

# Bachelor of Science

## Cybersecurity (BS)

**Web Site:** <https://www.odu.edu/cyber> (<https://www.odu.edu/cyber/>)

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The Bachelor of Science degree in cybersecurity provides opportunities for students to integrate education and training with the application of problem-solving skills in the lab environment. Courses are drawn from the disciplines of philosophy, computer science, computer engineering, information technology, and criminal justice to examine the multi-faceted nature of cybersecurity. Students admitted to the program have a variety of credit options, including portfolio review, CLEP, DANTES, and departmental exams.

For more information about the cybersecurity interdisciplinary program, email [cyber@odu.edu](mailto:cyber@odu.edu) or Charlie Kirkpatrick ([ckirkpat@odu.edu](mailto:ckirkpat@odu.edu)).

### Requirements

#### Lower-Division General Education

|                                                                                                                                                                                                                                 |     |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| Written Communication ( <a href="https://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#written">https://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#written</a> )                     | 6   |
| Oral Communication ( <a href="https://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#oral">https://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#oral</a> )                              | 3   |
| Mathematics ( <a href="https://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#math">https://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#math</a> )                                     | 3   |
| Language and Culture ( <a href="https://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#language">https://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#language</a> )                    | 0-6 |
| Information Literacy and Research ( <a href="https://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#information">https://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#information</a> ) | 3   |
| Human Behavior ( <a href="https://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#behavior">https://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#behavior</a> )                          | 3   |
| Human Creativity ( <a href="https://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#creativity">https://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#creativity</a> )                    | 3   |
| Interpreting the Past ( <a href="https://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#interpret">https://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#interpret</a> )                 | 3   |
| Literature ( <a href="https://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#literature">https://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#literature</a> )                          | 3   |
| Philosophy and Ethics ( <a href="https://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#philosophy">https://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#philosophy</a> )               | 3   |
| The Nature of Science ( <a href="https://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#nature">https://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#nature</a> )                       | 8   |
| Impact of Technology ( <a href="https://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#impact">https://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#impact</a> )                        | 3   |

Written Communication: Grade of C or better required in both written communication courses and in ENGL 110C before declaring major.

Mathematics: MATH 162M required. MATH 211 and MATH 212 are required as prerequisites for selected upper-division ECE and MSIM courses.

Philosophy and Ethics: can be met by PHIL 355E

Impact of Technology: met with CYSE 200T/IT 200T in the major

Human Behavior: CRJS 215S or DASC 205S/SOC 205S

#### Upper-Division General Education

Met in the major.

#### Requirements for Graduation

Requirements for graduation include the following:

- Minimum of 120 credit hours.
- Minimum of 30 credit hours overall and 12 credit hours of upper-level courses in the major program from Old Dominion University.
- Minimum overall cumulative grade point average of C (2.00) in all courses taken.
- Minimum overall cumulative grade point average of C (2.00) in all courses taken toward the major.
- Minimum overall cumulative grade point average of C (2.00) in all courses taken toward a minor.
- Completion of ENGL 110C, ENGL 211C or ENGL 231C, and the writing intensive (W) course in the major with a grade of C or better. The W course must be taken at Old Dominion University.
- Completion of Senior Assessment.

### Cybersecurity Major

#### General Education

Complete lower-division requirements 35-44

Complete upper-division requirements (met in the major)

#### Prerequisite Courses

Students may be required to complete an additional 15-36 hours of prerequisite courses depending on which Principles and Application courses they select. 15-36

#### Interdisciplinary Writing Course

|          |                                       |   |
|----------|---------------------------------------|---|
| IDS 300W | Interdisciplinary Theory and Concepts | 3 |
|----------|---------------------------------------|---|

#### Core Courses

|                   |                                                          |   |
|-------------------|----------------------------------------------------------|---|
| CYSE/IT 200T      | Cybersecurity, Technology, and Society                   | 3 |
| CYSE 201S         | Cybersecurity and the Social Sciences                    | 3 |
| CYSE 250          | Basic Cybersecurity Programming and Networking           | 3 |
| CYSE 300          | Introduction to Cybersecurity                            | 3 |
| CYSE 301          | Cybersecurity Techniques and Operations                  | 3 |
| CYSE/CRJS/CPD 406 | Cyber Law                                                | 3 |
| CYSE 425W         | Cybersecurity Strategy and Policy (C or better required) | 3 |
| or POLS 425W      | Cybersecurity Strategy and Policy                        |   |
| CS 462            | Cybersecurity Fundamentals                               | 3 |

