I L L I N O I S
UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Proposal to the Senate Educational Policy Committee

PROPOSAL TITLE: Add Philosophy to the list of units participating in the BSLAS in Computer Science and an LAS Discipline (CS + X)

SPONSOR and COLLEGE CONTACT: Kelly Ritter, Associate Dean, College of Liberal Arts and Sciences, ritterk@illinois.edu , 333-1350

BRIEF DESCRIPTION: The LAS BSLAS in Computer Science and an LAS Discipline was established in 2013 with four LAS units participating: Anthropology, Astronomy, Chemistry, and Linguistics. The major was designed to enable other LAS units to participate if they wished; according to the proposal, "If an LAS unit wishes to participate, the College of LAS will review their proposal for the minimum of 24 hours of supporting coursework. Upon LAS approval, a memo would be sent to Provost office [*sic*] requesting the addition of that unit to the degree name for students pursuing that area."

JUSTIFICATION: Since its beginning, computer science has been closely linked with philosophy. One of the first computing devices, an adding machine, was created by the philosopher Blaise Pascal in the 1640s; while the promises of computing devices for our lives were lauded by the philosophical giant Gottfried Wilhelm Leibniz also in the seventeenth century. But the links between computer science and philosophy came into fuller focus during the twentieth century. Among the pioneers of the foundations of computer science are Alonzo Church, Emil Post, Alan Turing, John von Neumann, and Kurt Gödel, whose accomplishments have their academic home today as much in philosophy departments as in computer science departments. The work of these figures posed questions such as: what is an algorithm; what is computation; what is effective computation; what is efficient computation; can computers think; and so on. These questions are as much philosophical as they are technical, and methods from philosophy and from computer science complement each other in the investigation of these questions. This was recognized by Turing, who published his 1950 article "Computing machinery and intelligence," on the question of whether machines can think, in the journal Mind, which was and remains one of the top journals in philosophy.

It is thus natural to propose a joint undergraduate major in computer science and philosophy here at Illinois. Training in philosophy complements and supplements the training provided in computer science on the key questions listed above. In

addition, philosophical training can help students in investigating ethical questions arising from the rise of computers in our society.

The CS and Philosophy major would require eleven lower division hours aimed at providing students with core training in philosophical methodology, drawing on courses in logic and the history of philosophy. Students would then choose five upper division courses from a diverse list of courses encompassing studies of mind, logic, language, science, mathematics, and ethics.

Course Requirements
The CS + Philosophy major follows the outline of coursework established in 2012 and revised in 2106 – 32-33 hours of CS courses, 9-10 hours in Math, a minimum of 24 hours in an LAS Discipline (this proposal requires 32 hours in Philosophy). In addition, IBHE requires that all new undergraduate degrees require 40 credit hours in upper division courses. Upper division courses have been described as 300- and 400- level coursework and some 200-level courses in which multiple prerequisites are required. The CS + Philosophy major itself requires 37 hours of upper division courses. Students pursing this degree will also take many additional upper level courses, such as those fulfilling the campus Advanced Composition requirement and electives in CS and Philosophy at the 300 and 400-level.
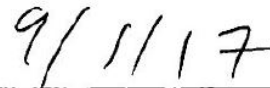
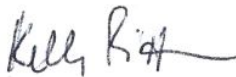**DESIRED EFFECTIVE DATE:** Fall 2018

CLEARANCES:

Signatures:

_____   ___9/ 1/ 17_____

Unit Representative: Date:

_____   9-15-17

College Representative: Date:

Statement for Academic Catalog

Computer Science and Liberal Arts and Sciences Discipline

The LAS major in Computer Science and an LAS Discipline is a flexible program for students who plan to pursue technical or professional careers in arts and sciences areas requiring a sound grounding in computer science. This major allows students to combine study of computer science with training in a field in Liberal Arts and Sciences to offer students novel perspectives in interdisciplinary work. Students can use the supporting coursework to prepare for employment immediately upon graduation or for pursuing graduate study in a wide variety of fields or to complete a significant body of courses in a single area, such as a double major or minor.

