COMPUTER SCIENCE, MS

Department of Computer Science, College of Information Science & Technology

Vision Statement
The vision of the department is to be recognized nationally and internationally for delivering outstanding computer science education and conducting research of high distinction, both of value and relevance to the communities we serve.

Program Contact Information
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Program Website (http://www.unomaha.edu/college-of-information-science-and-technology/computer-science/graduate)

Other Program-Related Information
The Department of Computer Science offers an Integrated Undergraduate-Graduate Program of 146-149 hours to include both the undergraduate BS in Computer Science and the MS in Computer Science degrees. It allows eligible students to work toward the master’s degree in computer science while completing their undergraduate degree. For further information about this program please contact 402-554-3819.

Graduate Assistantships
- Applications will be solicited before the Fall semester begins with the limited number of available assistantships. These positions are highly competitive and evaluated based on qualifications and computer science faculty research needs.

Advantage Scholarship for Non-Nebraska Residents
- Awarded to qualified students who are not residents of Nebraska.
- Tuition scholarships partially reduce the difference between resident and non-resident tuition
- Application submission deadlines:
  - Fall: April 15
  - Spring: November 15
- Must maintain a cumulative GPA of 3.20 or better for renewal of the scholarship
- If an application is submitted after a deadline, it will be added to the wait-list. If funds become available, the department will notify the applicant.

Admissions
Application Deadlines
- Fall: July 1
- Spring: November 1
- Summer: March 1

Program-Specific Requirements
- Minimum GPA of at least 3.0 in undergraduate courses related to proposed major.
- If English is not the language of nurture, the following minimum official test scores from the TOEFL, IELTS or PTE exam are required:
  - 550 for the written TOEFL
  - 213 for the computer-based TOEFL
  - 80 for the internet-based TOEFL
  - 6.5 on the IELTS
  - 53 PTE
- Minimum Graduate Record Examination (GRE) score 158 in Quantitative Reasoning and 146 in Verbal Reasoning. The submitted score must not be older than five years.
  - GRE is waived if the student is a graduate of the University of Nebraska system with a degree in Computer Science and a GPA of 3.5; or the student has earned an MS or a higher advanced degree in a closely related discipline
- Two (2) letters of recommendation
- Professional resume

Undergraduate Deficiencies
The curriculum for the MS in Computer Science requires a basic knowledge of computer fundamentals including mathematics, programming, data structures, computer architecture and operating systems. Successful completion of these courses with a “B” or better (3.0 on a 4.0 scale) in each course is required to become an unconditionally admitted student.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIST 1400</td>
<td>INTRODUCTION TO COMPUTER SCIENCE I</td>
<td>3</td>
</tr>
<tr>
<td>CSCI 1620</td>
<td>INTRODUCTION TO COMPUTER SCIENCE II</td>
<td>3</td>
</tr>
<tr>
<td>CSCI 8010</td>
<td>FOUNDATIONS OF COMPUTER SCIENCE</td>
<td>3</td>
</tr>
<tr>
<td>CSCI 3710</td>
<td>INTRODUCTION TO DIGITAL DESIGN AND COMPUTER ORGANIZATION</td>
<td>3</td>
</tr>
<tr>
<td>CSCI 4350</td>
<td>COMPUTER ARCHITECTURE</td>
<td>3</td>
</tr>
<tr>
<td>CSCI 4500/8506</td>
<td>OPERATING SYSTEMS</td>
<td>3</td>
</tr>
<tr>
<td>CSCI 4220</td>
<td>PRINCIPLES OF PROGRAMMING LANGUAGES</td>
<td>3</td>
</tr>
<tr>
<td>CSCI 4830/8836</td>
<td>INTRODUCTION SOFTWARE ENGINEERING</td>
<td>3</td>
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</tbody>
</table>

Core Courses
The five courses listed below provide an overall breadth in the areas of languages, algorithms, architecture, operating systems, and software engineering. Refer to the UNO Graduate College quality of work standards for additional grade requirements.

Students selecting the Thesis/Project option or declaring a concentration area as part of their program are required to take three core courses; students selecting Coursework option with no area of concentration must take all five core courses (note that some core courses are needed as prerequisites for certain areas of concentration).

