

CYBERSECURITY ANALYTICS AND OPERATIONS, B.S. (UNIVERSITY COLLEGE)

Begin Campus: Any Penn State Campus

End Campus: Beaver, Brandywine, Greater Allegheny, Lehigh Valley, Schuylkill, York

Program Description

The Bachelor of Science in Cybersecurity Analytics and Operations in the College of Information Sciences and Technology (IST) is an interdisciplinary program that prepares students for careers as cybersecurity professionals. It educates students on the essential concepts of cyber-defense and the analytical fundamentals of cybersecurity, with a focus on the analytical and risk management underpinnings and associated cyber-defense techniques and strategies for ensuring the safety of online information stored in large and heterogeneous networks that are embedded within and across the complex socio-technical infrastructures that are pervasive in today's business, government and military organizations. Students will acquire the knowledge and skills needed to critically assess and respond to modern information security threats, using approaches that are grounded in a holistic understanding of adversarial strategies and effective responses. More specifically, it will offer an in-depth and domain-independent approach to the development of skills in cyberdefense technologies, tools and processes; cybersecurity analytics and visualization; and cybersecurity risk analysis and management. The major draws from concepts and skills associated with a number of disciplines, including information science, management science, statistics and data science, human behavior, and law/policy. Graduates will be prepared to join the rapidly growing cybersecurity workforce deployed across organizations of diverse sizes and missions.

What is Cybersecurity Analytics and Operations?

Cybersecurity is a field that deals with the protection of computer systems, networks, programs, and data from attacks and unauthorized access. This includes the development of cyber defense tools to protect critical infrastructure as well as the analysis and mitigation of cyber threats.

Cybersecurity is a very broad field. This program focuses students beyond the information technology field and instead focuses on the analysis of cybersecurity data, identification of cyber incidents, understanding the actions of malware, communication of concerns to business stakeholders and the general public. High performing cyber analysts have a strong mathematical and computational background. They often employ computer programming and scripting to solve problems and integrate existing tools. They analyze the data they are presented with from intrusion detection sensors, firewalls, and anti-malware tools.

Cybersecurity professionals apply their skills for organizations to prevent cyber criminals, hacktivists, and persistent nation-state actors. They protect organizations, companies, healthcare institutions, and government agencies from the loss of confidential data. They keep

abreast of new developments technically, as well as those in the work domain of the organization and events that occur in the world at large.

MORE INFORMATION ABOUT CYBERSECURITY ANALYTICS AND OPERATIONS (<https://ist.psu.edu/prospective/undergraduate/academics/cybersecurity/>)

You Might Like This Program If...

- You enjoy working with and on computers as well as their operating systems and applications.
- You have an interest in business and organizations and securing
- You want to protect digital information, data stores, and computer networks from threats.
- You want to learn the cyber defense strategies used to anticipate, recognize, and defend against computer attacks.
- You're passionate about how we can keep sensitive information out of the hands of hackers, cybercriminals, and terrorist organizations.
- You enjoy working on a team to solve technical problems for organizations.
- You are interested in computer programming and mathematics.

MORE INFORMATION ABOUT WHY STUDENTS CHOOSE TO STUDY CYBERSECURITY ANALYTICS AND OPERATIONS (<https://ist.psu.edu/prospective/undergraduate/academics/cybersecurity/>)

Entrance to Major

To be eligible for the Cybersecurity Analytics and Operations major, students must:

1. Have completed the following entrance-to-major requirements with a grade of C or better in each: CYBER 100 or CYBER 100S, IST 210, IST 220, IST 242 or CMPSC 122 or CMPSC 132, and STAT 200 or SCM 200.
2. Have achieved a minimum cumulative grade point average of 2.00 prior to and through the end of the semester during which the entrance to major is requested.

Degree Requirements

For the B.S. degree in Cybersecurity Analytics and Operations, a minimum of 123 credits is required:

Requirement	Credits
General Education	45
Electives	3
Requirements for the Major	87

12 of the 45 credits for General Education are included in the Requirements for the Major. This includes: 6 credits of GQ courses, 3 credits of GS courses, 3 credits of GWS courses.

Requirements for the Major

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (<https://senate.psu.edu/students/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/>).

