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
Dr. Azad Azadmanesh, Graduate Program Chair (GPC)
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Ms. Leslie Planos, Advisor
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402-554-3819
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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

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>Course</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>FOUNDATNS 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>
</tr>
</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>
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<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSCI 8000</td>
<td>ADVANCED CONCEPTS IN PROGRAMMING LANGUAGES</td>
<td>3</td>
</tr>
</tbody>
</table>
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 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  

TOTAL  
33

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

Core Courses
Select three of the following:  

<table>
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</thead>
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<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 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 Credit Hours
Thesis Option: 30 hours  
Project Option: 30 hours  
Coursework Option: 33 hours

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

<table>
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<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CSCI 8456</td>
<td>INTRODUCTION TO ARTIFICIAL INTELLIGENCE</td>
<td>3</td>
</tr>
</tbody>
</table>

Elective Courses
Select three of the following:  

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSCI 8110</td>
<td>ADVANCED TOPICS IN ARTIFICIAL INTELLIGENCE</td>
<td></td>
</tr>
<tr>
<td>CSCI 8300</td>
<td>IMAGE PROCESSING COMPTR VISION</td>
<td></td>
</tr>
<tr>
<td>CSCI 8450</td>
<td>ADVANCED TOPICS IN NATURAL LANGUAGE UNDERSTANDING</td>
<td></td>
</tr>
<tr>
<td>CSCI 8476</td>
<td>PATTERN RECOGNITION</td>
<td></td>
</tr>
<tr>
<td>CSCI/MATH 8480</td>
<td>MULTI-AGENT SYSTEM AND GAME THEORY</td>
<td></td>
</tr>
<tr>
<td>CSCI 8486</td>
<td>ALGORITHMS FOR ROBOTICS</td>
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Total Credits 12

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

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

Elective Courses
Select one of the following:  

<table>
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<tr>
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<tbody>
<tr>
<td>CSCI 8040</td>
<td>LARGE SCALE NETWORK ANALYSIS ALGORITHMS</td>
<td>3</td>
</tr>
<tr>
<td>CSCI 8350</td>
<td>DATA WAREHOUSING AND DATA MINING</td>
<td></td>
</tr>
<tr>
<td>CSCI 8390</td>
<td>ADVANCED TOPICS IN DATA BASE MANAGEMENT</td>
<td></td>
</tr>
<tr>
<td>CSCI 8876</td>
<td>DATABASE SEARCH AND PATTERN DISCOVERY IN BIOINFORMATICS</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 12

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

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<tr>
<th>Code</th>
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<th>Credits</th>
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</table>

Required Courses
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
CSCI/CYBR 8420 SOFTWARE ASSURANCE
CSCI 8450 ADVANCED TOPICS IN NATURAL LANGUAGE UNDERSTANDING
CYBR 8460 SECURITY OF EMBEDDED SYSTEMS
CYBR 8470 SECURE WEB APPLICATION DEVELOPMENT

Total Credits 12

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

<table>
<thead>
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</tr>
</thead>
<tbody>
<tr>
<td>CSCI 8210</td>
<td>ADV COMMUNICATIONS NETWORKS</td>
<td>3</td>
</tr>
</tbody>
</table>

Elective Courses
Select three of the following: 9

CSCI 8040 LARGE SCALE NETWORK ANALYSIS ALGORITHMS
CSCI/MATH 8156 GRAPH THEORY & APPLICATIONS
CSCI/CYBR 8410 DISTRIB SYSTEM & NETWORK SEC
CSCI 8610 FAULT TOLERANT DISTRIBUTED SYSTEMS
CSCI 8620 MOBILE COMPUTING AND WIRELESS NETWORKS

Total Credits 12

Software Engineering

Required Core Courses

<table>
<thead>
<tr>
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<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

CSCI 8256 HUMAN COMPUTER INTERACTION
CSCI 8266 USER INTERFACE DESIGN AND DEVELOPMENT
CSCI/CYBR 8420 SOFTWARE ASSURANCE
CSCI 8430 TRUSTED SYSTEM DESIGN, ANALYSIS AND DEVELOPMENT
CSCI 8710 MODERN SOFTWARE DEVELOPMENT METHODOLOGIES
CSCI 8760 FORMAL METHODS IN SOFTWARE ENGINEERING
CSCI 8790 ADVANCED TOPICS IN SOFTWARE ENGINEERING

Total Credits 12

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.