

UNIVERSITY OF  
**Nebraska**  
Lincoln

*Pioneering new frontiers.*

Bachelor of Science in  
**Computer Science**

Advising Brochure  
**2015 – 2016**

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 9, 2015

## Computer Science Major Requirements

### 72-73 Hours of CSCE, MATH, and Natural Science Courses

#### Computer Science & Engineering Courses: (45-46 hours)

- max 6 hrs P/NP for CSCE with permission (3 for MATH if minor)
- min 13 hrs of CSCE/RAIK/MATH @ 400 level
- min grade of C for CSCE/RAIK/minors
- for our graduate program: + prereq; ! deficiency

Course	Title	Raikes		Hrs
		RAIK	Hrs	
CSCE 10	CSE Freshman Seminar		0	0
+ CSCE 155	Introduction to Comp Sci I	183H	4	3
+ CSCE 156	Introduction to Comp sci II	184H	4	4
+ CSCE 230	Computer Organization		4	4
+ CSCE 235	Introduction to Discrete Struct	(283H)	0	3
CSCE 251	Unix Programming		1	1
+ CSCE 310	Data Structures & Algos	283H	3	3
! CSCE 322	Programming Lang Concepts		3	3
CSCE 361	Intro to Software Engineering	383H	3	3
CSCE 486	CS Professional Development	381H	3	3
CSCE 487	CS Senior Design Project	402H	3	3
! CSCE 351/451	OS Kernels or OS Principles		3	3
CSCE 423/428	Des & An Algos or Automata		3	3
CSCE 3/4 _____	<i>Technical Elective - lecture</i>	411H	3	3
CSCE 3/4 _____	<i>Technical Elective - lecture</i>	475H	3	3
CSCE 3/4 _____	<i>Technical Elective</i>	301H	3	3
	(Raikes only <i>Technical Elective</i> )	401H	<u>3</u>	<u>0</u>
			46	45

#### Mathematics Courses:

+ MATH 106	Calculus I	5
+ MATH 107	Calculus II	4
! MATH 314	Linear Alg (Matrix Theory)	3
! STAT 380	Statistics & Applications	<u>3</u>
Add MATH 208	Calculus III (4 hr) for Math Minor!	15

#### Natural Science Courses:

12

Most are 4 hours so need at least 3 courses. Must include at least one lab (**bold face**). Choose from the following (or more advanced):

- CHEM **109 & 110** or **113 & 114** and **221, 261/262, 263/264**
- PHYS 211/**221**, 212/**222**, 213/**223**                      ASTR 204/**224**
- LIFE 120/**120L**, 121/**121L**                              BIOS 206/**205, 207**
- GEOL **101, 103, 210, 211, 310, 340**
- METR **100, 205, 223, 311, 312, 323, 341**
- GEOG **155, 181**
- ANTH 242/**242L**

## CSCE Technical Electives

### Informatics Focus:

411	Data Modeling for Sys Dev	?
411H	(Raikes Data Mod for Sys Dev)	s
413	Database Systems	f
464	Internet Systems & Programming	s
470	Computer Graphics	f(not 17)
471	Bioinformatics	so
472	Digital Image Processing	f(not 15)
473	Computer Vision	so
474	Data Mining	se

### Artificial Intelligence Focus:

421	Foundations of Constraint Sat Theory	fo
475	Multiagent Systems	fe
475H	(Raikes Multiagent Systems)	s
476	Artificial Intelligence	s
478	Machine Learning	fe

### Networking & High-End Computing Focus:

351	Operating System Kernels	f
430	Computer Architecture (grad school def.)	s
432	High Performance Proc. Archs	?
434	VLSI Design	s18...
435	Cluster & Grid Computing	fo
436	Advanced Embedded Systems	fo
437	File & Storage Systems	?
438	Sensor Networks	f18
439	Robotics	fo
451	Operating System Principles	s
455	Distributed Operating Systems	so
456	Parallel Algorithms & Programming	fe
457	Systems Administration	fo
462	Communication Networks	s
463	Data & Network Security	se(not 16)
465	Wireless Communication Networks	?

### Foundations Focus:

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

### Software Engineering Focus:

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

### Additional Choices:

399H	Honors Thesis	fssu
491 & 498	Internship & Computer Problems	fssu

## Recent CSCE 496 Special Topics Electives

Title	Focus Area
Adv Topics in Software Engr (fe)	Software Engr
AI and Heuristics in Software Engr (s16)	Software Engr
Computational Methods in Bioinfo (f)	Informatics
Coordination in Global Software Dev (so)	Software Engr
Genetically Engineered Sys (f)	Networking & High End
Human-Robot Interaction (f)	Networking & High End
Multiway Data Analysis (se)	Informatics
Queuing Models (f17)	Foundations
Self-Managing Comp Sys (f18)	Networking & High End

## Math Courses as Technical Electives

Math will accept one of the following CSCE courses as a Math major elective: CSCE 421, 423, 424, 428, 463. Since CS majors must take CSCE 423 or 428, this double-dipping for double majors is automatic.

Similarly, one (non-crosslisted) math course from the following list can be used as a technical elective for Computer Science, thus potentially double-dipping for a double major. Crosslisted courses may always double dip.

MATH 428	Principles of Operations Research	s
MATH 432	Linear Optimization	?
MATH 433	Nonlinear Optimization	se
MATH 439	Math Models in Biology	s
MATH 450	Combinatorics	fo
MATH 452	Graph Theory	fe
MATH/CSCE 440	Numerical Analysis	f
MATH/CSCE 441	Approximation of Functions	?
MATH/CSCE 447	Numerical Analysis II	se

## Recent Changes in the Program

ACE has been in effect since 2009. Beginning in 2012 the number of hours for the degree dropped from 125 to 120. Also, the College Distribution (CD) Requirement dropped the second course in History/Humanities.

