STUDENT LEARNING OUTCOMES

Beacom College of Computer and Cyber Sciences

Undergraduate Programs - Bachelor

B.S. Computer Game Design

Upon completion of the B.S. degree in Computer Game Design, students will:

- be prepared to contribute to interactive, multimedia software design and development projects, such as digital games, mobile apps, websites, educational software, interactive architectural models, marketing software, and simulations.
- be prepared to work effectively on interdisciplinary teams, with appropriate communication, teamwork, and process skills using collaboration tools as appropriate.
- know some specific tools and processes applicable to game development or similar software efforts, but more importantly graduates will be prepared to quickly and readily apply the principles they have learned to using new or updated tools and processes for similar purposes. Graduates will have applied agile processes while using specific tools, including: multiple game engines, multiple programming languages, 3d modeling, 2d graphics (both raster and vector), web-programming tools, and version control systems.

B.S. Computer Science

Upon completion of the B.S. degree in Computer Science, students will:

- be able to demonstrate mastery of computer science in the following knowledge areas: algorithms, data structures, and complexity; programming languages and compilers; software engineering and development; computer hardware and architecture.
- be able to apply problem-solving skills and the knowledge of computer science to solve real problems.

B.S. Cyber Operations

Upon completion of the B.S. degree in Cyber Operations, students will:

- be able to dynamically and statically analyze computer systems to understand the functional behavior and identify potential security vulnerabilities.

- be able to construct and execute attacks against computer systems to take advantage of discovered vulnerabilities.

- be able to create functionally-sound and robust software in multiple languages to execute in various operating environments.

B.S. Network and Security Administration

Upon completion of the B.S. degree in Network / Security Administration, students will:

- be able to implement the network confidentiality integrity, and availability basic security services.

- be able to engage web applications with vulnerabilities and patch them.

- be able to apply penetration testing procedures to exploit vulnerable systems and be able to configure firewall and IDS for secure network systems.

Undergraduate Programs - Associate

A.S. Network and Security Administration

Upon completion of the A.S. degree in Network / Security Administration, students will:

- be able to perform a range of IT and digital security positions, from network administration to network security to technical support.

- be able to develop and maintain network systems, monitor their operation, and assist other employees with network troubleshooting and operations.

A.S. Software Development

Upon completion of the A.S. in Software Development, students will:

- be able to design, construct, test and maintain computer application software or systems.

- be able to write, test and maintain computer programs and/or web applications in several languages.

- be able to build web-enabled applications.

Undergraduate Programs - Certificate

Certificate in High-Performance Computing

Upon completion of the Certificate in High Performance Computing, students will:

- have a basic introduction to the skills needed to utilize high performance computing resources.
- be able to select algorithms and hardware for the solution of high performance projects.
- be able to run parallel programs on different hardware architectures and software environments and to assess the performance of implementations.

Certificate in IS Management: Network & Telecommunications Administration

Upon completion of the Certificate in IS Management: Network and Telecommunications Administration, students will:

- be able to design a logical network(s), including IP networking scheme and placement of network services.
- be able to configure and troubleshoot services in a networked environment.
- be able to develop a plan, use Internet research, define options, and provide options for further study, leading to a problem solution.
- be able to configure routers and switches to perform routing and maintain virtual LANs in a logical network.

Certificate in IS Management: Object Oriented Programming

Upon completion of the Certificate in IS Management: Object-Oriented Programming, students will:

- be able to design and construct object-oriented software with appropriate layers of abstraction.
- be able to understand and use encapsulation, inheritance, polymorphism and interfaces.
- be able to design architect systems with minimal complexity and cost to attain maximal functionality, flexibility and maintainability.

Certificate in Cybersecurity

Upon completion of the Certificate in Cybersecurity, students will:

- be able to describe and identify cybersecurity issues in IT operations and software.

- be able to use the techniques, skills, and tools necessary for cybersecurity entry level jobs.

Certificate in Networking Management

Upon completion of the Certificate in Network Management, students will:

- be able to use the techniques, skills, and tools necessary for daily IT operations.
- be able to identify, formulate, analyze and solve networking problems for entry level IT jobs.

Certificate in Software Development

Upon completion of the Certificate in Software Development, students will:

- be able to use the techniques, skills, and tools necessary for software development.
- be able to participate in the entry level development of a system, component, or process to meet desired needs.

Graduate Programs – Doctoral

Ph.D. in Cyber Security

Upon completion of the D.Sc. in Cybersecurity, students will:

- be able to articulate the importance of software reverse engineering and successfully complete hands-on exercises and demonstrate a thorough understanding of the domain.
- be able to apply low level programming and understanding of operating systems and software to explain various types of vulnerabilities, their underlying causes, their identifying characteristics, and the ways in which they are exploited.
- be able to conduct research that demonstrates an ability to model, analyze and design cyber operation processes and systems.
- be able to communicate technical information, both orally and in writing, in an effective manner.
- be able to fill the gap having well-trained and talented professionals in academic, industry, and government.

Ph.D. in Cyber Defense

Upon completion of the D.Sc. in Cyber Defense, students will:

- possess a foundation in the security issues; practices, politics and cultures of terrorism; as well as a foundation in research methodology and practice.
- be knowledgeable of in-depth cyber defense education for high-end cyber defense professionals, making them capable of working in industry, government, the military and academia.
- be able to work in a variety of research methodologies.
- be able to research and develop tools to advance the field of network defense, software assurance, the Internet of Things security (IoT), digital forensics, penetration testing and vulnerability scanning.

Graduate Programs - Master

M.S. in Applied Computer Science

Upon completion of the M.S. in Applied Computer Science, students will:

- possess a deep knowledge of and understanding of computer science core areas providing them the ability to create and implement solutions across a broad spectrum of computer application areas.
- possess the ability to analyze complex computer science problems and obtain relevant knowledge and information to contribute to the understanding of the problem and/or propose new solutions.
- (with the Cyber Operations Specialization) be prepared to take on the advanced challenges in this focused security area and will help meet the critical demand for expert knowledge in support of federal, state, and private actors.

M.S. Cyber Defense

Upon completion of the M.S. degree in Cyber Defense, students will:

- be able to prevent network attacks through risk management, vulnerability assessment, intrusion detection and penetration testing.
- be knowledgeable about best practices to respond to external or internal cybersecurity incidents through incident response, forensic imaging, memory forensics and computer forensics.

- be able to protect data through cryptography and through offensive and defensive security practices.

Graduate Programs - Certificate

Certificate in Banking Security

Upon completion of the Graduate Certificate in Banking Security, students will:

- be able to serve the banking industry by providing cyber education that will help institutions better deal with cybersecurity threats and regulations.

Certificate in Ethical Hacking

Upon completion of the Graduate Certificate in Ethical Hacking, students will:

- be able to identify common security tools and compare and contrast their features and purpose.
- be able to perform a realistic penetration test.
- have technical skills that will allow advancement in the field of security assessment.