#### Principles Courses

Select three courses from the following. The coursework allows students to study the selected cybersecurity principles of their choice aligned with their interests and career goals. 9

|              |                                                   |  |
|--------------|---------------------------------------------------|--|
| CRJS 310     | Cybercriminology: Foundations                     |  |
| CS 463       | Cryptography for Cybersecurity                    |  |
| CS 464       | Networked Systems Security                        |  |
| CYSE 495     | Topics in Cybersecurity                           |  |
| CYSE 416     | Cyber Defense Fundamentals                        |  |
| CYSE 419     | Cyber Physical System Security                    |  |
| CYSE 430     | Introduction to Cybersecurity Risk Management     |  |
| or CYSE 431  | Advanced Techniques Cybersecurity Risk Management |  |
| ECE/MSIM 470 | Foundations of Cyber Security                     |  |
| IT 315       | Introduction to Networking and Security *         |  |
| IT 417       | Management of Information Security *              |  |
| IT 418       | Enterprise Information Assurance *                |  |
| or CS 465    | Information Assurance for Cybersecurity           |  |
| PHIL 355E    | Cybersecurity Ethics                              |  |

#### Application Courses <sup>+</sup>

Select three courses from the following. The coursework allows students to apply fundamental cybersecurity theories and techniques in their selected application domains. 9

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                              |                |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|----------------|
| CYSE 270                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Linux System for Cybersecurity                               |                |
| CYSE 280                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Windows System Management and Security                       |                |
| CYSE 407/<br>CRJS 395                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Digital Forensics                                            |                |
| or CYSE 409<br>or CRJS 409                                                                                                                                                                                                                                                                                                                                                                                                                                             | Crime and Computer Applications                              |                |
| CYSE 420                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Applied Machine Learning in Cybersecurity                    |                |
| CYSE 421                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Generative AI in Cybersecurity                               |                |
| CYSE 426<br>or POLS 426                                                                                                                                                                                                                                                                                                                                                                                                                                                | Cyber War                                                    |                |
| CYSE 432<br>or CYSE 433                                                                                                                                                                                                                                                                                                                                                                                                                                                | Cyber Risk CSF/CMMC                                          |                |
| CYSE 432<br>or CYSE 433                                                                                                                                                                                                                                                                                                                                                                                                                                                | Cyber Risk FedRAMP/Audit                                     |                |
| CYSE 450                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Ethical Hacking and Penetration Testing                      |                |
| CS 467                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Introduction to Reverse Software Engineering                 |                |
| CS 471                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Operating Systems                                            |                |
| ECE 452                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Fundamentals of Radio Communications and Wireless Networking |                |
| ECE 455                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Network Engineering and Design                               |                |
| IT 410                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Business Intelligence *                                      |                |
| IT 416                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Network Server Configuration and Administration *            |                |
| IT 419                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Enterprise Cyber Defense *                                   |                |
| IT 461                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Implementing Internet Applications *                         |                |
| RMI 412                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Property & Liability Insurance Company Operations *          |                |
| or RMI 443                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Enterprise Risk Management                                   |                |
| <b>Capstone Courses</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                              |                |
| CYSE 368                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Cybersecurity Internship                                     | 3              |
| or CYSE 494                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Entrepreneurship in Cybersecurity                            |                |
| Capstone enrollment is restricted to declared Cybersecurity (CYSE) majors only. An active internship is required to enroll in CYSE 368. Non-CYSE majors are not permitted to enroll.                                                                                                                                                                                                                                                                                   |                                                              |                |
| IDS 493                                                                                                                                                                                                                                                                                                                                                                                                                                                                | IDS Electronic Portfolio Project                             | 3              |
| <b>Electives (minimum of 19 credit hours)</b>                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                              |                |
| Students can take the electives from any discipline at ODU and/ or complete prerequisites for Principles and Application courses, as needed, to complete the required 120 credit hours. However, no more than 29 credits from courses in the Strome College of Business may be applied to the degree requirements, including named elective courses and general electives (ACCT, BNAL, BUSN, ECON, ENTR, FIN, INBU, IT, MGMT, MKTG, MSCM, OPMT, PAS, PORT, REST, RMI). |                                                              | 19             |
| <b>Total Credit Hours</b>                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                              | <b>120-150</b> |

|   |                                                                                                                                                                                                                                                                       |
|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| * | No more than 29 credits from courses in the Strome College of Business may be applied to the degree requirements, including named elective courses and general electives (ACCT, BNAL, BUSN, ECON, ENTR, FIN, INBU, IT, MGMT, MKTG, MSCM, OPMT, PAS, PORT, REST, RMI). |
| + | Other courses may be substituted with the approval of the program coordinator.                                                                                                                                                                                        |

No more than two classes, or six credits, may be counted for both the major and a minor. Some minors may allow fewer credits to share.

### Electives

Elective credit may be needed to meet the minimum of 120 hours required for the degree.

