearly | 95% of assessed students will demonstrate satisfactory or better mastery. | We hope to learn whether the curriculum as designed supports students in achieving their program’s goals. |
Colleges Goals

College of Arts and Humanities

1. To offer quality undergraduate and graduate programs that engage students in effective learning communities and prepare them for professional careers or advanced study.
2. To offer general education courses that encourage students to acquire disciplined habits of critical thinking and creative expression, thus enabling students to make and communicate enlightened judgments.
3. To promote creative and scholarly expression through exhibitions, performances, lectures, and discussions that will engage the campus and the general public in the arts and humanities.
4. To offer students opportunities to engage in meaningful practice within their disciplines.
5. To engage in scholarship, research, and creative activity--using appropriate technologies--that will contribute to faculty development and to the professions and society.
6. To provide advising and support services that will aid students in academic and career planning.
7. To encourage students to be lifelong learners who recognize the interrelatedness of all knowledge in a diverse, global society.

College of Science, Engineering and Technology

Provide quality undergraduate and graduate programs that foster student learning through a wide variety of instructional applications. This will be accomplished by:

1. Providing strong, discipline-based and interdisciplinary undergraduate and graduate degree programs that are recognized and respected for their high quality by the many publics.
2. Providing degree programs that give students in-depth knowledge, inspire critical thinking skills, problem solving skills, oral and written communication skills and laboratory skills.
3. Providing a thorough understanding of the applications of their major as well as the ethical nature of the applications to societal needs.
4. Promoting a commitment to life-long learning through a variety of technologies and research tools so that each learner has the ability to maintain and adapt their knowledge base to new situations.
5. Continually assessing College programs so that each aspect of the College can document its intellectual growth and service to students.
6. Producing graduates that are recognized for their high quality and readiness to enter the workforce.
7. Providing faculty professional development opportunities that will enhance a life-long professional career of growth.
8. Providing an enriching and professionally relevant general education program that serves the needs of the non-science/engineering major.
College of Social and Behavioral Sciences

1. The College of Social and Behavioral Sciences will provide high quality, well respected undergraduate and graduate programs in the social and behavioral sciences and related professional fields.
2. The College of Social and Behavioral Sciences will provide challenging, personally enriching, and professionally relevant general education.
3. The College of Social and Behavioral Sciences will provide an environment that fosters continued intellectual growth and contributions of faculty, staff, and students.
4. The College of Social and Behavioral Sciences will provide its professional expertise to the region, state, nation, and global communities.
5. The College of Social and Behavioral Sciences will provide curricular and extracurricular activities that promote students' personal and professional growth and their commitment to social responsibilities.
6. The College of Social and Behavioral Sciences will provide accessible and effective academic advising and other support services for all students in the college.
7. The College of Social and Behavioral Sciences will use new technologies in support of teaching, learning, scholarship, and service.
8. The College of Social and Behavioral Sciences will provide support for campus initiatives to improve Mankato State University.
Cognitive Science is an interdisciplinary inquiry concerned with understanding the nature and development of such intelligent capacities as perception, language, reasoning, learning and problem-solving, whether these capacities are realized in biological or artificial systems. Such inquiry is by its very nature interdisciplinary, integrating methodological, theoretical and practical foci of Biology, Computer Science, Philosophy and Psychology into a single course of study.

The cognitive science major is a broad major and does not require that a student complete a minor in addition to the major. The major requires approximately 60 units (depending on area of concentration). As prerequisites for the major students must also take CHEM 201, General Chemistry I (5 units), MATH 115, Precalculus Mathematics, (4 units) OR Math 121, Calculus I (4 units), PSYCH 201, Statistics for Psychology, (4 units) OR STAT 354, Concepts of Probability and statistics (3 units). Some of these program requirements can be fulfilled in General Education. Some of the concentrations have additional prerequisites. The program requirements below should be read carefully.