Code	Title	Credits
Prescribed Courses		
<i>Prescribed Courses: Require a grade of C or better</i>		

CYBER 221	Overview of Information Security	3
CYBER 262	Cyber-Defense Studio	3
CYBER 342W	Cyber Incident Handling and Response	3
CYBER 362	Cybersecurity Analytics Studio	3
CYBER 366	Malware Analytics	3
CYBER 440	Cybersecurity Capstone	3
CYBER 451	Network Security	3
CYBER 454	Computer and Cyber Forensics	3
CYBER 456	Information Security Management	3
IST 210	Organization of Data	3
IST 220	Networking and Telecommunications	3
IST 230	Language, Logic, and Discrete Mathematics	3
IST 432	Legal and Regulatory Environment of Information Science and Technology	3
IST 495	Internship	1
SRA 111	Introduction to Security and Risk Analysis	3
SRA 211	Threat of Terrorism and Crime	3
SRA 231	Decision Theory and Analysis	3
SRA 311	Risk Analysis in a Security Context	3
SRA 365	Statistics for Security and Risk Analysis	3

Additional Courses

Additional Courses: Require a grade of C or better

CYBER 100	Computer Systems Literacy	3
or CYBER 100S Computer Systems Literacy		
ENGL 202C	Effective Writing: Technical Writing	3
or ENGL 202D Effective Writing: Business Writing		
MATH 110	Techniques of Calculus I	4
or MATH 140 Calculus With Analytic Geometry I		
STAT 200	Elementary Statistics	4
or SCM 200 Introduction to Statistics for Business		
Select one of the following:		3
CMPSC 121	Introduction to Programming Techniques	
CMPSC 131	Programming and Computation I: Fundamentals	
IST 140	Introduction to Application Development	
Select one of the following:		3
CMPSC 122	Intermediate Programming	
CMPSC 132	Programming and Computation II: Data Structures	
IST 242	Intermediate & Object-Oriented Application Development	
Select one of the following:		3
IST 256	Programming for the Web	
IST 261	Application Development Design Studio I	
HCDD 361	Application Development Design Studio II	

Supporting Courses and Related Areas

Select 9 credits from one of the Application Focus course lists. At least 3 credits must be at the 400-level. Students may also complete a custom Application Focus sequence with approval from an academic adviser and a CYBER undergraduate program coordinator. 9

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing

intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (<https://bulletins.psu.edu/undergraduate/general-education/baccalaureate-degree-general-education-program/>) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required and Inter-Domain courses do not meet this requirement.)

- **Quantification (GQ):** 6 credits
- **Writing and Speaking (GWS):** 9 credits

Breadth in the Knowledge Domains (Inter-Domain courses do not meet this requirement.)

- **Arts (GA):** 3 credits
- **Health and Wellness (GHW):** 3 credits
- **Humanities (GH):** 3 credits
- **Social and Behavioral Sciences (GS):** 3 credits
- **Natural Sciences (GN):** 3 credits

Integrative Studies

- **Inter-Domain Courses (Inter-Domain):** 6 credits

Exploration

- **GN**, may be completed with Inter-Domain courses: 3 credits
- **GA, GH, GN, GS, Inter-Domain courses.** This may include 3 credits of World Language course work beyond the 12th credit level or the requirements for the student's degree program, whichever is higher: 6 credits

University Degree Requirements**First Year Engagement**

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement

6 credits are required and may satisfy other requirements

- **United States Cultures:** 3 credits
- **International Cultures:** 3 credits

Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits.

Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (<https://senate.psu.edu/students/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/>)). For more information, check the Suggested Academic Plan for your intended program.

Integrated B.S. in Cybersecurity Analytics and Operations and M.P.S. in Cybersecurity Analytics and Operations

Undergraduate degree available at the following campuses: Abington, Altoona, Beaver, Berks, Brandywine, Greater Allegheny, Harrisburg, Lehigh Valley, Schuylkill, University Park, World Campus York

Graduate degree available at the following campuses: World Campus

Requirements for the Integrated B.S. in Cybersecurity Analytics and Operations and M.P.S. in Cybersecurity Analytics and Operations can be found in the Graduate Bulletin (<https://bulletins.psu.edu/graduate/programs/majors/cybersecurity-analytics-operations/#integratedundergradtext>).

Program Learning Objectives

- **Knowledge/Application:** Understand and apply the interdisciplinary knowledge of information sciences in a security context to recognize, analyze, defend against, and manage cyber risks.
 - Understand the components and interoperability of computer hardware, operating systems, networks and databases.
 - Demonstrate proficiency in programming and scripting to perform Cybersecurity automation and analysis.
 - Understand Cyber threats and appropriate defensive designs and tools to mitigate the risk of attack.
 - Understand the procedures for Cybersecurity Incident Handling and Response.
 - Understand the static and dynamic analysis of malware.
- **Problem-Solving:** Understand, apply and adapt various problem solving strategies, using appropriate technology and methods.
 - Identify Cybersecurity threats and implement complementary defensive measures to mitigate risk.
 - Apply data analytics in a security context to analyze, predict and prevent cyberattacks.
 - Perform malware analysis and forensics to understand the nature and origin of attacks.
 - Evaluate several Cybersecurity frameworks and provide analysis that culminates in a high level executive briefing exercise.
- **Evaluation and Communication (Individual and Team):** Communicate and work effectively (both individually and in teams) with a range of perspectives and audiences through a variety of media.

