Developing Career-Relevant Academic Programs

A Case Study: UMUC’s B.S. Program in Computer Networks & Cybersecurity

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Topics

• UMUC – History & Mission
• The CMIT Program – Origins
• New Approach to Program Development
• The CNAS Program – Rebirth
• The CNAS Program – Growth
• The CNAS Program – Future

Along the way:
• UMUC’s approach to building new programs.
• Meeting Industry Needs while delivering academic Programs
• Recruit, motivate, and retain quality faculty
UMUC – History & Mission

- Founded in 1947.

- Military heritage – first university to offer classes on military bases overseas; educating the U.S. Military since WW II.

- UMUC’s mission: to “operate as Maryland’s open university, serving working adults, military servicemen and servicewomen and their families, and veterans who reside in Maryland, across the U.S. and around the world.”
UMUC – History & Mission

• Dedicated to serving Adult Learners and Working Professionals.
• Global Leader in Distance and Online Education: 80,000+ Students and 180,000+ Alumni; 150+ Worldwide locations.
• Regionally accredited institution, and member of the University System of Maryland.
• 90+ career-relevant programs (30+ Undergraduate, and 60+ Graduate), offered entirely online.
Multiple Opportunities for Demonstrating Learning

Students can earn credit in a variety of ways:

• Taking a course at UMUC
• Transferring in equivalent course
• Challenge Exam
• Workplace Learning
• Prior Learning
The CMIT Program – Birth (2000)

• CMIT: Computer Information Technology

• Statement from Fall 2000 Catalog:
  “...development of skills and education that workers need to succeed in high-demand employment categories such as network administration...”

• Focus on IT certifications – also impart more general skills/concepts.

• Initial Focus: Windows OS & Novell Networking certs.

• Program started with 7 courses
The CMIT Program – Infancy (to 2005)

After 5 years:
• Cisco track (2001)
• 27 courses

Total Enrollments 2000-2005
The CMIT Program – Childhood (to 2010)

After the first 10 years:
- 23 courses
- New Certifications added: CEH, CISSP, Wireless Network Administration

**Total Enrollments 2000-2010**

- AY00-01: 941
- AY01-02: 2175
- AY02-03: 2446
- AY03-04: 2395
- AY04-05: 2205
- AY05-06: 1636
- AY06-07: 1913
- AY07-08: 1960
- AY08-09: 2241
- AY09-10: 2849
New Approach to Program Development

• Market Analysis & Environmental Scan

• Segue (Supporting Educational Goals for Undergraduate Excellence) started in 2009, and Delivered in 2010

• Key Goals:
  – All programs outcomes based
  – Curriculum design should be based on programs
  – 8 week sessions
  – Simplified (Straight Line) Pathways
  – Integrated Program- & Course-Level Assessment
New Approach to Program Development

• Program Outcomes & Scope: Defined by external Advisory Group

• Career Tracks for Revised Program:
  – Network Administrator, Systems Administrator, IT Manager, Network Engineer, Network Security Administrator
  – Penetration tester
  – Digital Forensics Analyst

• Program renamed to CNAS. Focus on certifications related to Computer Networking and (Cyber)Security.
New Approach to Program Development

Program Outcomes:

- Design, implement, and administer local-area and wide-area networks to satisfy organizational goals
- Resolve IT system problems and meet the needs of end users by applying troubleshooting methodologies
- Apply relevant policies and procedures to effectively secure and monitor IT systems
- Communicate IT knowledge effectively using a wide range of presentation styles
- Meet organizational goals using effective workforce skills, best practices, and ethical principles

• Program re-built to achieve outcomes.
• CNAS Program organized around Four areas:
  - Microsoft
  - Cisco Networking
  - Network Security
  - Digital Forensics
The CNAS Program - Now

Program Structure: 33 Credits

Core (18 Credits)
- Fundamentals of Computer Troubleshooting
- Fundamentals of Networking
- Network Security
- Interconnecting Cisco Devices
- Installing and Configuring Windows Server
- Linux Server