Each Cognitive Science major will concentrate in one of the four participating disciplines: Biology, Computer Science, Philosophy and Psychology. The concentration typically requires 24 units of work. In addition to the concentration each student with take core courses from each of the other three participating disciplines. Each core will typically require 12 units of course work, a total of 36 units. A student need not do the core for her or his area of concentration since the core is already included in the concentration.
The structure of the major insures that students have a solid grounding in each of the four disciplines as well as a specific concentration in one area that draws on the interdisciplinary foundation. Graduates of the program will be prepared for a variety of post-baccalaureate options. They will be prepared for any of the careers open to graduates with degrees in one of the participating disciplines. They will be prepared for graduate study in traditional programs in biology, computer science, psychology or philosophy. They will also be prepared for study in one of the many recently developed graduate cognitive science programs as well as graduate study in related programs such as cognition, brain, and behavior, cognitive neuroscience, biopsychology and human-computer interaction. Those who choose to study the law, a path frequently chosen by philosophy majors, will be well suited for legal practice concerned with the variety of legal complexities associated with the development of new technology.

**Admission to the major** is granted by the Cognitive Science Program. Minimum university admission requirements are:

--a minimum of 32 earned semester hours.
--a minimum cumulative GPA of 2.5 (C)

Contact the Cognitive Science Program Director or the Program Advisors in one of the four participating departments.
PROGRAM CURRICULUM

BIOLOGY

**Core** (11 units):
required:
BIOL 220: Human Anatomy (4 units)
BIOL 230: Human Physiology [Pre: BIOL 220, Human Anatomy AND CHEM 201, General Chemistry I] (4 units)
BIOL 324: Neurobiology [Pre: BIOL 220 & 230] (3 units)

**Concentration** (23+ units):
required:
BIOL 105: General Biology I (4 units)
BIOL 106: General Biology II [Pre: BIOL 105] (4 units)
BIOL 220: Human Anatomy (4 units)
BIOL 230: Human Physiology [Pre: BIOL 220 and CHEM 201, General Chemistry I] (4 units)
BIOL 324: Neurobiology [Pre: BIOL 220 & 230] (3 units)
--at least 4 credits from the following—
BIOL 211 Genetics [Pre: BIOL 105W, 106 and MATH 112] (3 units)
BIOL 434: Development and Human Embryology [Pre: BIOL 100 or 105] (3 units)
BIOL 436: Animal Behavior [Pre: BIOL 105, 106, or consent] (4 units)
BIOL 438: General Endocrinology [Pre: BIOL 100 or 105] (3 units)
BIOL 460: Introduction to Toxicology [Pre: BIOL 105, 106, and CHEM 201, General Chemistry I, and CHEM 202, General Chemistry II] (3 units)
BIOL 466: Principles of Pharmacology [Pre: BIOL 105, 106, 230, and CHEM 201, General Chemistry I, and CHEM 202, General Chemistry II] (3 units)

Total additional required prerequisites (beyond program prerequisites) for required Biology concentration: 0 courses.

If one elects to satisfy the biology concentration by taking either Biology 460 or 466, General Chemistry II is required.

**Total additional required prerequisites for Biology concentration:** 0-1 course, 0-5 credits

**Total credits for Biology concentration:** 23 + (0-5) (Biology Concentration and General Chemistry II); 11 (Computer Science Core); 12 (Psychology Core); 12 (Philosophy Core), 13 (Required Prerequisites, 9 of which can be satisfied in General Education).

**TOTAL:** 71-76 (16 of which can be met with General Education)
Computer Science (New Curriculum)

Core (11-12 units)
Required:
CS 110: Computer Science I (Programming) [Pre/Coreq: Math 115] (4 units)
---Choose or more of the following---
CS 430: Artificial Intelligence [Pre: CS 210 or CS 230] (3 units)
CS 431: Computational Linguistics [Pre: CS 210 or CS 110, and CS 230] (3 units).
ISYS/IT 482: Human Computer Interaction [CS 210, CogSci & Consent] (3 units)
Recommended:
CS 111: Computer Science II (Object-oriented prog) [CS 110, Pre/Coreq: Math 121] (4 units)