Students are strongly encouraged to get involved in undergraduate research through independent studies and funded research experiences, with the goal of learning from the University of Illinois CS and LAS internationally recognized scholars outside the classroom and participating in the exciting quest for new contributions to the field.

Students interested in Mathematics or Statistics should enroll in the Math/CS or Stat/CS degree

Current approved curricula include:

Computer Science and Anthropology

Today, anthropologists use computational tools and algorithms to analyze large amounts of data either gathered from a field site or by studying on-line social communities and social networks. Students majoring in CS + Anthropology will have knowledge of how people live and communicate as social beings, which can inform best designs and user interfaces for software.

Computer Science and Astronomy

Astronomy is a computation-intensive discipline. Computational challenges in astronomy, including radio astronomical data processing, analysis of large optical image data sets, and dynamical and statistical simulation of astronomical systems, test the limits of currently available hardware and software and have led to significant advances in computational science. This major will offer computationally focused students with a grounding in astronomy for them to understand astronomically motivated computational challenges such as mysteries of the origins of life and our universe.

Computer Science and Chemistry

Students majoring in Computer Science and Chemistry are prepared for a variety of careers, including helping manufacturers design more productive and efficient processes, helping pharmaceutical firms characterize new compounds for drug discovery, and conducting research that requires studying the fundamental properties of atoms, molecules, and chemical reactions. Computer Science and Chemistrymajors might develop computer models or simulate chemical and biochemical processes, perform statistical analysis of large data sets, or create visualizations of reaction pathways, molecular interactions, or other phenomena.

Computer Science and Economics

The Computer Science and Economics program provides students with enhanced quantitative analysis and programming skills. Students learn a variety of economic analytical skills, both theoretical and empirical, and computational skills. These are an asset for students interested in nearly all fields of economics, including the three of the core fields (microeconomics, macroeconomics, and econometrics), but also the applied fields of industrial organization, public economics, labor economics, development economics, international economics, and financial economics.

There is an increasing need for more sophisticated skills to examine large administrative datasets ("Big Data"), thus combining the computer science and economics curriculums will produce students who are able to write their own code and develop their own software for analyzing these data sets. Possible job opportunities for graduates include area such as banking, finance, insurance, policy centers, government agencies and non-profit organizations. The degree will also prepare students for various graduate programs, including areas of economics, finance, policy, and financial engineering.

Computer Science and Linguistics

The Computer Science and Linguistics program brings together students and faculty interested in different aspects of the computer – natural language relationship – i.e., studying the cognitive aspects of natural languages; endowing computers with human-like behavior and understanding of spoken and written natural language; and designing user-friendly computer programs and interfaces using natural language communication. Students will be exposed to the tools of both disciplines — formal methods, philosophical analysis, computer programming, and empirical research — with the aim of acquiring the appropriate skills required by the field. Graduates will be successful in landing jobs in various areas, including natural language software design and applications, teaching and research, law, medicine, and public service. The innovative aspect of the program is its focus on relating computers to language, technology, and society where the combination has potential for great impact.

Computer Science and Philosophy

The computer science and philosophy major provides students strong analytical, critical, technical, and communication skills that will prove useful for careers in academia, industry, public service, and elsewhere. Computer science and philosophy share deep historical roots. Questions about the nature of algorithms, complexity, the ability of computers to think, and computation itself are as much philosophical as they are technical. Likewise, many basic philosophical questions – what does it take to know something, when does something cause something else, what makes an action right or wrong to do – matter for practical computer science applications. As computers and machines continue to play an ever-increasing role in our daily lives, there is also a corresponding need to think clearly about the ethical implications of machine technology with respect to, e.g., questions of privacy, security, equality, and justice. Tools from both computer science and philosophy help to clarify and to answer such questions, as well as many others.

Majors tab (edits to add Philosophy in Yellow):

Computer Science and Anthropology

Computer Science and Philosophy web page

Computer Science and Philosophy

For the degree of Bachelor of Science in Liberal Arts and Sciences

Major in Sciences and Letters Curriculum

Please see the computer science advisor as well as the philosophy advisor.

