

UNIVERSITY OF  
**Nebraska**  
Lincoln

*Pioneering new frontiers.*

Bachelor of Science in  
**Computer Science**

Advising Brochure  
**2014 – 2015**

Department of  
**Computer Science & Engineering**  
**College of Arts & Sciences**

256 Avery Hall

[advising@cse.unl.edu](mailto:advising@cse.unl.edu)  
<http://cse.unl.edu/advising>

The B.S. Degree in Computer Science is accredited by  
the Computing Accreditation Commission of ABET.  
<http://www.abet.org>

rev: June 10, 2014

## Computer Science Major Requirements

### Computer Science & Engineering Courses:

*max 6 hrs P/NP with permission; 13+ hrs @ 400 level for non-Raikes.*

*★ new constraint fall 2013: 6+ hrs lecture-based technical electives.*

*+ prereq for, ! deficiency for graduate school.*

Course	Title	RAIK	Hrs
CSCE 10	CSE Freshman Seminar		0
+ CSCE 155	Introduction to Comp Sci I	183	3
+ CSCE 156	Introduction to Comp sci II	184	4
+ CSCE 230	Computer Organization	284	4
+ CSCE 235	Introduction to Discrete Struct	(283)	3
CSCE 251	Unix Programming		1
+ CSCE 310	Data Structures & Algos	283	3
! CSCE 322	Programming Lang Concepts		3
CSCE 361	Intro to Software Engineering	383	3
CSCE 486	CS Professional Development	381&2	3
CSCE 487	CS Senior Design Project	402	3
! CSCE 351 or 451	OS Kernels or OS Principles		3
CSCE 423 or 428	Des & An Algos or Automata		3
CSCE 3/4 _____	<i>Technical Elective - lecture ★</i>	DM	3
CSCE 3/4 _____	<i>Technical Elective - lecture ★</i>	MAS	3
CSCE 3/4 _____	<i>Technical Elective</i>	301	3
	(Raikes only <i>Technical Elective</i> )	401	<u>(3)</u>
			<u>45</u>

### Mathematics Courses:

+ MATH 106	Analytic Geom & Calculus I		5
+ MATH 107	Analytic Geom & Calculus II		4
! MATH 314	Linear Alg (Matrix Theory)		3
! STAT 380	Statistics & Applications		<u>3</u>
			15

### Natural Science Courses: 12

Must include at least one lab (**bold face**). Choose from the following areas:

- CHEM **109, 110, 221** or CHEM **113, 114**
- PHYS 211/**221**, 212/**222**, 213/**223**, ASTR 204/**224**
- LIFE 120/**120L**, 121/**121L**, BIOS **109, 111**, 112/**112L**, 206/**112L**, 206/**205, 207**
- GEOL **101, 103, 210**, 212, 410, METR **100, 205, 370**
- GEOG **155**, 181
- ANTH 242/**242L**

## CSCE Technical Electives

### Informatics Focus:

413	Database Systems	fe
464	Internet Systems & Programming	f+s15
470	Computer Graphics	f
471	Bioinformatics	so
472	Digital Image Processing	f
473	Computer Vision	so
474	Data Mining	se

### Artificial Intelligence Focus:

+ 421	Foundations of Constraint Sat Theory	fe+so
475	Multiagent Systems	fo
476	Artificial Intelligence	s+f15
478	Machine Learning	fe

### Networking & High-End Computing Focus:

430	Computer Architecture (grad school def.)	f
432	High-Performance Processor Architectures	se
434	VLSI Design	so
435	Cluster & Grid Computing	fo
436	Advanced Embedded Systems	s
437	File & Storage Systems	so
438	Sensor Networks	fe
439	Robotics	fo
455	Distributed Operating Systems	s17
456	Parallel Algorithms & Programming	fe
462	Communication Networks	s
+ 463	Data & Network Security	se

### Foundations Focus:

340	Numerical Analysis	f
+ 421	Foundations of Constraint Sat Theory	fe+so
+ 423	Design & Analysis of Algorithms	s+fo
+ 424	Computational Complexity Theory	s16
+ 428	Automata, Computation, & Formal Languages	f+so
477	Cryptography & Computer Security	f+s15

### Software Engineering Focus:

378	Human Computer Interaction	s
425	Compiler Construction	s
464	Internet Systems & Programming	f+s15
493	ILab Project (or 301/2,401/2 DS)	

### Additional Choices:

351	Operating System Kernels	f
399H	Honors Thesis	fssu
451	Operating System Principles	s
457	Systems Administration	fe
491 & 498	Internship & Computer Problems	fssu

*+ indicates applicability as Math major elective.*

## Recent CSCE 496 Special Topics Electives

Title	Focus Area
AI and Heuristics in Software Engr	Software Engr
Computational Meta-Bioinformatics	
Coordination in Global Software Dev (so)	Software Engr
Multiway Data Analysis (se)	Informatics
Self-Managing Comp Sys (so)	
Software Architechure	Informatics
Wireless Communication Networks	Networking ...