Concentration (New Curriculum) (24 credits)
Required:
CS 110: Computer Science I {Programming} [Pre/Coreq: Math 115] (4 units)
CS 111: Computer Science II {Object-oriented prog} [Pre: CS 110, Pre/Coreq: Math 121] (4 units).
CS 210: Data Structures [Pre: CS 111] (4 units)
---Four or more of the following---
CS 310: Algorithm Analysis [Pre: CS 210] (3 units)
CS 370: Concepts of Programming Languages [Pre: CS 210] (3 units).
CS 410: Formal Languages/Abstract Machines [Pre: CS 310, MATH 375] (3 units).
CS 415: High Performance Computing [Pre: CS 310, CS 350, MATH 247] (3 units)
CS 430: Artificial Intelligence [Pre: CS 210 or CS 230] (3 units)
CS 433: Data Mining and Machine Learning [Pre: CS 210 and STAT 354] (3 units).
ISYS/IT 482: Human Computer Interaction [Pre: CS 210, CogSci & Consent] (3 units)
CS 498: Senior Thesis (4 units)

Total additional required prerequisites (beyond program prerequisites) for Computer Science Concentration: Math 121A which can be taken as a program prerequisite.

If one elects to satisfy Computer Science concentration with CS 410, Formal Languages/Abstract Machines, Math 375, Introduction to Discrete Mathematics, is a prerequisite.

If one elects to satisfy Computer Science concentration with CS 415, High Performance Computing, Math 247, Linear Algebra is a prerequisite.
Total additional required prerequisites for Computer Science concentration: 0-3 courses/0-11 credits

Total credits for Computer Science: 24+ (0-11), (Computer Science Concentration); 11, (Biology Core); 12, (Psychology Core); 12 (Philosophy Core); 13 (Required Prerequisites, 9 of which can be satisfied in General Education).

Total: 72-79 (16 of which can be met with General Education)

**Computer Science under the pre-2007 Curriculum**

**Core** (12 credits)

- COMS 110: Foundation of Computer Science [Pre: MATH 115] (4 units)
- COMS 230: Intelligent Systems [Pre: COMS 110] (4 units)

---One or more of the following---

- COMS 430: Artificial Intelligence [Pre: COMS 230 or COMS 310] (4 units)
- COMS 496: Computational Linguistics [Pre:COMS 230 or COMS 310 (4units)

**Concentration** (24 credits)

- COMS 211: Fundamentals of Computer Science I [Pre:COMS 110 (4 units)
- COMS 212: Fundamentals of Computer Science II [Pre:COMS 211 (4 units).
- COMS 310: Data Structures & Algorithms [Pre:COMS 212 (4units)

---Two or more of the following---

- COMS 370: Concepts of Programming Language (4 units)
- COMS 410: Abstract Machines and Grammar (4units).
- COMS 430: Artificial Intelligence (4units)
- COMS 432: Robotics (4units).
- COMS 465: Parallel and Distributed Processing (4units).
- COMS 496: Selected topics: Comp. Linguistics (4units).

*Students completing the Cognitive Science Program in the Computer Science pre-2007 curriculum may do so with upper division credits made up from the new Computer Science curriculum classes above: CS 310, CS370, CS 410, CS 415, CS 430, CS 431, CS 433.*

If one elects to satisfy Computer Science concentration with CS 410, Abstract Machines and Grammars, Math 375 is a prerequisite, 4 units;

If one elects to satisfy concentration by taking CS 432, Robotics, CS 260 or 320 is a prerequisite;

If one elects to satisfy the concentration with CS 465, Parallel and Distributed Processing, CS 362 is a prerequisite.
Total additional required prerequisites for Computer Science concentration: 0-3 courses/0-12 credits

Total credits for Computer Science: 24+(0-12) (Computer Science concentration); 11 (Biology Core); 12 (Philosophy Core); 12 (Psychology Core); 13 (Required Prerequisites, 9 of which can be satisfied in General Education).

Total: 72-84 (16 can be met with General Education)

Philosophy

**Core** (12 credits):
required:
PHIL 101: The Mind Body Problem (3 units)
--choose 3 of the following--
PHIL 410: Philosophy of Language (3 units)
PHIL 474: Philosophy of Mind (3 units)
PHIL 475: Philosophical Issues in Cognitive Science (3 units)
PHIL 480: Philosophy of Science (3 units)
PHIL 481: Philosophy of Biology (3 units)

