



Proposal to the Senate Educational Policy Committee

PROPOSAL TITLE: Proposal to revise the Statistics and Computer Science BSLAS in the College of Liberal Arts and Sciences.

SPONSOR: Lenny Pitt, Professor and Director of Undergraduate Programs, Computer Science
Tel: 333-7505, Email: pitt@illinois.edu. Douglas Simpson, Professor and Chair, Statistics,
dgs@illinois.edu

COLLEGE CONTACT: Karen Carney, Associate Dean for Courses and Degree Programs,
College of Liberal Arts & Sciences, 333-6622, kmcarney@illinois.edu.

BRIEF DESCRIPTION:

This is a major revision that includes a variety of changes:

1. Replace and discontinue CS 242 with new course CS 126.
2. Replace CS 231 + CS 232 requirement with CS 233.
3. Replace CS 373 + (CS 473 or CS 475) requirement with new course CS 374.
4. Add two new course options in statistical methods: STAT 212 Biostatistics, and CS 361 (cross-listed STAT 361) Probability and Statistics for Computer Science.
5. Eliminate the option of taking CS 423 instead of CS 421.
6. Adjust some of the courses available as technical electives satisfying group distributions.
7. Explicitly recommend CS 100 Freshman Orientation (1hour)

JUSTIFICATION:

The CS undergraduate degree in the College of Engineering is proposing a new curriculum, and the above changes will bring the foundational CS coursework in the Stat & CS degree program in LAS in line with that in the CS degree program in ENGR. Additional changes serve to update the degree program to reflect the availability of new courses. Specific reasons for the above changes:

1. CS 242 is taken too late in the current curriculum to allow students to benefit from the instruction on good coding practice. Also, CS 126 will introduce a number of topics that are currently not covered in the curriculum. Finally, CS 126, placed between software/programming courses CS 125 and CS 225, will engage students in the practice of programming during their second semester, where there is currently a hole in the curriculum resulting in students going eight months or more without programming following their initial exposure.
2. CS 233 combines material from both CS 231 and CS 232, while eliminating an undue focus on digital logic more relevant to computer engineering. CS 233 also includes

- deeper coverage of important topics such as parallel architectures. The reduction of two credit hours (3+3 to 4) will also allow students to take more advanced technical electives.
3. CS 373 contained dated material that was of dubious value for current CS students. CS 473 was taken too late in the curriculum for other courses to benefit, because CS 373 was a prerequisite. The material from CS 475 is significantly less important to than that in CS 473. The new four-hour CS 374 blends together topics from these two computer science theory courses (CS 373 and CS 473), presenting them in a more unified manner, and accessible earlier in the curriculum. The reduction of two credit hours (from 3+3 to 4) will also allow students to take more technical electives.
 4. Modern computer science practice increasingly relies on probabilistic and statistical methods to deal with large amounts of data. It has become a sufficiently important topic that it is desirable to introduce this material earlier in the curriculum than STAT 400 could (since it requires MATH 241 instead of just MATH 221 and 225). It is also important to focus on the particular topics that are relevant to CS, and to have students solve real-world problems via programming applied statistical and probabilistic methods. The new Group I courses Stat 200, Stat 212 and CS 361 provide a survey of probability, statistical methods and data applications before the more mathematical treatment of probability and statistics in STAT 400 and STAT 410.
 5. Requiring CS 421 (Programming Languages and Compilers), and not CS 423 (Operating Systems Design) as an alternative, was a change in the CS/Engineering curriculum from a number of years ago, and this change was overlooked and unimplemented in the Stat & CS curriculum. Much of the material that was important from CS 423 at that time migrated to (the then new) CS 241, which is now required of all students, obviating the need for CS 423, and making it less pressing as an alternative to CS 421. Material from CS 421 is viewed as more central/essential than that from CS 423, especially since students now take CS 241.
 6. Groups were retitled and stream lined from 6 to 4. One course (STAT 424) was eliminated from a list of options in the “Linear Regression Analysis” group. The two remaining courses in that group are deemed much more appropriate for STAT & CS majors. In addition, several CS courses and one new Statistics course involving significant application of probability and statistics were added as options in the “Group III Computational Application Areas.”
 7. Students have been advised to take the optional CS 100. We are simply listing this recommendation explicitly in the Academic Catalog.

BUDGETARY AND STAFF IMPLICATIONS:

1) Resources

- a. How does the unit intend to financially support this proposal?

The proposal is not for a new program, but for revenue-neutral modification of an existing one, so it will be supported in the future as it has been in the past.

- b. How will the unit create capacity or surplus to appropriately resource this program? If applicable, what functions or programs will the unit no longer support to create capacity?

There is no net gain in the number of courses required, and teaching resources will be shifted from previously taught discontinued courses to the new ones proposed. No other additional resources are required other than those associated with our natural growth.

- c. Will the unit need to seek campus or other external resources? If so, please provide a summary of the sources and an indication of the approved support.

