Bachelor of Science in

Computer Science

Advising Brochure

2013 – 2014

Department of

Computer Science & Engineering

College of Arts & Sciences

256 Avery Hall

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: May 20, 2013
Computer Science Major Requirements

Computer Science & Engineering Courses:

max 6 hrs P/NP with permission; 13+ hrs @ 400 level for non-Raikes.
★ new constraint for fall 2013: 6+ hrs lecture-based technical electives.
+ prereq for, ! deficiency for graduate school.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>RAIK</th>
<th>Hrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>+ CSCE 155</td>
<td>Introduction to Comp Sci I</td>
<td>183</td>
<td>3</td>
</tr>
<tr>
<td>+ CSCE 156</td>
<td>Introduction to Comp Sci II</td>
<td>184</td>
<td>4</td>
</tr>
<tr>
<td>+ CSCE 230</td>
<td>Computer Organization</td>
<td>284</td>
<td>4</td>
</tr>
<tr>
<td>+ CSCE 235</td>
<td>Introduction to Discrete Struct (283)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>+ CSCE 251</td>
<td>Unix Programming</td>
<td></td>
<td></td>
</tr>
<tr>
<td>+ CSCE 310</td>
<td>Data Structures &amp; Algos</td>
<td>283</td>
<td>3</td>
</tr>
<tr>
<td>! CSCE 322</td>
<td>Programming Lang Concepts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CSCE 361</td>
<td>Intro to Software Engineering</td>
<td>383</td>
<td>3</td>
</tr>
<tr>
<td>CSCE 486</td>
<td>CS Professional Development</td>
<td>381&amp;2</td>
<td>2</td>
</tr>
<tr>
<td>CSCE 487</td>
<td>CS Senior Design Project</td>
<td>402</td>
<td>3</td>
</tr>
<tr>
<td>! CSCE 351 or 451</td>
<td>OS Kernels or OS Principles</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CSCE 423 or 428</td>
<td>Des &amp; An Algos or Automata</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CSCE 3/4</td>
<td>Technical Elective - lecture ★</td>
<td>378</td>
<td>3</td>
</tr>
<tr>
<td>CSCE 3/4</td>
<td>Technical Elective - lecture ★</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CSCE 3/4</td>
<td>Technical Elective</td>
<td>301</td>
<td>3</td>
</tr>
<tr>
<td>(Raikes only Technical Elective)</td>
<td></td>
<td>401</td>
<td>(3)</td>
</tr>
</tbody>
</table>

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 | 3 |

Natural Science Courses:

Must include two labs (bold face) from one area. 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, METR 200, 205, 370
- GEOG 155, 181
- ANTH 242/242L
# CSCE Technical Electives

**Informatics Focus:**
- 413 Database Systems  
- 464 Internet Systems & Programming
- 470 Computer Graphics  
- 471 Bioinformatics
- 472 Digital Image Processing  
- 473 Computer Vision
- 474 Data Mining

**Artificial Intelligence Focus:**
- 421 Foundations of Constraint Sat Theory  
- 475 Multiagent Systems
- 476 Artificial Intelligence
- 478 Machine Learning

**Networking & High-End Computing Focus:**
- 430 Computer Architecture (grad school def.)  
- 432 High-Performance Processor Architectures
- 434 VLSI Design
- 435 Cluster & Grid Computing
- 436 Advanced Embedded Systems
- 437 File & Storage Systems
- 438 Sensor Networks
- 439 Robotics
- 455 Distributed Operating Systems
- 456 Parallel Algorithms & Programming
- 462 Communication Networks
- 463 Data & Network Security

**Foundations Focus:**
- 340 Numerical Analysis  
- 421 Foundations of Constraint Sat Theory
- 423 Design & Analysis of Algorithms
- 424 Computational Complexity Theory
- 428 Automata, Computation, & Formal Languages
- 477 Cryptography & Computer Security

**Software Engineering Focus:**
- 378 Human Computer Interaction  
- 425 Compiler Construction
- 461 Software Engineering II
- 464 Internet Systems & Programming
- 493 ILab Project (or 301/2,401/2 DS)