Computer Science email: academic@cs.illinois.edu
Philosophy email: phildept@illinois.edu

Minimum required major and supporting course work normally equates to 66 hours.

General education: Students must complete the Campus General Education requirements including the campus general education language requirement.

Twelve hours of 300- and 400-level courses in the major must be taken on this campus.

A Major Plan of Study Form must be completed and submitted to the LAS Student Affairs Office by the beginning of the fifth semester (60-75 hours). Please see the computer science advisor as well as the advisor in your LAS discipline.

Minimum hours required for graduation: 120 hours

Required Computer Science Courses:		32-33
CS 100	Freshman Orientation[1]	0-1
CS 125	Intro to Computer Science	4
CS 126	Software Design Studio	3
CS 173	Discrete Structures	3
CS 225	Data Structures	4
CS 233	Computer Architecture	4
CS 241	System Programming	4
Choose one of the following:		3
	STAT 200- Statistical Analysis	
	STAT 212- Biostatistics	

CS 361- Probability & Statistics for Computer Sciences		
CS 374	Algorithms & Models of Computation	4
CS 421	Progrmg Languages & Compilers	3
Mathematics (may also fulfill the General Education Quantitative Reasoning I and II requirements)		**9-10**
MATH 220 or MATH 221	Calculus Calculus I	4-5
MATH 225	Introductory Matrix Theory	2
MATH 231	Calculus II	3
Required Philosophy coursework		
PHIL 203 Ancient Philosophy		4
PHIL 206 Early Modern Philosophy		4
PHIL 421 Ethical Theories		3

Choose one of the following:
  PHIL 426 Metaphysics
  PHIL 430 Theory of Knowledge
		3

PHIL 454 Advanced Symbolic Logic		3
Capstone Seminar PHIL 480 TBD		3
In consultation with an advisor, choose 12 hours of philosophy courses, not more than one of which may be at the 100-level and at least two of which must be at the 300 or 400-level		12

1

CS 100 is an orientation course aimed at first-year students, so students who declare the major after the freshman year are not required to complete it.

Appendix A
PhilosophyFaculty

Philosophers at Illinois are concerned with a variety of problems of particular contemporary interest. Through courses they teach and work they publish on these issues, they are contributing to the recent expansion of the compass of philosophy. They likewise enable students to become acquainted with these developments and to pursue their own interests along these lines.

Name	Title	Research keywords
Ben-Moshe, Nir	Assistant Professor	Ethics, Metaethics, Practical Reason, Moral Psychology, Scottish Enlightenment, Biomedical Ethics
Bojanowski, Jochen	Teaching Assistant Professor	
Gilbert, David	Lecturer	Logic, Philosophy and Foundations of Mathematics
Hillmer, Philip	Lecturer	Engineering Ethics
Livengood, Jonathan	Assistant Professor	Philosophy of Science; Metaphysics; Experimental Philosophy
McCarthy, Timothy	Professor	Logic, Philosophy of Language; Philosophy of Mathematics
Murphy, Colleen	Associate Professor	Social and Political Philosophy, Philosophy of Law, Engineering Ethics
Newton, Alexandra	Assistant Professor	
Saenz, Noel	Lecturer	Metaphysics, Philosophy of Religion, Philosophy of Mind
Sanders, Kirk	Associate Professor, Department Chair	Ancient Philosophy (Greek and Roman)
Sussman, David	Associate Professor, Acting Chair	Ethics; Social & Political Philosophy; Moral Psychology; Kant
Varden, Helga	Associate Professor, Director	Political and Legal Philosophy; Kant; Feminist Philosophy

Name	Title	Research keywords
	of Graduate Studies	
Weaver, Christopher	Assistant Professor	Philosophy of Science/Physics, Metaphysics, Philosophy of Religion
Weinberg, Shelley	Assistant Professor, Director of Undergraduate Studies	Early modern philosophy, especially Locke,