- Synthesize data from multiple sources to help make informed decisions.
- Communicate effectively to a variety of audiences through writing and the spoken word.
- **Professional Responsibilities:** Understand professional responsibilities in terms of the ethical, legal and security policy aspects of information assurance and security.
 - Understand the rules, regulations and issues related to compliance with applicable laws and regulations related to Information Security and Privacy.
 - Understand the legal and ethical ramifications of violating the trust that organizations will place in you as a Cybersecurity professional.
- **Lifelong Learning:** Commit to the continuous acquisition of relevant knowledge for professional development by self-teaching and/or on-going education and certification.
 - Employ information-seeking strategies and self-directed learning in pursuit of current knowledge.
 - Enroll in professional development and pursue industry certifications to enhance your career and the profession.

Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information needed to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (<https://senate.psu.edu/students/policies-and-rules-for-undergraduate-students/32-00-advising-policy/>)

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Suggested Academic Plan

The suggested academic plan(s) listed on this page are the plan(s) that are in effect during the 2025-26 academic year. To access previous years' suggested academic plans, please visit the archive (<https://bulletins.psu.edu/undergraduate/archive/>) to view the appropriate Undergraduate Bulletin edition.

Cybersecurity Analytics and Operations, B.S. at Beaver Campus

The course series listed below provides **only one** of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an **Academic Requirements** or **What If** report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

Fall	Credits Spring	Credits
CYBER 100 ^{*#}	3 CAS 100 (GWS) [†]	3
IST 140 (*# or CMPSC 121 (GQ)#‡ or CMPSC 131 *#) ^{1,2}	3 IST 220 ^{*#}	3
ENGL 15 or 30H (GWS)	3 IST 242 ^{*#1}	3
MATH 110 or 140 (GQ) ^{*‡2,3}	4 SRA 221 [*]	3
First Year Seminar (IST 111S)	1 General Education Course (GN) ⁴	3
SRA 111 (GS) [*]	3	
	17	15

Second Year

Fall	Credits Spring	Credits
CYBER 262 [*]	3 ENGL 202C or 202D (GWS)	3

IST 210 ^{*#}	3 IST 256 (or Application Focus Selection 1)	3
IST 230 [*]	3 STAT 200 (‡# (GQ) or SCM 200‡# (GQ) or DS 200*)	4
SRA 211 [*]	3 General Education Course (GA/GH) ⁵	3
Application Focus Selection 1 or IST 261	3 General Education Course (GN) ⁴	3
15		16

Third Year			
Fall	Credits Spring	Credits Summer	Credits
IST 451 [*]	3 CYBER 362 [*]	3 IST 495 ^{*6}	1
SRA 231 [*]	3 CYBER 366 [*]	3	
SRA 365 [*]	3 IST 454 [*]	3	
General Education Course (GA/GH) ⁵	3 SRA 311 [*]	3	
Health and Wellness (GHW)	1.5 Application Focus Selection 2	3	
13.5		15	1

Fourth Year			
Fall	Credits Spring	Credits	
CYBER 342W [*]	3 CYBER 440 (GWS) [*]	3	
IST 456 [*]	3 IST 432 [*]	3	
IST 495 ^{*6}	1 IST 495 ^{*6}	1	
General Education Course (INT)	3 Application Focus Selection 3	3	
General Education Course (Exploratory)	3 General Education Course (INT)	3	
General Education Course (Exploratory)	3 Elective	3	
Health and Wellness (GHW)	1.5		
17.5		16	

Total Credits 126

- * Course requires a grade of C or better for the major
- ‡ Course requires a grade of C or better for General Education
- # Course is an Entrance to Major requirement
- † Course satisfies General Education and degree requirement

- ¹ Since IST 240 will not be offered at this campus, these courses are required courses for ISTBS or ISSCC at Brandywine.
- ² Course substitutions required for Computer Science minor.
- ³ MATH 110 or MATH 140 required for graduation requirements. HS Trigonometry or MATH 22 required for admission.
- ⁴ Recommend one (1) GN selection be FRNSC 100 Intro to Forensic Science before taking IST 454 Cyber Forensics.
- ⁵ Students must complete three (3) credits of United States Cultures (US) and three (3) credits of International Cultures (IL) as part of General Education, choice of course may vary.
- ⁶ One internship for credit is required to complete degree requirements, a maximum of three internships for credit are allowed.

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy Cultural Diversity Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

General Education includes Foundations (GWS and GQ), Knowledge Domains (GHW, GN, GA, GH, GS) and Integrative Studies (Inter-domain) requirements. N or Q (Honors) is the suffix at the end of a course number used to help identify an Inter-domain course, but the inter-domain attribute is used to fill audit requirements. Foundations courses (GWS and GQ) require a grade of 'C' or better.

