The need for Cybersecurity professionals is rapidly growing. Nearly every government, military, financial institution, medical establishment, and viable businesses collect, process, and store confidential information in databases. Cyber-attacks and digital spying can take many forms, including high visibility and very damaging offenses such as data breaches, phishing, and identity theft. Attacks can take place within databases, while data is processed, or when it is transmitted across networks. In the world of today, cyber-attacks may be a greater threat than terrorism.

The Graduate Certificate Program in Cybersecurity delivered cooperatively among North Dakota State University (NDSU), the University of North Dakota (UND), and Minot State University (MSU). Regardless of their home campus, enrolled students will take fully online courses from all three institutions. Students will learn learn best practices, new technology, and research in Cybersecurity.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core Courses</td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>EE 590</td>
<td>Emerging Threats and Defenses (University of North Dakota)</td>
<td></td>
</tr>
<tr>
<td>CSCI 773</td>
<td>Foundations of the Digital Enterprise</td>
<td></td>
</tr>
<tr>
<td>CSCI 558</td>
<td>Applied Cryptography (Minot State University)</td>
<td></td>
</tr>
<tr>
<td>Elective</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>CSCI 774</td>
<td>Topics of the Digital Enterprise</td>
<td></td>
</tr>
<tr>
<td>CSCI 783</td>
<td>Topics In Software Systems</td>
<td></td>
</tr>
<tr>
<td>CSCI 796</td>
<td>Special Topics (special topics project course in cyber security with a faculty mentor (available at NDSU, UND, and MSU))</td>
<td></td>
</tr>
<tr>
<td>EE 590</td>
<td>Information Security and Security Practices (University of North Dakota)</td>
<td></td>
</tr>
<tr>
<td>Total Credits</td>
<td></td>
<td>12</td>
</tr>
</tbody>
</table>

**Department Faculty**

**Anne Denton, Ph.D.**
University of Mainz, 1996
Research Interests: Data Mining, Bioinformatics, Scientific Informatics, Databases, Geospatial Data, Cloud Computing

**Jun Kong, Ph.D.**
University of Texas, Dallas, 2005
Research Interests: Human Computer Interaction, Mobile Computing, Software Engineering

**Juan (Jen) Li, Ph.D.**
University of British Columbia, 2008
Research Interests: Large-scale Distributed System (P2P and Cloud Computing, Distributed Search, Routing Algorithms), Semantic Web Technologies, Social Networks, Information Retrieval, Knowledge Discovery

**Simone Ludwig, Ph.D.**
Brunel University, 2004
Research Interests: Swarm Intelligence, Evolutionary Computation, Fuzzy Reasoning, Cloud Computing

**Kenneth Magel, Ph.D.**
Brown University, 1977
Research Interests: Software Engineering, Human-Computer Interfaces, Software Complexity, and Software Design

**Kendall Nygard, Ph.D.**
Virginia Polytechnic Institute and State University, 1978
Research Interests: Data Science, Optimization Modeling, Smart Grid, Sensor Networks, Agents, Artificial Intelligence, Security, Adaptive Systems, Swarm Intelligence

**Saeed Salem, Ph.D.**
Rensselaer Polytechnic Institute, 2009
Research Interests: Bio-Informatics and Data Mining

**Brian Slator, Ph.D.**
New Mexico State University, 1988
Research Interests: Artificial Intelligence, Educational Media

**Jeremy Straub, Ph.D.**
University of North Dakota, 2015
Research Interests: Multi-tier Mission Architecture & Control, Autonomous Data Link Reduction, Autonomous Vehicle Control, Machine Vision, Super Resolution

Vasant Ubhaya, Ph.D.
University of California-Berkeley, 1971
Research Interests: Algorithm Analysis, Approximation and Optimization

Gursimran Walia, Ph.D.
Mississippi State University, 2009

Changhui Yan, Ph.D.
Iowa State University, 2005
Research Interests: Bioinformatics, Computational Biology, Genomics, Machine Learning, Data Mining, Big Data, Cloud Computing

Professors of Practice

Oksana Myronovych, Ph.D.
North Dakota State University, 2009

Mark Pavicic, Ph.D.
Columbia University, 1985

Affiliate Faculty

Otto Borchert, Ph.D.
North Dakota State University, 2015
Research Interests: Artificial Intelligence, Educational Games, STEM Learning

Hyunsook Do, Ph.D.
University of Nebraska, 2007

Hassan Reza, Ph.D.
North Dakota State University, 2002
Research Interests: Software Architecture, Cloud Computing, Architectural Analysis & Description

Xiaodong Zhang, Ph.D.
Dalhousie University, Canada, 2001
Research Interests: Satellite Sensing, Geographic Information Systems