No campus or external resources will be needed due to the revision in program

- d. Please provide a letter of acknowledgment from the college that outlines the financial arrangements for the proposed program.

2) Resource Implications

- a. Please address the impact on faculty resources including the changes in numbers of faculty, class size, teaching loads, student-faculty ratios, etc.

No additional faculty resources will be needed due to this revision.

- b. Please address the impact on course enrollment in other units and provide an explanation of discussions with representatives of those units. (*A letter of acknowledgement from units impacted should be included.*)

Enrollment in MATH 415 will decrease by about 10 per semester, with commensurate increase in enrollment in MATH 225.

- c. Please address the impact on the University Library (*A letter of estimated impact from the University Librarian must be included for all new program proposals. If the impact is above and beyond normal library business practices, describe provisions for how this will be resourced.*)

None anticipated

- d. Please address the impact on technology and space (e.g. computer use, laboratory use, equipment, etc.)

None anticipated

DESIRED EFFECTIVE DATE:

Fall, 2016

STATEMENT FOR ACADEMIC CATALOG:

Statistics

<http://www.stat.illinois.edu>

Head of Department: Douglas G. Simpson

Department Office: 101 Illini Hall, 725 South Wright St., Champaign, IL
61820 (217) 333-2167

Statistics and Computer Science

www.stat.illinois.edu or www.cs.illinois.edu

This major is sponsored jointly by the Departments of Statistics and Computer Science. The Statistics and Computer Science major is designed for students who would like a strong foundation in computer science, coupled with significant advanced coursework in statistics. The major prepares students for professional or graduate work in statistics and computer science, and for applications of computing in which knowledge of statistics is particularly important, such as data mining and machine learning. See also [Computer Science](#), [Mathematics](#), [Mathematics and Computer Science](#), and [Statistics](#).

Major in Sciences and Letters Curriculum

E-mail: stat-office@illinois.edu or academic@cs.illinois.edu

Degree title: Bachelor of Science in Liberal Arts and Sciences

Minimum required major and supporting course work normally equates to 68-69 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 must be taken on this campus.

Minimum hours required for graduation: 120 hours.

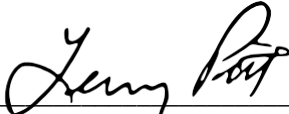
Departmental distinction: To graduate with distinction requires a specified minimum grade point average in all Computer Science, Statistics, and Mathematics courses listed below. A GPA of 3.25 is required for Distinction, 3.5 for High Distinction, and 3.75 for Highest Distinction.

Hours	Requirements
0-1	CS 100- Freshman Orientation (recommended)
11-12	Calculus through MATH 241 - Calculus III
3	MATH 415 - Linear Algebra
32	Required Computer Science Foundation:
	CS 125 - Intro to Computer Science (4)
	CS 173 - Discrete Structures (3)
	CS 126 - Software Design Studio (3)
	CS 225 - Data Structures (4)
	CS 233 - Computer Architecture (4)
	CS 241 - System Programming (4)
	CS 357 - Numerical Methods I (3)
	CS 374 - Algorithms and Models of Computation (4)
	CS 421 - Programming Languages and Compilers (3)
10	Required Probability and Statistics Foundation:
	STAT 400 - Statistics and Probability I (4)
	STAT 410 - Statistics and Probability II (3)
	STAT 428 - Statistical Computing (3)
12	Other Specified Requirements. At least four other STAT, CS, or MATH courses, with at least one chosen from each of the following groups:
	Group I: Statistical Methods¹
	STAT 200 - Statistical Analysis
	STAT 212 - Biostatistics
	CS 361 – Probability and Statistics for Computer Science
	Group II: Mathematical Analysis and Modeling
	MATH 347 - Fundamental Mathematics
	MATH 441 - Differential Equations
	MATH 444 - Elementary Real Analysis
	MATH 447 - Real Variables
	Group III: Computational Application Areas
	STAT 385 - Statistics Programming Methods
	CS 410 - Text Information Systems
	CS 411 - Database Systems
	CS 412 - Data Mining
	CS 446 - Machine Learning & Pattern Rec
	CS 481 - Stochastic Processes & Applications
	CS 482 - Simulation
	Group IV: Statistical Analysis and Modeling
	STAT 420 - Methods of Applied Statistics
	STAT 425 - Applied Regression and Design
	STAT 426 – Sampling and Categorical Data
	STAT 448 – Advanced Data Analysis

¹ Students should take a course from Group I before taking STAT 400.