Advising Notes:

- Students should consult with an adviser when scheduling courses.
- See Adviser for Internship Preparation (CNED 280) – recommended elective; offered every semester.

Cybersecurity Analytics and Operations, B.S. at Brandywine Campus

The course series listed below provides **only one** of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an **Academic Requirements** or **What If** report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

Fall	Credits Spring	Credits Summer	Credits
CYBER 100 ^{*#}	3 IST 220 ^{*#}	3 IST 495 or ITECH 495 ⁷	1
IST 111S (FYE)	1 IST 242 or CMPSC 132 ^{*#1}	3	
IST 140 or CMPSC 131 ^{*#1,2}	3 CYBER 221 or SRA 221 [*]	3	
ENGL 15 or 30H (GWS)	3 General Education Course ^{4,5}	3	
MATH 110 (GQ) ^{*2,3}	4 Natural Sciences (GN) ⁶	3	
SRA 111 [*]	3		
	17	15	1

Second Year

Fall	Credits Spring	Credits Summer	Credits
IST 230 ^{*2}	3 IST 256 or 210 ^{*#}	3 IST 495 or ITECH 495 ⁷	1
IST 210 or 261 [*]	3 STAT 200 (GQ) ^{*#}	4	
CYBER 262 [*]	3 SRA 211 [*]	3	
Application Focus Selection 1 ⁵	3 General Education Course ⁴	3	
CAS 100A (GWS)	3 General Education Course (GN) ⁶	3	
	15	16	1

Third Year

Fall	Credits Spring	Credits Summer	Credits
CYBER 451 or IST 451 [*]	3 CYBER 342W [*]	3 IST 495 or ITECH 495 ⁷	1
ENGL 202C or 202D (GWS)	3 CYBER 362 [*]	3	
SRA 231 [*]	3 CYBER 454 or IST 454 [*]	3	
SRA 365 [*]	3 SRA 311 [*]	3	
Application Focus Selection 2 ⁵	3 General Education Course ⁴	3	
General Education Course (GHW)	1.5		
	16.5	15	1

Fourth Year

Fall	Credits Spring	Credits
CYBER 366 [*]	3 CYBER 440 [*]	3
CYBER 456 or IST 456 [*]	3 IST 432 (or Elective) [*]	3
General Education Course ⁴	3 Elective	3
General Education Course (GHW)	1.5 General Education Course ⁴	3
Application Focus Selection 3 ⁵	3 General Education Course (GN)	3
	13.5	15

Total Credits 126

- * Course requires a grade of C or better for the major
- ‡ Course requires a grade of C or better for General Education
- # Course is an Entrance to Major requirement
- † Course satisfies General Education and degree requirement

¹ IST 240 will not be offered at this campus.

² Course substitutions required for Computer Science minor.

³ MATH 110 or MATH 140 required for graduation requirements. HS Trigonometry or MATH 22 required for admission.

⁴ Students must complete three (3) credits of United States Cultures (US) and three (3) credits of International Cultures (IL) as part of General Education, choice of course may vary.

⁵ Consider courses that are prerequisites for an application focus. You may consider courses toward a minor like Business, Peace and Conflict Studies, Computer Science or other.

⁶ Recommend one (1) GN selection be FRNSC 100 Intro to Forensic Science before taking IST 454 Cyber Forensics.

⁷ One internship for credit is required to complete degree requirements, a maximum of three internships for credit are allowed.

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy Cultural Diversity Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

General Education includes Foundations (GWS and GQ), Knowledge Domains (GHW, GN, GA, GH, GS) and Integrative Studies (Inter-domain) requirements. N or Q (Honors) is the suffix at the end of a course number used to help identify an Inter-domain course, but the inter-domain attribute is used to fill audit requirements. Foundations courses (GWS and GQ) require a grade of 'C' or better.

Advising Notes:

- Students should consult with an adviser when scheduling courses.

Application Focus Lists

Students may select from the Application Focus Lists found on the College of IST Suggested Academic Plan for CYAOP BS degree

(<https://bulletins.psu.edu/undergraduate/colleges/information-sciences-technology/cybersecurity-analytics-operations-bs/#suggestedacademicplantext>), or create a custom 3-course application from the lists below, in consultation with their academic adviser. Note that not all courses are available at the Brandywine campus.

Students are required to pick one track to fulfill the degree requirements. Students must pick three (3) credits at the 400 level. All nine (9) credits must be in the same application focus area. It is recommended that students use the application focus area list to select a course that meets a General Education requirement (GS/GHW) and serves as a prerequisite for more advanced coursework within the application focus. This course does not count as part of the 9 credits of application focus sequence.