Area Of Concentration (12 Credits. Choose ONE:)
- Microsoft
- Network Security
- Digital Forensics
- CISCO

Capstone (3 credits)
The CNAS Program – IT Certifications Addressed

**Core:**
- CompTIA A+
- CompTIA Network+
- CompTIA Security+
- Cisco CCNA
- Windows Server
- Linux Server Professional (LPIC-1)

**Network Security:**
- Certified Ethical Hacker (CEH)
- Certified Information Systems Security Professional (CISSP)

**Microsoft:**
- Microsoft Certified Solutions Expert (MCSE)

**Cisco:**
- Cisco Certified Network Associate (CCNA)
- Cisco Certified Network Professional (CCNP)
- CCNA Security

**Forensics:**
- Certified Computer Examiner (CCE)
- Computer Security Incident Handler (CSIH)
- Mobile Forensic Certified Examiner (MFCE)
The CNAS Program – Key Drivers

- Regular meetings with Advisory Group
- Track & Monitor Certifications
- Track Major Drivers: DoD 8570/8140, NIST (NICE) Workforce Development Framework
- Academic Partnerships: with Cisco, MS, EC-Council, COMP-TIAA etc.
- Participation in Cyber Competitions
- Become a Preferred Provider of Education for major institutions (e.g. OPM, BAH, Northrop-Grummann, CACI, ManTech etc.)
<table>
<thead>
<tr>
<th>Accreditation</th>
<th>Image</th>
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<tbody>
<tr>
<td>Member of DoD Cyber Crime Center (DC3)</td>
<td></td>
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<tr>
<td>Academic Cyber Curriculum Alliance Board</td>
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<tr>
<td>Certified as Center of Digital Forensics</td>
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<tr>
<td>Academic Excellence</td>
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<tr>
<td>Re-Certified as Center of Academic Excellence in</td>
<td></td>
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<tr>
<td>Information Assurance / Cyber Defense</td>
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<tr>
<td>Member of National CyberWatch</td>
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The CNAS Program Now – Enrollment Growth

After 16 Years:
20 courses

Total Enrollments 2000-2016
The CNAS Program - Headcounts

Headcount by Term

<table>
<thead>
<tr>
<th>Term</th>
<th>Fall</th>
<th>Spring</th>
<th>Summer</th>
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<tbody>
<tr>
<td></td>
<td>2K</td>
<td>4K</td>
<td>57.2%</td>
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<tr>
<td>Fall 2012</td>
<td>16.8%</td>
<td>13.3%</td>
<td>24.0%</td>
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<td>Fall 2013</td>
<td>16.4%</td>
<td>18.9%</td>
<td>19.9%</td>
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<td>Fall 2014</td>
<td>33.3%</td>
<td>14.4%</td>
<td>13.6%</td>
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<td>Fall 2015</td>
<td></td>
<td>49.1%</td>
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<tr>
<td>Fall 2016</td>
<td>43.0%</td>
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E&H Headcount
The CNAS Program - Enrollments
Building an effective Faculty Pool

Faculty:

- 200+ faculty (almost all adjunct) led by a Program Chair
- Collegiate faculty
- Adjunct faculty work as SysAdmins, Network Engineers, Pen-testers, Forensics Analysts, CIOs etc.

Qualifications, Hiring:

- Masters degree, corresponding certification, current Industry Experience: all needed
- In Interviews: look for people who have a passion for teaching, disciplined.
Building an effective Faculty Pool

Evaluation, Promotions
• Faculty promoted on a 3 yr, 30 sh cycle.
• Routinely monitor online classes, student comments & evals

Faculty Support
• Mentoring for new faculty
• Mandatory training for teaching online and hybrid classes.
• Special training for faculty teaching military learners.
• Model classrooms
• Course Chairs
• Online faculty meetings twice a year.
The CNAS Program – The Future

• Competency-Based Curriculum
• Linux Track
• Accelerated Pathway to Graduate Degrees
• Suggestions needed: System Administration
Questions