Harper College

Cybersecurity – Associate in Applied Science Program Map

The 60-hour technical curriculum provides a strong foundation for students to enter the growing field of cybersecurity and prepares students for various technician-level positions in the emerging fields of cybersecurity, including information security analysts, penetration testers, and digital forensics analysts.

First Semester:

Course Number & Title	Course Details	Topics Covered	Course Description
CIS 106 **Computer Logic and Programming Technology** **(3 credits)**	1. Program Requirement 2. Existing Course (updated for Fall 2024) 3. Pre-req: Math placement into MTH101 or higher	Foundational programming concepts Use of variables Control structures Array and data structures File and data access OOP principles Subroutine/function/method implementation Programming applications	Provides students with a comprehensive introduction to computer programming using a currently popular programming language. Includes program logic, program structure, subroutines/functions/methods, variables, conditions, loops, arrays, files/data access, and object-oriented programming. A variety of programs are created throughout the course.
ENG 101 **Composition I** **(3 credits)**	1. AAS General Education Requirement 2. Existing Course 3. Pre-req: ENG096 with a grade of P or other placement options found here		Emphasizes the writing of expository prose. Introduction to the critical reading of nonfiction prose.
MTH 101 or higher **Mathematics[1]** **(3 credits)**	1. AAS General Education Requirement 2. Existing Course 3. MTH103 recommended		
NET 101 **Orientation to Cybersecurity Careers** **(1 credit)**	1. Program Requirement 2. New Course	Cybersecurity field Cybersecurity workforce competencies Cybersecurity academic degrees, and certificates Cybersecurity industry certifications Program of Study and academic pathways to cybersecurity professions Start Smart objectives: College life, learning, and career development.	Provides an overview of the cybersecurity industry and the different careers and work roles in the field. Major skills and knowledge required for cybersecurity professions and associate employment skills and knowledge sets to specific courses in the Cybersecurity AAS degree and certificate programs. Covers issues facing the cybersecurity industry,

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			cybersecurity professional organizations, and industry credentials.
NET 105 **Information Technology Fundamentals** **(3 credits)**	1. Program Requirement 2. Existing Course (updated for Fall 2024 to incorporate additional objectives and outcomes) 3. Aligns to the CompTIA IT Fundamentals (ITF+) certification	IT concepts and terminology Infrastructure Applications and software Software development Database fundamentals Computer and network security practices	Provides students with skills required to identify and explain basics of computing, IT, infrastructure, application and software, software development, database fundamentals and security. Contains basic computer maintenance and support principles. Includes computer science-related topics, including programming concepts and principles of software development and database design.
NET 121 **Computer Networking** **(3 credits)**	1. Program Requirement 2. Existing Course (updated for Fall 2024 to incorporate updated/most recent industry standards and KUs to course objectives and outcomes.) 3. Pre-req: CIS 101, NET 105, or WEB 110 with a grade of C or better. NET 105 can be taken concurrently with NET 121. 4. Aligns to the CompTIA Network+ certification	Networking fundamentals Network implementations Network operations Network security Network troubleshooting	Provides students with hands-on experience implementing and maintaining computer networks. Includes networking standards, architecture, models, protocols, operations, security and troubleshooting using current network operating systems. Introduces IP addressing and Ethernet fundamentals. Course prepares students to build simple local area networks (LANs) that integrate IP addressing schemes and foundational network security.

Second Semester:

Course Number & Title	Course Details	Topics Covered	Course Description
CIS 226 **Programming for Cybersecurity** **(3 credits)**	1. Program Requirement 2. New Course 3. Pre-req: CIS 106 or CSC 121 with a grade of C or better	Python basics and related scripting tools Python best practices Custom scripts Automating cybersecurity-related tasks Customizing existing cybersecurity scripts, tools, and programs Tools to automate cybersecurity routine tasks	Provides students with hands-on experience to build upon foundational programming skills to develop Python scripts and programs for modern security professionals to monitor, protect against, contain, respond to and recover from cyber attacks. Includes Python concepts used to facilitate cybersecurity initiatives.