Business (Minor)

Code	Title	Credits
ECON 102 or ECON 104	Introductory Microeconomic Analysis and Policy Introductory Macroeconomic Analysis and Policy	3
ACCTG 211	Financial and Managerial Accounting for Decision Making	4
MGMT 301	Basic Management Concepts	3
MKTG 301	Principles of Marketing	3
IST 432	Legal and Regulatory Environment of Information Science and Technology (Required for CYAOP major)	3
One (1) three credit 400-level business course from the following disciplines: ¹		3
	Accounting	
	Business Administration	
	Business Law	
	Energy Business and Finance	
	Economics	
	Entrepreneurship	
	Finance	
	Financial Services	
	Health Policy and Administration	
	International Business	
	Management Information Systems	
	Management	
	Risk Management	
	Supply Chain Management	
	Statistics	

¹ Each 400-level business course will have different prerequisites; make sure to confirm meeting prerequisites before scheduling

Computer Science (Minor)

Requires planning and decision during NSO to schedule CMPSC required courses.

Code	Title	Credits
MATH 140	Calculus With Analytic Geometry I (Course Substitute for MATH 110) ¹	4
CMPSC 121	Introduction to Programming Techniques (Course Substitute for IST 140) ²	3
CMPSC 122	Intermediate Programming	3

CMPSC 221	Object Oriented Programming with Web-Based Applications	3
CMPSC 360	Discrete Mathematics for Computer Science	3
CMPSC 462 or CMPSC 465	Data Structures Data Structures and Algorithms	3
Two (2) additional CMPSC courses for six more credits of 400-level work in computer science		6

¹ Prerequisite: ALEKS score > 75 or MATH 22 and MATH 26

² Prerequisite: ALEKS score > 45

Peace and Conflict (Minor)

Code	Title	Credits
PLSC 14	International Relations	3
PLSC 291	Introduction to Peace and Conflict Studies	3
PLSC 491	Peace and Conflict Studies Seminar	3
SRA 211	Threat of Terrorism and Crime (Required for CYAOP Major)	3
Two (2) additional 400-level courses from approved list (e.g., CAS 404; COMM 458)		6

Health Policy and Administration (via DLC from consortium)

Code	Title	Credits
HPA 101	Introduction to Health Services Organization	3
HPA 332	Health Systems Management	3
HPA 470	Health Care Information Management	3
BBH 440	Principles of Epidemiology	3

Custom

Custom 4-course application focus provides coherent sequence in Cybersecurity context for student in terms of three credits of GS coursework and must contain six credits of 400-level coursework.

Examples are student taking courses to receive Homeland Security minor, Criminal Justice minor, Cybersecurity Computational Foundations minor (variant of Computer Science minor), or Crime, Law, and Psychology minor.

Requires completion and submission of Custom 4-Course Focus Approval Form.

Cybersecurity Analytics and Operations, B.S. at Greater Allegheny Campus

The course series listed below provides **only one** of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an **Academic Requirements** or **What If** report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

Fall	Credits Spring	Credits
CYBER 100S (FYS) ^{*#}	3 IST 220 ^{*#}	3
IST 140 ^{*#}	3 IST 242 ^{*#}	3
ENGL 15 or 30H (GWS) [‡]	3 SRA 221 [*]	3
MATH 110 ^{*‡}	4 Application Focus Selection 1 (GS/GHW)	3
SRA 111 ^{*†}	3 General Education Course	3
	16	15

Second Year

Fall	Credits Spring	Credits
IST 230 [*]	3 IST 210 ^{*#}	3
IST 261 [*]	3 SRA 211 [*]	3
CYBER 262 [*]	3 STAT 200 ^{*‡#}	4
CAS 100A (GWS) [‡]	3 ENGL 202C or 202D [‡]	3
General Education Course	3 General Education Course	3
	15	16

Third Year

Fall	Credits Spring	Credits
General Education Course	3 CYBER 342W [*]	3
CYBER 362 [*]	3 CYBER 366 [*]	3
SRA 231 [*]	3 SRA 311 [*]	3
SRA 365 [*]	3 Application Focus Selection 3	3
Application Focus Selection 2	3 General Education Course	3
General Education Course	1.5	
	16.5	15

Fourth Year

Fall	Credits Spring	Credits
IST 456 [*]	3 CYBER 440 [*]	3
SRA 472 [*]	3 IST 432 [*]	3
IST 451 [*]	3 IST 454 [*]	3
General Education Course	3 Application Focus Selection 4	3
General Education Course	1.5 Elective	2
Elective	3 IST 495 [*]	1
	16.5	15

Total Credits 125

* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy Cultural Diversity Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

General Education includes Foundations (GWS and GQ), Knowledge Domains (GHW, GN, GA, GH, GS) and Integrative Studies (Inter-domain) requirements. N or Q (Honors) is the suffix at the end of a course number used to help identify an Inter-domain course, but the inter-domain attribute is used to fill audit requirements. Foundations courses (GWS and GQ) require a grade of 'C' or better.