Affiliated and Visiting Faculty

Name	Title	Research keywords
Renear, Allen	Professor	Ontologies for data curation and scientific publishing
Hummel, John	Professor	
Hurd, Heidi	Professor	Legal Philosophy; Political Philosophy
Kar, Robin	Professor	Contract Law; Economics
Lasersohn, Peter	Professor	Formal Semantic Theory; Pragmatics; Mathematical Linguistics; Philosophy of Language
McKim, Robert	Professor	Philosophy of Religion; Modern Philosophy (esp. Berkeley); Applied Ethics
Orlie, Melissa	Associate Professor	Classical, modern, and contemporary political theory; Marx, Nietzsche, Freud; Democratic theory and practice; Psychoanalysis; Ecological thinking and practice
Rosenstock, Bruce	Associate Professor	German Philosophy, Jewish Philosophy, Political Theology

Emeritus Faculty

Name	Title	Research keywords
Chandler, Hugh	Emeritus	Metaphysics; Ethics; Philosophy of Mind
Maher, Patrick	Emeritus	Philosophy of science, philosophy of probability
Melnick, Arthur	Emeritus	Kant; Metaphysics; Logic
Mohr, Richard	Emeritus	
Neely, Wright	Emeritus	Philosophy of Action; History of Modern Philosophy; American Philosophy
Schacht, Richard	Emeritus	Continental Philosophy (esp. Nietzsche, Hegel); Human Nature; Value Theory
Schroeder, William	Emeritus	Continental Philosophy (esp. Hegel, Sartre, Merleau-Ponty); Ethics
Shwayder, David	Emeritus	Metaphysics; Language; Practical Reason
Wagner, Steven	Emeritus	Philosophy of Language; Philosophy of Mind; Logic
Wallace, James	Emeritus	Ethical Theory; Biomedical Ethics; Ancient Greek Philosophy; Philosophy of Art
Wengert, Robert	Emeritus	Medieval Philosophy; Ancient Philosophy; Logic

Dear Karen,

The CS department faculty have unanimously approved the newly proposed CS+Philosophy version of the CS+X degree programs. We feel this is a very natural fit due to overlaps along several dimensions: understanding the notion of computability, addressing issues in artificial intelligence and mind, and considering the ethical implications surrounding security and privacy in a digital age.   We look forward to working with the Philosophy Department in furthering the success of the CS+X programs.

Lenny Pitt
Professor and Associate Head
Director of Undergraduate Programs
Computer Science Department
University of Illinois
pitt@illinois.edu
217-333-7505

UNIVERSITY OF ILLINOIS
AT URBANA-CHAMPAIGN

Office of the Provost and Vice Chancellor for Academic Affairs

Swanlund Administration Building
601 East John Street
Champaign, IL 61820

September 21, 2017

Gay Miller, Chair
Senate Committee on Educational Policy
Office of the Senate
228 English Building, MC-461

Dear Professor Miller:

Enclosed is a copy of a proposal from the College of Liberal Arts and Sciences to add Philosophy to the list of majors available for the Bachelor of Science in Liberal Arts and Sciences in Computer Science and a Liberal Arts and Sciences discipline (CS + X).

Sincerely,

Kathryn A. Martensen
Assistant Provost

Enclosures

c: K. Ritter
    A. Elli
    A. Edwards
    E. Stuby

September 15, 2017

Kathryn Martensen
Associate Provost
Office of the Provost and Vice Chancellor for Academic Affairs
207 Swanlund Administration Building
MC-304

Dear Kathy:

The Committee on Courses and Curricula on behalf of the Faculty of the College of Liberal Arts and Sciences has voted to approve the following proposal:

Add Philosophy to the BSLAS in Computer Science and an LAS Discipline

Please address all correspondence concerning this proposal to me. Per our earlier correspondence on how to add future pairings to the CS + X Degree, the BSLAS in Computer Science and Philosophy should be reviewed administratively by EPC.

Sincerely,

Kelly Ritter
Associate Dean

enclosures
C: Professor Kirk Sanders
        Professor Lenny Pitt