		Scripting for ethical hacking and incident response Cybersecurity-preferred scripting shells Using APIs with cybersecurity focus	
ENG 102 **Composition II[2]** **(3 credits)**	1. AAS General Education Requirement 2. Existing Course 3. Pre-req: ENG 101 with a grade of C or better, or consent of instructor or department chair		Continues ENG 101. Reading literature and writing of various types of prose. Introduces methods used in writing investigative papers.
NET 240 **Linux Server Administration** **(3 credits)**	1. Program Requirement 2. Existing Course (updated for Fall 2024 to incorporate updated/most recent industry standards and KUs to course objectives and outcomes.) 3. Pre-req: NET 121 with a grade of C or better 4. Aligns to Red Hat Certified Systems Administrator 5. Aligns to the CompTIA Linux+ Certification	System management Security Scripting, containers, and automation Troubleshooting	Provides students with a comprehensive introduction to Linux Server administration. Includes installation, configuration, and administration of a Linux Server environment. Covers user management, hardware and software configuration, and security as well as network services configuration. Includes creating simple shell scripts, booting into different run levels, controlling services, identifying processes, and virtual machines.
NET 260 **Windows Server Administration** **(3 credits)**	1. Program Requirement 2. Existing Course (updated for Fall 2024 to incorporate updated/most recent industry standards and KUs to course objectives and outcomes) 3. Pre-req: NET 121 with a grade of C or better 4. Aligns to the Microsoft Administering Windows Server Hybrid Core Infrastructure Certification	Deploy and manage Active Directory Domain Services (AD DS) in on-premises and cloud environments Manage Windows servers and workloads in a hybrid environment Manage virtual machines and containers Implement and manage an on-premises and hybrid networking infrastructure Manage storage and file services	Provides students with a comprehensive introduction to Windows Server Administration. Includes installation, configuration, administration, and security of a Windows Server environment. Learn to configure network services including DNS, DHCP, ADS, printing, and network routing. Implement and manage Active Directory Domain Services (AD DS) in on-premises and hybrid networking infrastructure and manage storage and file services.

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| NET 280 Cybersecurity Fundamentals (3 credits) | 1. Program Requirement
2. Existing Course (updated for Fall 2024 to incorporate updated/most recent industry standards and KUs to course objectives and outcomes)
3. Pre-req: NET 121 or NET 122 with a grade of C or better
4. Aligns to the CompTIA Security+ Certification | General security concepts

Threats, vulnerabilities, and mitigations

Security architecture

Security operations

Security program management and oversight | Provides students with a hands-on foundation of essential cybersecurity concepts, principles, trends, practices, technologies, and compliance. Includes topics related to threats, attacks, vulnerabilities, risk, emerging technologies, security architecture and design, identity and access management, risk management, cryptography, and secure communications. |

Third Semester:

Course Number & Title	Course Details	Topics Covered	Course Description
NET 262 Windows 365 Administration (3 credits)	1. Program Requirement 2. Existing Course (updated for Fall 2024 to incorporate updated/most recent industry standards and KUs to course objectives and outcomes) 3. Pre-req: NET 121 with a grade of C or better 4. Aligns to the Microsoft 365 Administrator Certification	Windows 365 architecture Deploy and manage a Microsoft 365 tenant Implement and manage identify and access in Microsoft Entra ID Manage security and threats by using Microsoft 365 Defender Manage compliance by using Microsoft Purview	Provides students with the skills necessary to deploy and manage a Microsoft 365 tenant. Implement and manage identity and access systems. Administer, manage and monitor security, threats and compliance in Microsoft 365 and hybrid environments. Includes identity synchronization, and security and compliance.
NET 281 Enterprise and Network Security (3 credits)	1. Program Requirement 2. New Course 3. Pre-req: Prior or concurrent enrollment in NET280 with a grade of C or better 4. Aligns to the ISC2 Systems Security Certified Practitioner Certification	Security operations and administration Access controls Risk identification, monitoring, and analysis Incident response and recovery Cryptography Network and communications security Systems and application security	Provides students with basic network security protocols and advanced enterprise security strategies with an emphasis on practical, real-world applications. Includes security concepts, principles, and practices. Covers host, end devices, servers, networks, wireless and mobile devices, virtual systems, and cloud-based systems. Prepares students with the skills to identify, prevent, and mitigate security threats in network environments and enterprise settings.

NET 283 **Ethical Hacking and Penetration Testing** **(3 credits)**	1. Program Requirement 2. New Course 3. Pre-req: NET 240 and NET 280 with grades of C or better 4. Aligns to the CompTIA PenTest+ Certifications	Planning and scoping Information gathering and vulnerability scanning Attacks and exploits Reporting and communication Tools and code analysis	Provides students with hands-on skills required of an ethical hacker using a variety of penetration testing tools. Focuses on hacking techniques and technology from an offensive perspective. Covers advanced security concepts, hacking techniques, exploits, automated programs, and defensive recommendations. Includes both passive and active reconnaissance techniques, identifying vulnerabilities across networks, systems, and applications. Explore ethical and legal considerations as well as implications.
NET 284 **Digital Forensics** **(3 credits)**	1. Program Requirement 2. New Course 3. Pre-req: NET 240 with a grade of C or better 4. Aligns to the EC-Council Computer Hacking Forensic Investigator (CHFI) Certification	Introduction to computer digital forensics and tools Digital and computer forensics evidence preservation, handling, and documentation Laws and corporate policy Digital forensics and data identification Extraction techniques Understanding of chain of custody Data interpretation and file systems analysis Platform-specific file systems, boot processes, commands, investigations, and recover techniques	Provides students with hands-on experience preserving, identifying, extracting, documenting and interpreting computer data. Examine computer data for evidence of a crime or violations of corporate policy. Includes performing forensic investigation on Windows, Unix and Linux file systems. Covers evidence handling, chain of custody, collection, and recovery of computer data using forensic software and methods.
SPE 101 **Fundamentals of Speech Communication** **(3 credits)**	1. AAS General Education 2. Existing Course		Theory and practice of oral communications. Development of poise, confidence and skill in speech organization and delivery. Emphasis on frequent speaking, development of