Advising Notes:

- CYBER, IST, and SRA courses have enforced prerequisites
- 1 credit of IST 495 IST Internship is required

Application Focus Lists:

- Business:
 - Students should choose 2 courses from the following: ACCTG 211, MGMT 301, or MKTG 301.
 - Select 3 credits at the 400-level from: ACCTG, BA, BLAW, EBF, ECON, ENTR, FIN, FINSV, HPA, IB, LER, MIS, MGMT, MKTG, RM, SCM, or STAT.
 - Note: MGMT 301 and MKTG 301 both require ECON 102 or ECON 104 as prerequisites, so students should take ECON 102/ECON 104 as their GS selection.
 - Note: IST 432 counts toward the business minor.
- Custom:
 - Custom 3 credit application focus provides coherent sequence in Cybersecurity context for student in terms of three credits of GS coursework and must contain 3 credits of 400-level courses.
 - Examples are student taking courses to receive Homeland Security minor, Criminal Justice minor, Cybersecurity Computational Foundations minor (variant of Computer Science minor), or Crime, Law, and Psychology minor.
 - Requires completion and submission of Custom 4-Course Focus Approval Form.

Cybersecurity Analytics and Operations, B.S. at Lehigh Valley Campus

The course series listed below provides **only one** of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an **Academic Requirements** or **What If** report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

Fall	Credits Spring	Credits
IST 140 ^{*#}	3 CYBER 221 [*]	3
SRA 111 [†]	3 IST 220 ^{*#}	3
CYBER 100 ^{*#}	3 General Education Selection	3
MATH 110 ^{††}	4 General Education Selection	3
ENGL 15 or 30H (GWS) ^{††}	3 IST 242 ^{*#}	3
	16	15

Second Year

Fall	Credits Spring	Credits
IST 230 [*]	3 IST 210 ^{*#}	3
IST 261 [*]	3 SRA 211 [*]	3
CYBER 262 [*]	3 STAT 200 ^{‡#†}	4
CAS 100A ^{††}	3 ENGL 202C or 202D ^{††}	3
General Education Selection	3 General Education Selection	3
	15	16

Third Year

Fall	Credits Spring	Credits
CYBER 362 [*]	3 CYBER 342W [*]	3
CYBER 451 [*]	3 CYBER 366 [*]	3
SRA 231 [*]	3 SRA 311 [*]	3
SRA 365 [*]	3 Application Focus Selection 1	3
General Education Selection	3 General Education Selection	3
	15	15

Fourth Year

Fall	Credits Spring	Credits
CYBER 456 [*]	3 CYBER 440 [*]	3
IST 432 [*]	3 CYBER 454 [*]	3
Application Focus Selection 2	3 IST 432 [*]	3
General Education Selection	3 Application Focus Selection 3	3
General Education Selection	3 Elective IST 495	3 1
	15	16

Total Credits 123

* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

US and IL are abbreviations used to designate courses that satisfy Cultural Diversity Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

General Education includes Foundations (GWS and GQ), Knowledge Domains (GHW, GN, GA, GH, GS) and Integrative Studies (Inter-domain) requirements. N or Q (Honors) is the suffix at the end of a course number used to help identify an Inter-domain course, but the inter-domain attribute is used to fill audit requirements. Foundations courses (GWS and GQ) require a grade of 'C' or better.

University Requirements and General Education Notes:

Cybersecurity Analytics and Operations, B.S. at Schuylkill Campus

The course series listed below provides **only one** of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an **Academic Requirements** or **What If** report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

Fall	Credits Spring	Credits
CYBER 100 ^{*#1}	3 IST 220 ^{*#}	3
IST 140 ^{*#}	3 IST 242 ^{*#2}	3
ENGL 15 or 30H [‡]	3 MATH 110 or 140 ^{*‡3}	4
SRA 111 (GS) ^{**†}	3 CYBER 221 or SRA 221 [*]	3
PSU 8 (FYS)	2 General Education Course	3
General Education Course	3	
	17	16

Second Year

Fall	Credits Spring	Credits
IST 230 [*]	3 IST 210 ^{*#}	3
IST 261 ^{*4}	3 SRA 211 [*]	3
CYBER 262 [*]	3 STAT 200 (GQ) ^{*‡#5}	4
CAS 100A [‡]	3 ENGL 202C or 202D [‡]	3
Application Focus Selection ¹⁶	3 General Education Course	3
	15	16

Third Year

Fall	Credits Spring	Credits
General Education Course	3 CYBER 342W [*]	3
CYBER 362 [*]	3 CYBER 366 [*]	3
SRA 231 [*]	3 SRA 311 [*]	3
SRA 365 [*]	3 General Education Course	3
Application Focus Selection ²⁶	3 General Education Course	3
	15	15

Fourth Year

Fall	Credits Spring	Credits
CYBER 456 or IST 456 [*]	3 CYBER 440 [*]	3
CYBER 451 or IST 451 [*]	3 IST 432 [*]	3
Application Focus Selection ³⁶	3 CYBER 454 or IST 454	3
General Education Course	3 General Education Course or Elective	3
Elective	3 Elective	3
	IST 495 ^{*7}	1
	15	16

Total Credits 125

* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

¹ Students enrolled at Schuylkill campus must take CYBER 100 and schedule the PSU 8 First-Year Seminar (FYS) course. If you have taken CYBER 100S elsewhere, it may be accepted as an alternative to CYBER 100 to satisfy the Entrance-to-Major requirement.