## Degree Program Guide

The Degree Program Guide is a suggested curriculum to complete this degree program in four years. It is just one of several plans that will work and is presented only as broad guidance to students. Each student is strongly encouraged to develop a customized plan in consultation with their academic advisor. Additional information can also be found in Degree Works.

| Course                                          | Title                                                                                                                 | Credit Hours |
|-------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|--------------|
| <b>Freshman</b>                                 |                                                                                                                       |              |
| <b>Fall</b>                                     |                                                                                                                       |              |
| ENGL 110C                                       | English Composition (Grade of C or better required)                                                                   | 3            |
| MATH 162M                                       | Precalculus I                                                                                                         | 3            |
| Oral Communication                              |                                                                                                                       | 3            |
| Information Literacy and Research               |                                                                                                                       | 3            |
| Human Behavior: CRJS 215S or DASC 205S/SOC 205S |                                                                                                                       | 3            |
| <b>Credit Hours</b>                             |                                                                                                                       | <b>15</b>    |
| <b>Spring</b>                                   |                                                                                                                       |              |
| ENGL 211C<br>or ENGL 231C                       | Writing, Rhetoric, and Research (Grade of C or better required)<br>or Writing, Rhetoric, and Research: Special Topics | 3            |
| Interpreting the Past                           |                                                                                                                       | 3            |
| CYSE 250                                        | Basic Cybersecurity Programming and Networking                                                                        | 3            |
| Approved prerequisite or program elective       |                                                                                                                       | 3            |
| CYSE 201S                                       | Cybersecurity and the Social Sciences                                                                                 | 3            |
| <b>Credit Hours</b>                             |                                                                                                                       | <b>15</b>    |
| <b>Sophomore</b>                                |                                                                                                                       |              |
| <b>Fall</b>                                     |                                                                                                                       |              |
| Nature of Science I                             |                                                                                                                       | 4            |
| CYSE 200T                                       | Cybersecurity, Technology, and Society (Meets Impact of Technology)                                                   | 3            |
| CYSE 300                                        | Introduction to Cybersecurity                                                                                         | 3            |
| Select one of the following:                    |                                                                                                                       | 3            |
| CYSE 406                                        | Cyber Law                                                                                                             |              |
| CRJS 406                                        | Cyber Law                                                                                                             |              |
| CPD 406                                         | Cyber Law                                                                                                             |              |
| Approved prerequisite or program elective       |                                                                                                                       | 3            |
| <b>Credit Hours</b>                             |                                                                                                                       | <b>16</b>    |
| <b>Spring</b>                                   |                                                                                                                       |              |
| Nature of Science II                            |                                                                                                                       | 4            |
| CYSE 301                                        | Cybersecurity Techniques and Operations                                                                               | 3            |
| CS 462                                          | Cybersecurity Fundamentals                                                                                            | 3            |
| Principles course selection 1 of 3              |                                                                                                                       | 3            |
| Approved prerequisite or program elective       |                                                                                                                       | 3            |
| <b>Credit Hours</b>                             |                                                                                                                       | <b>16</b>    |
| <b>Junior</b>                                   |                                                                                                                       |              |
| <b>Fall</b>                                     |                                                                                                                       |              |
| IDS 300W                                        | Interdisciplinary Theory and Concepts                                                                                 | 3            |
| Philosophy and Ethics (Can be met by PHIL 355E) |                                                                                                                       | 3            |

|                                           |                                                                                                          |
|-------------------------------------------|----------------------------------------------------------------------------------------------------------|
| Principles course selection 2 of 3        | 3                                                                                                        |
| Application course selection 1 of 3       | 3                                                                                                        |
| Approved prerequisite or program elective | 3                                                                                                        |
| <b>Credit Hours</b>                       | <b>15</b>                                                                                                |
| <b>Spring</b>                             |                                                                                                          |
| Human Creativity                          | 3                                                                                                        |
| CYSE 425W<br>or POLS 425W                 | Cybersecurity Strategy and<br>Policy (C or better required)<br>or Cybersecurity Strategy<br>and Policy 3 |
| Application course selection 2 of 3       | 3                                                                                                        |
| Approved prerequisite or program elective | 3                                                                                                        |
| Approved program elective                 | 3                                                                                                        |
| <b>Credit Hours</b>                       | <b>15</b>                                                                                                |
| <b>Senior</b>                             |                                                                                                          |
| <b>Fall</b>                               |                                                                                                          |
| Literature                                | 3                                                                                                        |
| Principles course selection 3 of 3        | 3                                                                                                        |
| Application course selection 3 of 3       | 3                                                                                                        |
| Approved program elective                 | 3                                                                                                        |
| Approved program elective                 | 3                                                                                                        |
| <b>Credit Hours</b>                       | <b>15</b>                                                                                                |
| <b>Spring</b>                             |                                                                                                          |
| CYSE 368                                  | Cybersecurity Internship 3                                                                               |
| IDS 493                                   | IDS Electronic Portfolio<br>Project 3                                                                    |
| Approved program elective                 | 3                                                                                                        |
| Approved program elective                 | 3                                                                                                        |
| Elective (if needed)                      | 1                                                                                                        |
| <b>Credit Hours</b>                       | <b>13</b>                                                                                                |
| <b>Total Credit Hours</b>                 | <b>120</b>                                                                                               |

Language and Culture I & II may be met in high school and are not included in this four-year plan. Please see requirement details.