Beginning in 2013, a restriction was placed on the choices for technical electives: At least 6 of the hours now need to be in lecture-based courses. This limits the number of internship, independent study, and Design Studio courses that can apply to just 3 hours.

In 2014 a zero credit hour CSCE 10 Orientation course was added to the requirements.

## Computer Science Major Requirements

### Major, Minor, plus 27-43 Hours of ACE and CDR Courses

<b>I. Major Area of Study: 72-73 hours</b>		
Computer Science		45-46
(Earn an optional <b>Focus</b> with all 3 technical electives in one area)		
Mathematics		15
Natural Science		12
<b>II. Minor Area of Study: Suggest MATH 208 to complete the Mathematics minor!</b>		4-18
<b>III. ACE Student Learning Outcomes: 6-18 hours</b>		
Max of 9 hrs in any one depart for ACE 4-10	<b>Raikes</b>	
1. Written Communication	–	3
2. Oral Communication	–	3
3. Math & Computation (all in major)	–	–
4. Natural Sciences (all in major)	–	–
5. Humanities/History	3	3
6. Social Sciences	–	3
7. Fine Arts	–	3
8. Ethics (all in major)	–	–
9. Human Diversity	3	3
10. Integrated Knowledge (all in major)	–	–
See <a href="http://ace.unl.edu/">http://ace.unl.edu/</a> for details and listings.		
<b>IV. College Distribution Requirements: 9-25 hours</b>		
(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> (need 6 hrs 200 level, 4 years HS, or ESL)		0-16
F. Additional CD not from CSCE		–
<b>V. Electives: 0-17 hours</b>		0-17
<b>Total hours for the degree:</b>		<b>120</b>

## 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/undergraduate-advising-center>*

Charles Riedesel (Chief Advisor) 259 Avery, 472-3486, *chuckr@unl.edu*

Chris Bourke (Advisor) 363 Avery, 472-5008, *cbourke@cse.unl.edu*

Jeff Ifland (Advisor) 259 Avery Hallway, *jifland@cse.unl.edu*

Mohammad Hasan (Advisor) 123E Avery, *hasan@unl.edu*

Jenna Huttenmaier (Admin Coordinator) 269 Avery,

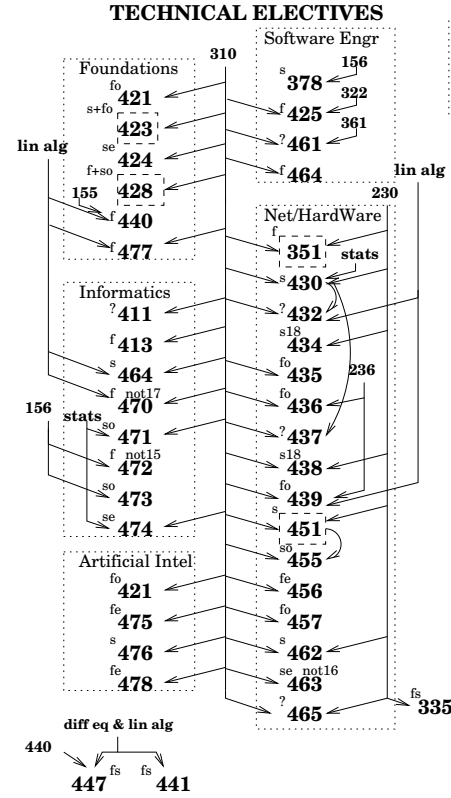
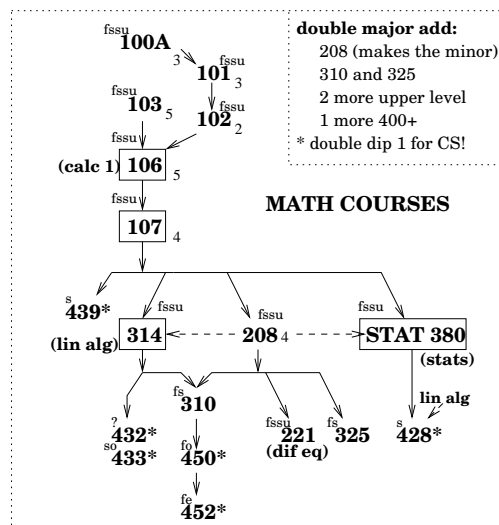
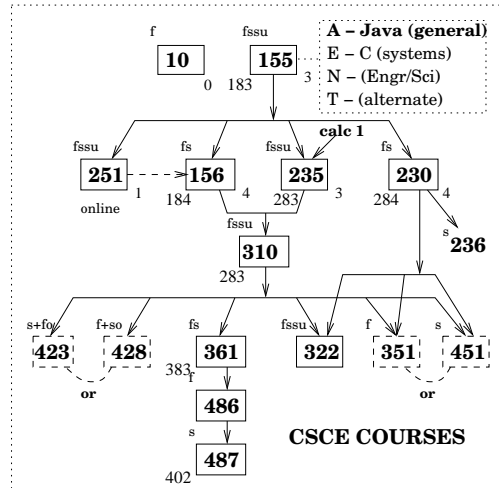
*jenna.huttenmaier@unl.edu*

Ryan Patrick (Advisor) 365 Avery, 472-5089, *rypat@unl.edu*

### General College Advising:

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

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



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

155(T) → 311 (3) for minors only!  
 alternative to 310 for many upper courses

**advised:** ↘  
**corequisite:** →  
**prerequisite:** ↙  
**required:** 310  
**depth elective:** 423  
**ffall s:spring su:summer**  
**eeven o:odd (years)**  
**RAIK # → 283 ← hours**

# COMPUTER SCIENCE PROGRAM

## Computer Science & Engineering and Supporting Courses