CLEARANCES:

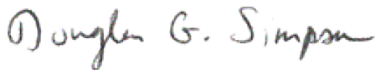
Signatures:



Computer Science Representative:

2/1/2015


Date:



Department of Statistics

2/11/2016

Date:



College Representative:

2-11-16

Date:

**Appendix A: Proposed
Curriculum Revisions for BSLAS
Stat/CS**

Current Requirements:	Current Hours	Proposed Requirements:	Revised Hours
TOTAL	72-73	TOTAL	68-69
CS Requirements	30	CS Requirements	32
		CS 100 (recommended)	(1)
CS 125	4	CS 125	4
		CS 126	3
CS 173	3	CS 173	3
CS 225	4	CS 225	4
CS 231	3	CS 233	4
CS 232	3		
CS 241	4	CS 241	4
CS 242	3		
CS 357	3	CS 357	3
CS 373	3	CS 374 (this requirement replaces one of the technical group choices (CS 473 or CS 475) below.	4
		CS 421 (this requirement replaces one of the technical group choices (CS 421 or CS 423) below.	3
Math Requirements	14-15	Math Requirements	14-15
MATH 220 or 221	4-5	MATH 220 or 221	4-5
MATH 231	3	MATH 231	3
MATH 241	4	MATH 241	4
MATH 415	3	MATH 415	3
Stat Requirements	10	Stat Requirements	10
STAT 400	4	STAT 400	4
STAT 410	3	STAT 410	3
STAT 428	3	STAT 428	3
Group Electives	18	Group Electives	12
Group I Applied Stats	3	Group I Stat Methods	3
STAT 200 or a 300- or 400- level STAT course; STAT 426 recommended		STAT 200 or 212 or CS/STAT 361	

<i>Group II Analysis & Differential Equations</i>	3	<i>Group II Math Analysis & Modeling</i>	3
MATH 347		MATH 347	
MATH 441		MATH 441	
MATH 444		MATH 444	
MATH 447		MATH 447	
<i>Group III Foundations</i>	3	<i>This group eliminated and replaced with new CS 374 above</i>	
CS 473			
CS 475			
<i>Group IV Software</i>	3	<i>This group eliminated and replaced with CS 421 requirement above.</i>	
CS 421			
CS 423			
<i>Group V Application Software</i>	3	<i>Group III Computational Application Areas</i>	3
		Stat 385	
		CS 410	
CS 411		CS 411	
		CS 412	
CS 418			
CS 446		CS 446	
		CS 481	
		CS 482	
<i>Group VI Linear Regression Analysis</i>	3	<i>Group IV Statistical Analysis and Modeling</i>	3
STAT 420		STAT 420	
STAT 424			
STAT 425		STAT 425	
		STAT 426	
		STAT 448	
ELECTIVES*	46-48		51-52

*Includes Rhetoric, advanced composition, language, and general education requirements

Name of existing Illinois (UIUC) degree: _____

Name of non-Illinois partnering institution: _____

Location of non-Illinois partnering institution:

State of Illinois US State: _____ Foreign country: _____

- B. Proposal to create a new academic unit (college, school, department, program or other academic unit):

Name of proposed new unit: _____

- C. Proposal to rename an existing academic unit (college, school, department, or other academic unit):

Current name of unit: _____

Proposed new name of unit: _____

- D. Proposal to reorganize existing units (colleges, schools, departments, or program):

1. Proposal to change the status of an existing and approved unit (e.g. change from a program to department)

Name of current unit including status: _____

2. Proposal to transfer an existing unit:

Current unit's name and home: _____

Proposed new home for the unit: _____

3. Proposal to merge two or more existing units (e.g., merge department A with department B):

Name and college of unit one to be merged: _____

Name and college of unit two to be merged: _____

Proposed name and college of new (merged) unit: _____

4. Proposal to terminate an existing unit:

Current unit's name and status: _____

- E. **Other educational policy proposals** (e.g., academic calendar, grading policies, etc.)

Nature of the proposal: _____

Revised 10/2012

UNIVERSITY OF ILLINOIS
AT URBANA-CHAMPAIGN

EP.16.61

Office of the Provost and Vice Chancellor
for Academic Affairs

Swanlund Administration Building
601 East John Street
Champaign, IL 61820



February 15, 2016

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

Dear Professor Francis:

Enclosed is a copy of a proposal from the College of Liberal Arts and Sciences to revise the Bachelor of Science in Statistics and Computer Science.

Sincerely,

A handwritten signature in black ink, appearing to read 'Kathryn A. Martensen'.

Kathryn A. Martensen
Assistant Provost

Enclosures

c: A. Elli
K. Carney
D. Simpson
L. Pitt

UNIVERSITY OF ILLINOIS
AT URBANA-CHAMPAIGN

College of Liberal Arts and Sciences
Office of the Dean

2090 Lincoln Hall
702 S. Wright Street, MC-448
Urbana, IL 61801



February 11, 2016

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:

Revise the Statistics and Computer Science BSLAS in the College of Liberal Arts and Sciences

Please address all correspondence concerning this proposal to me. This proposal is now ready for review by the Senate Educational Policy Committee for proposed implementation in Fall 2016.

Sincerely,



Karen M. Carney
Associate Dean

enclosure

C: Professor Douglas Simpson
Professor Lenny Pitt