**Additional Choices:**
- 351 Operating System Kernels
- 399H Honors Thesis
- 451 Operating System Principles
- 457 Systems Administration
- 491 & 498 Internship & Computer Problems
Recent CSCE 496 Special Topics Electives

<table>
<thead>
<tr>
<th>Title</th>
<th>Focus Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coordination in Global Software Dev (so)</td>
<td>Software Engr</td>
</tr>
<tr>
<td>Multiway Data Analysis (se)</td>
<td>Informatics</td>
</tr>
<tr>
<td>Self-Managing Comp Sys (so)</td>
<td>Informatics</td>
</tr>
<tr>
<td>Software Architecture</td>
<td>Informatics</td>
</tr>
<tr>
<td>Wireless Communication Networks</td>
<td>Networking ...</td>
</tr>
</tbody>
</table>

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. Crosslisted courses may always double dip.

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

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 this 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) 44  
   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 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 3  
   (CLAS,ENGL,HIST,PHIL,RELG)  
   D. Social Sciences 3  
   (ANTH,COMM,GEOG,POLS,PSYC,SOCL)  
   E. Foreign Language 1015, 1025, 2013, 2023 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 71 are in the major, 4 in the Math minor, and 27–43 in the General Studies (ACE and CD), leaving up to 18 as pure electives.
### Example Eight Semester Schedule - 120 hrs

<table>
<thead>
<tr>
<th>Fall 1</th>
<th>Spring 1</th>
</tr>
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<tbody>
<tr>
<td>CSCE 155A CS I 3</td>
<td>CSCE 156 CS II 4</td>
</tr>
<tr>
<td>MATH 106 Calc I 5</td>
<td>CSCE 235 Discrete 3</td>
</tr>
<tr>
<td>ACE 1 3</td>
<td>CSCE 251 Unix 1</td>
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<tr>
<td>Lang 201 Language 3</td>
<td>MATH 107 Calc II 4</td>
</tr>
<tr>
<td>ACE 1 3</td>
<td>Lang 202 Language 3</td>
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</table>

<table>
<thead>
<tr>
<th>Fall 2</th>
<th>Spring 2</th>
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</thead>
<tbody>
<tr>
<td>CSCE 310 Algos 3</td>
<td>CSCE 230 Comp Org 4</td>
</tr>
<tr>
<td>Elect MATH 208? 4</td>
<td>CSCE 361 Soft Engr 3</td>
</tr>
<tr>
<td>NatSci (with lab) 4</td>
<td>MATH 314 Lin Alg 3</td>
</tr>
<tr>
<td>ACE 2 3</td>
<td>NatSci (with lab) 4</td>
</tr>
<tr>
<td>CD A 3</td>
<td>ACE 1 3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fall 3</th>
<th>Spring 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSCE 322 Lang Conc 3</td>
<td>CSCE 3/4XX elective 3</td>
</tr>
<tr>
<td>STAT 380 Stats 3</td>
<td>CSCE 3/4XX elective 3</td>
</tr>
<tr>
<td>NatSci 4</td>
<td>CD C 3</td>
</tr>
<tr>
<td>ACE 5 3</td>
<td>CD D 3</td>
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<tr>
<td>ACE 6 3</td>
<td>ACE 7 3</td>
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<table>
<thead>
<tr>
<th>Fall 4</th>
<th>Spring 4</th>
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</thead>
<tbody>
<tr>
<td>CSCE 351 or 428 3</td>
<td>CSCE 423 or 451 3</td>
</tr>
<tr>
<td>CSCE 3/4XX elective 3</td>
<td>CSCE 487 CS Sen Des 3</td>
</tr>
<tr>
<td>CSCE 486 CS Prof 2</td>
<td>ACE 9 3</td>
</tr>
<tr>
<td>Elect 3</td>
<td>Elect 3</td>
</tr>
<tr>
<td>Elect 3</td>
<td>Elect 3</td>
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</tbody>
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**Departmental Advising:**
http://cse.unl.edu/advising
Charles Riedesel (Chief Undergraduate Adviser)
259 Avery Hall, 472-3486, chuckr@unl.edu
Chris Bourke (Undergraduate Adviser)
363 Avery Hall, 472-5008, cbourke@cse.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)

MATH COURSES

COMPUTER SCIENCE PROGRAM
Computer Science & Engineering
and Supporting Courses