## Math Courses as Technical Electives

One non-crosslisted math course can be used as a technical elective for Computer Science, and can also double dip for a Mathematics double major. Similarly, Math will accept one of the following CSCE courses as an elective: 421, 423, 424, 428, 463. Crosslisted courses may always double dip.

MATH/CSCE 340	Numerical Analysis	f
MATH 428	Principles of Operations Research	s
MATH 432	Linear Optimization	?
MATH 433	Nonlinear Optimization	so
MATH 439	Math Models in Biology	?
MATH/CSCE 441	Approximation of Functions	?
MATH/CSCE 447	Numerical Analysis II	so?
MATH 450	Combinatorics	fs?
MATH 452	Graph Theory	so

## Recent Changes in the Program

Many students currently under earlier bulletin years in which ACE has been in effect (2009-11) may wish to switch to a newer bulletin year (2012-). Two important changes have been made. First, the number of hours for the degree has dropped from 125. Second, the College Distribution (CD) Requirement has dropped the second course in History/Humanities, replacing it with a broader choice from any of areas B, C, and D. Any of our required MATH courses easily covers it.

Beginning last year, 2013, there is a restriction placed on the choices for technical electives. At least 6 of the hours will need to be in lecture-based courses. This will limit the number of internship, independent study, and Design Studio courses that can apply.

# Computer Science Degree Requirements

## I. Major Area of Study:

Computer Science (C or higher required in CSCE)	45
Mathematics	15
Natural Science	12

Earn a **focus** with 3 technical elective courses in one area!

## II. Minor Area of Study: Suggest MATH 208 for Mathematics!

## III. ACE Student Learning Outcomes:

Max of 9 hrs in any one department for ACE 4-10.

1. Written Communication (in Raikes)	3
2. Oral Communication (in Raikes)	3
3. Math & Computation (all in major)	–
4. Natural Sciences (all in major)	–
5. Humanities/History	3
6. Social Sciences (in Raikes)	3
7. Fine Arts (in Raikes)	3
8. Ethics (all in major)	–
9. Human Diversity	3
10. Integrated Knowledge (all in major)	–

See <http://ace.unl.edu/> for details and listings.

## IV. College Distribution (CD) Requirements:

(In addition to and distinct from ACE)

A. Written Communication (another ACE 1)	3
B. Math and Science (all in major)	–
C. Humanities/History (CLAS, ENGL, HIST, PHIL, RELG)	3
D. Social Sciences (ANTH, COMM, GEOG, POLS, PSYC, SOCI)	3
E. Foreign Language 101 <sub>5</sub> , 102 <sub>5</sub> , 201 <sub>3</sub> , 202 <sub>3</sub>	0-16 *
F. Additional CD not from CSCE	–

\* 2 semesters at 200 level **or** 4 years H.S. **or** English second language.

**Total hours for graduation:** 120, of which typically 72 are in the major, 4 in the Math minor, and 27–43 in the General Studies (ACE and CD), leaving up to 17 as pure electives.

## Example Eight Semester Schedule - 120 hrs

<b>Fall 1</b>					<b>Spring 1</b>			
CSCE	10	CS Sem	0		CSCE	156	CS II	4
CSCE	155	CS I	3		CSCE	235	Discrete	3
MATH	106	Calc I	5		CSCE	251	Unix	1
		ACE 1	3		MATH	107	Calc II	4
Lang	201	Language	3		Lang	202	Language	3
			<u>14</u>					<u>15</u>
<b>Fall 2</b>					<b>Spring 2</b>			
CSCE	310	Algos	3		CSCE	230	Comp Org	4
Elect		MATH 208?	4		CSCE	361	Soft Engr	3
NatSci		(with lab)	4		MATH	314	Lin Alg	3
		ACE 2	3		NatSci		(with lab)	4
		CDR A	3					<u>14</u>
			<u>17</u>					
<b>Fall 3</b>					<b>Spring 3</b>			
CSCE	322	Lang Conc	3		CSCE	3/4XX	elective	3
STAT	380	Stats	3		CSCE	3/4XX	elective	3
NatSci			4				CDR C	3
		ACE 5	3				CDR D	3
		ACE 6	3				ACE 7	3
			<u>16</u>					<u>15</u>
<b>Fall 4</b>					<b>Spring 4</b>			
CSCE	351	or 428	3		CSCE	423	or 451	3
CSCE	3/4XX	elective	3		CSCE	487	CS Sen Des	3
CSCE	486	CS Prof	3				ACE 9	3
Elect			3		Elect			3
Elect			3		Elect			2
			<u>15</u>					<u>14</u>