Coursework Option
<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSCI 8000</td>
<td>ADVANCED CONCEPTS IN PROGRAMMING LANGUAGES</td>
<td>3</td>
</tr>
<tr>
<td>CSCI/MATH 8080</td>
<td>DESIGN AND ANALYSIS OF ALGORITHMS</td>
<td>3</td>
</tr>
<tr>
<td>CSCI 8150</td>
<td>ADVANCED COMPUTER ARCHITECTURE</td>
<td>3</td>
</tr>
<tr>
<td>CSCI 8530</td>
<td>ADVANCED OPERATING SYSTEMS</td>
<td>3</td>
</tr>
<tr>
<td>CSCI 8700</td>
<td>SOFTWARE SPECIFICATIONS AND DESIGN</td>
<td>3</td>
</tr>
</tbody>
</table>

Electives
Select either three or five elective courses depending on whether a computer science area of concentration is declared.

Concentrations

All areas of concentration require four (4) classes selected according to the requirements of each concentration. See Computer Science Concentrations.

CSCI 8910  MASTER OF SCIENCE CAPSTONE 1  3
TOTAL 33

1 The Capstone course should be taken only after students have completed at least 75% of course requirements for the major, this includes all core classes. Students with insufficient progress toward degree completion are prohibited from enrolling. Students must have an overall GPA of at least a 3.0 to register for the Capstone Course.

Thesis Option

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Core Courses</td>
<td></td>
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</tbody>
</table>
Select three of the following: 9
CSCI 8000  ADVANCED CONCEPTS IN PROGRAMMING LANGUAGES
CSCI/MATH 8080  DESIGN AND ANALYSIS OF ALGORITHMS
CSCI 8150  ADVANCED COMPUTER ARCHITECTURE
CSCI 8530  ADVANCED OPERATING SYSTEMS
CSCI 8700  SOFTWARE SPECIFICATIONS AND DESIGN

Electives
Select any five additional graduate-level computer science courses.

Concentrations

All areas of concentration require four (4) classes selected according to the requirements of each concentration. See Computer Science Concentrations.

CSCI 8990  THESIS  6
Total 30

Project Option

<table>
<thead>
<tr>
<th>Code</th>
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</thead>
<tbody>
<tr>
<td>Core Courses</td>
<td></td>
<td></td>
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</tbody>
</table>
Select three of the following: 9
CSCI 8000  ADVANCED CONCEPTS IN PROGRAMMING LANGUAGES
CSCI/MATH 8080  DESIGN AND ANALYSIS OF ALGORITHMS
CSCI 8150  ADVANCED COMPUTER ARCHITECTURE
CSCI 8530  ADVANCED OPERATING SYSTEMS
CSCI 8700  SOFTWARE SPECIFICATIONS AND DESIGN

Electives
Select any five additional graduate-level computer science courses.

Concentrations

All areas of concentration require four (4) classes selected according to the requirements of each concentration. See Computer Science Concentrations.

CSCI 8960  THESIS EQUIVALENT PROJECT IN COMPUTER SCIENCE  6
Total 30

Total Credit Hours

Thesis Option: 30 hours
Project Option: 30 hours

Thesis Option: 33 hours

Concentrations

Artificial Intelligence
Students must take any 3 of the 5 Core Courses listed under the Requirements tab (9 hours).

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Required Courses</td>
<td></td>
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</tbody>
</table>
CSCI 8456  INTRODUCTION TO ARTIFICIAL INTELLIGENCE  3

Elective Courses

Select three of the following: 9
CSCI 8110  ADVANCED TOPICS IN ARTIFICIAL INTELLIGENCE
CSCI 8300  IMAGE PROCESSING COMPTR VISION
CSCI 8450  ADVANCED TOPICS IN NATURAL LANGUAGE UNDERSTANDING
CSCI 8476  PATTERN RECOGNITION
CSCI/MATH 8480  MULTI-AGENT SYSTEMS AND GAME THEORY
CSCI 8486  ALGORITHMS FOR ROBOTICS
Total Credits 12

Database and Knowledge Engineering

Students must take any 3 of the 5 Core Courses listed under the Requirements tab (9 hours).

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Required Courses</td>
<td></td>
<td></td>
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</tbody>
</table>
CSCI 8856  DATABASE MANAGEMENT SYSTEMS  3
CSCI 8340  DATABASE MANAGEMENT SYSTEMS II  3
CSCI 8360  INFORMATION STORAGE AND RETRIEVAL  3

Elective Courses

Select one of the following: 3
CSCI 8040  LARGE SCALE NETWORK ANALYSIS ALGORITHMS
CSCI 8350  DATA WAREHOUSING AND DATA MINING
CSCI 8390  ADVANCED TOPICS IN DATA BASE MANAGEMENT
CSCI 8876  DATABASE SEARCH AND PATTERN DISCOVERY IN BIOINFORMATICS
Total Credits 12

Information Assurance

Students must take any 3 of the 5 Core Courses listed under the Requirements tab (9 hours).