			standards of criticism and selection and organization of material.

Fourth Semester:

Course Number & Title	Course Details	Topics Covered	Course Description
CIS 211 **IT Project Management** **(3 credits)**	1. Program Requirement 2. Existing Course (updated for Fall 2024) 3. Pre-req: CAS 105, CAS 115, and CAS 125 with grades of C or better; or CAS 160 OR CIS 101 or WEB 110 or NET 105, with a grade of C or better; and math placement into MTH 101 or higher 4. Aligns to the CompTIA Project+ certification	Project management concepts Project life cycle phases Tools and documentation Basics of IT and governance	Provides students with a comprehensive introduction to Information Technology project management. Includes project selection, initiation, planning, execution, monitoring and closure. Students gain practical project management skills and competencies related to Information Technology project management. Activities are performed using a currently popular project management software package. Aligns to the CompTIA Project+ certification.
NET 282 **Cybersecurity Governance, Risk Management, and Compliance** **(2 credits)**	1. Program Requirement 2. New Course 3. Pre-req: NET280 with a grade of C or better 4. Aligns to the ISACA Certified Information Security Manager Certification	Major Course Concepts Information Security Management Frameworks and Systems IT Risk Management, Governance, and Compliance Federal Information Security Management Act (FISMA) NIST SP-800-171 Cybersecurity Compliance Payment Card Industry Data Security Standard (PCI DSS) ISO 22301 (Business Continuity Management) HIPAA (Health Insurance Portability and Accountability Act) Sarbanes Oxley Act (SOX)	Provides students with an overview of the critical aspects of cybersecurity governance, risk management, and compliance. Equips students with knowledge of current cybersecurity laws, regulations, and best practices. Explores various frameworks and standards used in information security management. Covers regulatory acts. Includes active monitoring techniques and security auditing, compliance, and network monitoring tools.

		GDPR (General Data Protection Regulation) ITIL (Information Technology Infrastructure Library) Security Auditing and Compliance Tools	
NET 290 Cloud Computing (3 credits)	1. Program Requirement 2. Existing Course (updated for Fall 2024) 3. Pre-req: Prior or concurrent enrollment in NET 240 or NET 260 or NET 280 with grades of C or better 4. Aligns to the CompTIA Cloud+ Certification		Provides students with hands-on experience in cloud computing. Examines cloud applications, security protocols as well as associated services and deployment models. Reviews system virtualization and its relation to cloud-based computing. Covers managing cloud resources, from planning, provisioning, implementing, and deploying cloud-based applications. Introduces cloud system disaster recovery. Includes best practices for cloud migration, governance, and networking.
NET 298 Cybersecurity Capstone (1 credit)	1. Program Requirement 2. New Course 3. Prerequisite: CIS 226, NET 280, NET 282, NET 283, NET 284 with grades of C or better	Team assignments Project proposal integration and knowledge Thread modeling, risk assessment, and project design Designing security solutions and project implementation with real-world application Incorporate emerging technologies Project management with secure development, testing, and evaluation Security policies, compliance, and implementation Final project delivery	Provides students with the opportunity to demonstrate their knowledge of cybersecurity theory, principles, best industry practices, methodologies, tools, and technologies. Expects students to use scholarly research methods and leverage their investigative, problem-solving, and research skills to study and design a cybersecurity project that addresses a real-world issue or challenge. Guidance and support are provided along with graded evaluation and feedback from their faculty throughout the semester.

SOC 101 Introduction to Sociology[3] (3 credits)	1. AAS General Education 2. Existing Course 3. Meets the World Culture and Diversity graduation requirement		Analysis and description of the structure and dynamics of human society. Application of scientific methods to the observation and analysis of social norms, groups, inter-group relations, social change, social stratification and institutions.

1 – Students must take at least three credit hours in a mathematics course at the level of MTH 101 or above.

2 – Students who have previously completed another course that satisfies AAS General Education electives requirements should contact the program coordinator before taking this course.

3 – This course meets the World Culture and Diversity graduation requirement.

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