### Departmental Advising:

<http://cse.unl.edu/advising>

Charles Riedesel (Chief Undergraduate Adviser)

259 Avery Hall, 472-3486, chuckr@unl.edu

Chris Bourke (Adviser)

363 Avery Hall, 472-5008, cbourke@cse.unl.edu

Ryan Patrick (Adviser)

365 Avery Hall, 472-5089, rypat@unl.edu

### General College Advising:

*Arts & Sciences Advising Center*, 107 Oldfather Hall 472-4190,

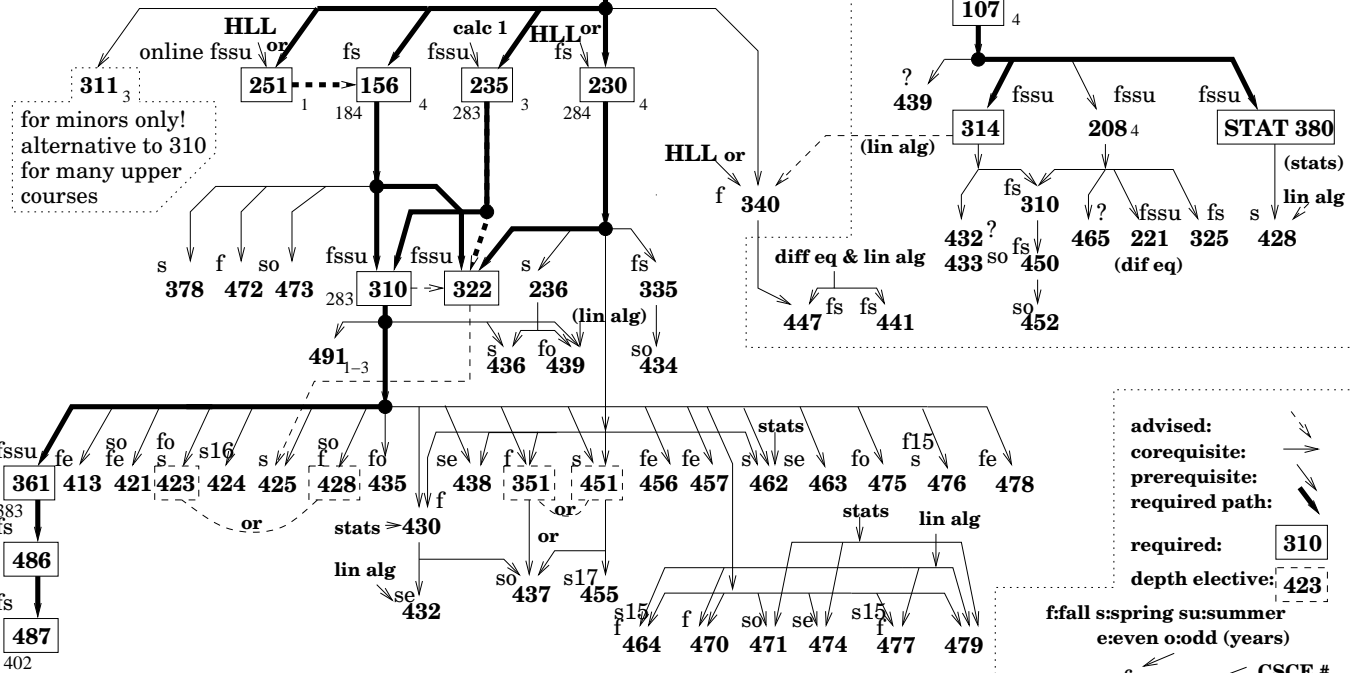
<http://cas.unl.edu/advisingcenter.html>

Computer Science Placement see <http://cse.unl.edu/cse-placement-exam/>  
 Math Placement see <http://www.math.unl.edu/resources/undergraduate/mpe/>

**MINOR IN COMPUTER SCIENCE**  
 CSCE155, 156, plus 11 hrs of  
 electives (at least one at 3/400 level)

**101/101L**  
 fssu 155  
 10 0 183  
 155 3  
**A - Java (general)**  
 E - C (systems)  
 N - (Engr/Sci)  
 T - (multimedia)

**double major add:**  
 208 (makes the minor)  
 310 and 325  
 2 more 3/400  
 2 more 400  
 double dip one math!



# COMPUTER SCIENCE PROGRAM

## Computer Science & Engineering and Supporting Courses