² CMPSC 122 or CMPSC 132 may be substituted as an alternative to IST 242 to satisfy the Entrance-to-Major requirement.

³ MATH 140 may be substituted as an alternative to MATH 110.

⁴ IST 256 or IST 361 may be substituted as an alternative to IST 261.

⁵ SCM 200 may be substituted as an alternative to STAT 200 to satisfy the Entrance-to-Major requirement.

⁶ Students satisfy the Application Focus Area requirement by taking 9 credits of coursework in an approved application track or custom focus area, including a minimum of 3 credits of 400-level coursework in the area. Students may optionally take a 4th course in an approved Application Focus Area track or choose a related elective in their senior year.

⁷ 1 credit of IST 495 is required. A grade of C or better must be earned in this course. This requirement can be completed at any time before graduation. Up to 3 internship credits may be earned during your degree work.

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy Cultural Diversity Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

General Education includes Foundations (GWS and GQ), Knowledge Domains (GHW, GN, GA, GH, GS) and Integrative Studies (Inter-domain) requirements. N or Q (Honors) is the suffix at the end of a course number used to help identify an Inter-domain course, but the inter-domain attribute is used to fill audit requirements. Foundations courses (GWS and GQ) require a grade of 'C' or better.

Application Focus Areas:

Students may select from the Application Focus Lists found on the College of IST Suggested Academic Plan for CYAOP BS degree (<https://bulletins.psu.edu/undergraduate/colleges/information-sciences-technology/cybersecurity-analytics-operations-bs/#suggestedacademicplantext>), or create a custom 3-course application focus in consultation with their academic adviser. Note that not all courses are available at the Schuylkill campus.

Students are required to pick one track to fulfill the degree requirements. Students must pick three (3) credits at the 400 level. All nine (9) credits must be in the same application focus area. It is recommended that students use the application focus area list to select a course that meets a General Education requirement (GS/GHW) and serves as a prerequisite for more advanced coursework within the application focus. This course does not count as part of the 9 credits of application focus sequence.

Below are the options supported from the Schuylkill campus.

Application Development

Code	Title	Credits
IST 311 or HCDD 311	Object-Oriented Design and Software Applications	3
IST 331 or HCDD 331	Foundations of Human-Centered Design	3
IST 361	Application Development Design Studio II	3
IST 402	Emerging Issues and Technologies	3
IST 411	Distributed-Object Computing	3
IST 412	The Engineering of Complex Software Systems	3

selected in consultation with a teaching CYBER faculty member and an academic adviser.

Law and Policy

Cybersecurity careers in law enforcement require knowledge of laws and policies focused on the handling of evidence related to digital forensics and monitoring. Individuals in the private sector and government agencies must also understand and adhere to these topics as they involve cybersecurity. The Law and Policy focus is for students who want to understand law and policy as they relate to digital data.

Code	Title	Credits
COMM 404	Telecommunications Law	3
CRIM/CRIMJ/ SOC 406	Sociology of Deviance	3
CRIM 430	American Correctional System	3
CRIM/CRIMJ 451	Race, Crime, and Justice	3
CRIM/CRIMJ/ SOC 467	Law and Society	3
CRIM 469	Seminar in the Law	3-4
CRIMJ 304	Security Administration	3
CRIMJ 430	Alternatives to Incarceration	3
CRIMJ 435	Border Security	3
HLS/PADM 401		3
IST 452	Legal and Regulatory Environment of Privacy and Security	3
PLSC 438	National Security Policies	3
PLSC/CRIMJ 439	The Politics of Terrorism	3
PLSC 440	Globalization and Its Implications	3
PLSC 442	American Foreign Policy	3
PLSC/STS 460	Science, Technology, and Public Policy	3
PLSC 467	International Relations of the Middle East	3
PLSC 471	American Constitutional Law	3
PLSC 487	International Law and Organizations	3

Business

Students should choose 2 courses from the following: ACCTG 211, MGMT 301, or MKTG 301.

Note: MGMT 301 and MKTG 301 both require ECON 102 or ECON 104 as prerequisites, so students should take ECON 102/ECON 104 as their GS selection.