**Concentration** (24 credits):
Required:
PHIL 101: Philosophical Problems: The Mind Body Problem (3 units)
PHIL 495: Senior Thesis I (2 units)
PHIL 496: Senior Thesis II (1 unit)
--choose 3 of the following--
PHIL 311: Symbolic Logic (3 units)
PHIL 410: Philosophy of Language (3 units)
PHIL 474: Philosophy of Mind (3 units)
PHIL 475: Philosophical Issues in Cognitive Science (3 units)
PHIL 480: Philosophy of Science (3 units)
PHIL 481: Philosophy of Biology (3 units)
--choose 3 of the following which have not already been chosen under the proceeding requirement--
PHIL 311: Symbolic Logic (3 units)
PHIL 334: History of Philosophy: Classical Philosophy (3 units)
PHIL 336: History of Modern and Renaissance Philosophy (3 units)
PHIL 410: Philosophy of Language (3 units)
PHIL 437: Contemporary Philosophy (pre: consent of Philosophy Department Cognitive Science Advisor) (3 units)
PHIL 450  Special Topics (pre: consent of Philosophy Department
Cognitive Science Advisor) (3 units)
PHIL 455  Existentialism and Phenomenology (3 units)
PHIL 473:  Knowledge and Reality (3 units)
PHIL 474:  Philosophy of Mind (3 units)
PHIL 475:  Philosophical Issues in Cognitive Science (3 units)
PHIL 480:  Philosophy of Science (3)
PHIL 481  Philosophy of Biology (3 units)

Total credits for philosophy concentration: 24 (Philosophy Concentration); 11 (Biology Core), 11 (Computer Science Core); 12 (Psychology Core); 13 (Required Prerequisites (9 of which can be satisfied in General Education).

TOTAL: 71 (16 can be met with General Education)

PSYCHOLOGY

Core  (12 credits):
required:
PSYC 101, Psychology (4 units)
PSYC 416, Cognitive Psychology [Pre: PSYC 101, 201 and 211* or CogSci & consent] (4 units)
--plus 1 of the following
PSYC 415, Human Memory [Pre: PSYC 101, 201 and 211 or CogSci & consent] (4 units)
PSYC 413, Sensation and Perception [Pre: PSYC 101, 201, and either 207 or 211 or CogSci & consent] (4 units)
PSYC 421, Biopsychology [Pre: PSYC 101, 201 and either 207 or 211 or CogSci & consent] (4 units)

Concentration (24 credits):
required:
PSYC 101, Psychology (4 units)
PSYC 416, Cognitive Psychology [Pre: PSYC 101, 201, and 211 or CogSci & consent] (4 units)
--plus 4 of the following
PSYC 206, The Human Mind [Pre: PSYC 101] (4 units)
PSYC 405, Motivation [Pre: PSYC 101, 201, and either 207 or 211, and 211 or CogSci & consent] (4 units)
PSYC 413, Sensation and Perception [Pre: PSYC 101, 201, and either 207 or 211 or CogSci & consent] (4 units)
PSYC 415, Human Memory [Pre: PSYC 101, 201 and 211 or CogSci & consent] (4 units)
PSYC 420, Drugs and Behavior [Pre: PSYC 101, 421] (4 units)
PSYC 421, Biopsychology [Pre: PSYC 101, 201 and either 207 or 211 or CogSci & consent] (4 units)
PSYC 423, Neuroscience [Pre: PSYC 101, 421] (4 units)
PSYC 424, Physiological Psychology Laboratory [Pre: PSYC 101, 421] (4 units)
PSYC 433, Child Psychology [Pre: PSYC 101] (4 units)
PSYC 436, Adolescent Psychology [Pre: PSYC 101] (4 units)
PSYC 455, Abnormal Psychology [Pre: PSYC 101, 8 PSYC credits] (4 units)
PSYC 458, Cultural Psychology [Pre: PSYC 101] (3 units)
PSYC 466, Psychology of Aging [Pre: PSYC 101] (3 units)

Total credits for psychology concentration: 24 (Psychology Concentration); 11 (Biology Core; 12 (Philosophy Core); 11 (Computer Science Core); 13 (Required Prerequisites, 9 of which can be satisfied in General Education).

Total credits for psychology concentration: 71 credits (16 can be met with General Education)

* Psychology 211 is a prerequisite for Psychology majors. With the consent of an instructor, Cognitive Science majors may have this prerequisite waived. This holds for all courses for which Psychology 211 is a prerequisite.