<table>
<thead>
<tr>
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<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>Required Courses</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Select two of the following: 6
CSCI 8430  TRUSTED SYSTEM DESIGN, ANALYSIS AND DEVELOPMENT
CSCI 8610  FAULT TOLERANT DISTRIBUTED SYSTEMS
CSCI 8760  FORMAL METHODS IN SOFTWARE ENGINEERING

Elective Courses

Select two of the following: 6
CSCI/CYBR 8410  DISTRIB SYSTEM & NETWORK SEC
### Network Technologies

Students must take any 3 of the 5 Core Courses listed under the Requirements tab (9 hours).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CSCI 8210</td>
<td>ADV COMMUNICATIONS NETWORKS</td>
<td>3</td>
</tr>
<tr>
<td>CSCI 8040</td>
<td>LARGE SCALE NETWORK ANALYSIS ALGORITHMS</td>
<td></td>
</tr>
<tr>
<td>CSCI/MATH 8156</td>
<td>GRAPH THEORY &amp; APPLICATIONS</td>
<td></td>
</tr>
<tr>
<td>CSCI/CYBR 8410</td>
<td>DISTRIB SYSTEM &amp; NETWORK SEC</td>
<td></td>
</tr>
<tr>
<td>CSCI 8610</td>
<td>FAULT TOLERANT DISTRIBUTED SYSTEMS</td>
<td></td>
</tr>
<tr>
<td>CSCI 8620</td>
<td>MOBILE COMPUTING AND WIRELESS NETWORKS</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 12

### Software Engineering

Required Core Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CSCI 8700</td>
<td>SOFTWARE SPECIFICATIONS AND DESIGN</td>
<td>3</td>
</tr>
</tbody>
</table>

Students must take any 2 of the 5 Core Courses listed under the Requirements tab (6 hours).

Select 12 Credit Hours: 12

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CSCI 8256</td>
<td>HUMAN COMPUTER INTERACTION</td>
<td></td>
</tr>
<tr>
<td>CSCI 8266</td>
<td>USER INTERFACE DESIGN AND DEVELOPMENT</td>
<td></td>
</tr>
<tr>
<td>CSCI/CYBR 8420</td>
<td>SOFTWARE ASSURANCE</td>
<td></td>
</tr>
<tr>
<td>CSCI 8430</td>
<td>TRUSTED SYSTEM DESIGN, ANALYSIS AND DEVELOPMENT</td>
<td></td>
</tr>
<tr>
<td>CSCI 8710</td>
<td>MODERN SOFTWARE DEVELOPMENT METHODOLOGIES</td>
<td></td>
</tr>
<tr>
<td>CSCI 8760</td>
<td>FORMAL METHODS IN SOFTWARE ENGINEERING</td>
<td></td>
</tr>
<tr>
<td>CSCI 8790</td>
<td>ADVANCED TOPICS IN SOFTWARE ENGINEERING</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 12

### Systems

Required Core Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSCI 8150</td>
<td>ADVANCED COMPUTER ARCHITECTURE</td>
<td></td>
</tr>
<tr>
<td>CSCI 8530</td>
<td>ADVANCED OPERATING SYSTEMS</td>
<td></td>
</tr>
</tbody>
</table>

Students must take any 1 of the 5 Core Courses listed under the Requirements tab (3 hours).

Required Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSCI 8170</td>
<td>VLSI TESTING</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 3

### Quality of Work Standards

The Graduate College Quality of Work Standards shall be applied to foundation courses as well as courses taken as part of the degree program. In particular, the GPC will recommend to the Graduate College that any

1. Student receiving a grade of "C-" or below in any foundation course will be dismissed from the program or, in the case of unclassified or non-degree students, be automatically denied admission.
2. Student receiving a grade of "C" in any foundation course will be placed on probation or dismissed from the program.
3. At most two graduate courses ending in 6 (8xx6) will be counted toward the degree requirements. Graduate courses with an undergraduate component (listed under Undergraduate Deficiencies) are not eligible as elective courses.
4. Students must have a minimum grade point average (GPA) of 3.0 ("B"), with at most one grade below "B", but not lower than "C+", for all Computer Science graduate courses in order to register for CSCI 8950.