Note: IST 432 counts toward the business minor.

Custom Application Focus

There is an option for a student to create a custom 3-course application focus sequence. It must be a coherent sequence of courses that provides context for the student in terms of cybersecurity content. It must contain three (3) credits of 400-level coursework. The focus area courses must be

Cybersecurity Analytics and Operations, B.S. at York Campus

The course series listed below provides **only one** of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an **Academic Requirements** or **What If** report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

Fall	Credits Spring	Credits
CYBER 100 ^{*#}	3 IST 210 ^{*#}	3
IST 140 ^{*#}	3 IST 220 ^{*#}	3
ENGL 15 or 30H (GWS) [‡]	3 IST 242 ^{*#}	3
PSU 8	1 General Education Course	3
SRA 111 (GS) ^{*†}	3 General Education Course	3
General Education Course	3	
	16	15

Second Year

Fall	Credits Spring	Credits
CYBER 221 [*]	3 IST 230 [*]	3
CYBER 262 [*]	3 IST 256 [*]	3
MATH 110 (GQ) ^{*‡}	4 SRA 211 [*]	3
CAS 100A (GWS) [‡]	3 STAT 200 (GQ) ^{*‡#}	4
General Education Course	3 Application Focus Selection 1 (GS/GHW)	3
	16	16

Third Year

Fall	Credits Spring	Credits
CYBER 451 [*]	3 CYBER 366 [*]	3
SRA 231 [*]	3 CYBER 342W [*]	3
ENGL 202C or 202D (GWS) [‡]	3 IST 432 [*]	3
Application Focus Selection 2	3 SRA 311 [*]	3
General Education Course	3 General Education Course	3
General Education Course	1.5	
	16.5	15

Fourth Year

Fall	Credits Spring	Credits
CYBER 362 [*]	3 CYBER 440 [*]	3
CYBER 456 [*]	3 CYBER 454 [*]	3
SRA 365 [*]	3 General Education Course	3
Application Focus Selection 3	3 Elective	3
General Education Course	3 IST 495 [*]	1
General Education Course	1.5	
	16.5	13

Total Credits 124

* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy Cultural Diversity Requirements (United States and International Cultures).

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Advising Notes:

- Application Focus Lists:
 - Custom (Business):
 - Students should choose 2 courses from the following: ACCTG 211, MGMT 301, or MKTG 301.
 - Select 3 credits at the 400-level from: ACCTG, BA, BLAW,EBF, ECON, ENTR, FIN, FINSV, HPA, IB, LER, MIS, MGMT, MKTG, RM, SCM, or STAT.
 - Note: MGMT 301 and MKTG 301 both require ECON 102 or ECON 104 as prerequisites, so students should take ECON 102/ECON 104 as their GS selection.
 - Note: IST 432 counts toward the business minor.
 - Custom:
 - Custom 3 credit application focus provides coherent sequence in Cybersecurity context for student in terms of three credits of GS coursework and must contain 3 credits of 400-level courses.
 - Examples are student taking courses to receive Homeland Security minor, Criminal Justice minor, Cybersecurity Computational Foundations minor (variant of Computer Science minor), or Crime, Law, and Psychology minor.
 - Requires completion and submission of Custom 4-Course Focus Approval Form.

Career Paths

Cybersecurity blends the technical expertise needed to analyze security issues and create cyberdefense strategies with the interpersonal skills needed to communicate threats to a variety of audiences. The program prepares students to meet the growing need for professionals who can defend against threats to digital information and assets. IST's Office of Career Solutions helps students navigate their internship and career development in the field through coaching, workshops, interview preparation, resume reviews, career fairs, job postings, and networking opportunities.

Careers

Because our courses blend technical knowledge with skills in communication and business, a Cybersecurity Analytics and Operations degree allows students to pursue opportunities as cybersecurity analysts,

cyberthreat advisers, penetration testers, and a number of other unique careers in fields such as defense, government, and business.

MORE INFORMATION ABOUT POTENTIAL CAREER OPTIONS FOR GRADUATES OF THE CYBERSECURITY ANALYTICS AND OPERATIONS PROGRAM (<https://www.ist.psu.edu/current/careers/development/process/path/>)

Contact

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Monaca, PA 15061
724-773-3814
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<https://beaver.psu.edu/academics/majors/cybersecurity> (<https://beaver.psu.edu/academics/majors/cybersecurity/>)

Brandywine

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Schuylkill

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York

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Abington

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Altoona

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Berks

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Harrisburg

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University Park

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World Campus

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<https://www.worldcampus.psu.edu/degrees-and-certificates/penn-state-online-cybersecurity-analytics-and-operations-bachelor-of-science-degree>
(<https://www.worldcampus.psu.edu/degrees-and-certificates/penn-state-online-cybersecurity-analytics-and-operations-bachelor-of-science-degree/>)