The objectives of the cyber security engineering program at Iowa State University are:

- Graduates, within five years of graduation, should demonstrate peer-recognized expertise in computer security principles together with the ability to articulate that expertise and use it for contemporary problem solving in the analysis, design, and operation of the physical, software and human components of a system, including system integration and implementation.
- Graduates, within five years of graduation, should demonstrate engagement in the engineering profession, locally and globally, by contributing to the ethical, competent, and creative practice of engineering or other professional careers.
- Graduates, within five years of graduation, should demonstrate sustained learning and adapting to a constantly changing field through graduate work, professional development, and self-study.
- Graduates, within five years of graduation, should demonstrate leadership and initiative to ethically advance professional and organizational goals, facilitate the achievements of others, and obtain substantive results.
- Graduates, within five years of graduation, should demonstrate a commitment to teamwork while working with others of diverse cultural and interdisciplinary backgrounds.

As a complement to the instructional activity, the ECPE department provides opportunities for each student to have experience with broadening activities. Through the cooperative education and internship program, students have the opportunity to gain practical industry experience. Students have the opportunity to participate in advanced research activities, and through international exchange programs, students learn about engineering practices in other parts of the world. Well-qualified juniors and seniors in cyber security engineering who are interested in graduate study may apply for concurrent enrollment in the Graduate College to simultaneously pursue both the Bachelor of Science and Master of Science.
Total credits required: 125
Any transfer credit courses applied to the degree program require a grade of C or better (but will not be calculated into the ISU cumulative GPA, Basic Program GPA or Core GPA). See also Basic Program and Special Programs.
Note: Department does not allow Pass/Not Pass credits to be used to meet graduation requirements.
International Perspectives: 3 cr.¹
U.S. Diversity: 3 cr.¹
Communication Proficiency/Library requirement:
- ENGL 1500 Critical Thinking and Communication (Must have a C or better in this course) 3
- ENGL 2500 Written, Oral, Visual, and Electronic Composition (Must have a C or better in this course) 3
- LIB 1600 Introduction to College Level Research 1
One of the following:
- ENGL 3140 Technical Communication (C or better in this course) 3
- ENGL 3090 Proposal and Report Writing (C or better in this course) 3

General Education Electives: 21 cr.³
- ENGL 2500 Written, Oral, Visual, and Electronic Composition (Must have a C or better in this course.) 3
- ENGL 3140 Technical Communication (Must have a C or better in this course.) 3
- or ENGL 3090 Proposal and Report Writing 3
Complete minimum of 3 cr. from Approved General Education Component 3000 level and above.³
Complete additional 12 cr. from Approved General Education Component.³

Total Credits 21

Basic Program: 24 cr.
A minimum GPA of 2.00 required for this set of courses (please note that transfer course grades will not be calculated into the Basic Program GPA). See Requirement for Entry into Professional Program in College of Engineering Overview section.
- CHEM 1670 General Chemistry for Engineering Students 4
  or CHEM 1770 General Chemistry I
- ENGL 1500 Critical Thinking and Communication (Must have a C or better in this course) 3
- ENGR 1010 Engineering Orientation 3
- CPRE 1850 Introduction to Computer Engineering and Problem Solving I ³ 2
- LIB 1600 Introduction to College Level Research 1
- MATH 1650 Calculus I 4
- MATH 1660 Calculus II 4
- PHYS 2310 Introduction to Classical Physics I 4

Total Credits 24

Math and Physical Science: 17 cr.
- COMS 2270 Object-oriented Programming 4
- COMS 2280 Introduction to Data Structures 3
- MATH 2670 Elementary Differential Equations and Laplace Transforms 4
- STAT 3300 Probability and Statistics for Computer Science 3
- Math Elective ³ 3

Total Credits 17

Cyber Security Engineering Core: 37 cr.
(A minimum GPA of 2.00 required for this set of courses, including any transfer courses; please note that transfer course grades will not be calculated into the Core GPA).
- CYBE 2300 Cyber Security Fundamentals 3
- CYBE 2310 Cyber Security Concepts and Tools 3
- CYBE 2340 Legal, Professional, and Ethical Issues in Cyber Systems 3
- CYBE 3310 Application of Cryptographic Concepts to Cyber Security 3
- CPRE 2810 Digital Logic 4
- CPRE 2880 Embedded Systems I: Introduction 4
- CPRE 3080 Operating Systems: Principles and Practice 4
- CPRE 3100 Theoretical Foundations of Computer Engineering 3
- CPRE 3810 Computer Organization and Assembly Level Programming 4
- COMS 3090 Software Development Practices 3
- COMS 3110 Introduction to the Design and Analysis of Algorithms 3

Total Credits 37

Other Remaining Courses: 26 cr.
- CPRE 4910 Senior Design Project I and Professionalism 3
- CPRE 4920 Senior Design Project II 2
- Cyber Security Technical Electives ³ 12
- Computer Engineering Technical Electives ³ 3
- Technical Electives ³ 6

Total Credits 26

Seminar/Co-op/Internships ⁴:
- CPRE 1660 Professional Programs Orientation
- CPRE 4940 Portfolio Assessment

Transfer Credit Requirements
The degree program must include a minimum of 30 credits at the 3000-level or above in professional and technical courses earned at ISU.
in order to receive a B.S. in computer engineering. These 30 credits
must include: CPRE 4910 Senior Design Project I and Professionalism,
CPRE 4920 Senior Design Project II, and credits in the core professional
curriculum and/or in technical electives. The Electrical and Computer
Engineering Department requires a grade of C or better for any transfer
credit course that is applied to the degree program.

1. These university requirements will add to the minimum credits of the
program unless the university-approved courses are also approved
by the department to meet other course requirements within the
degree program. U.S. diversity and international perspectives courses
may not be taken Pass/Not Pass but are used to meet the general
education electives.

2. See Basic Program for Professional Engineering Curricula for
accepted substitutions for curriculum designated courses in the
Basic Program.

3. From department approved lists. (http://www.ece.iastate.edu/
academics/bachelors-degree-requirements/)

4. Co-op / Internships are optional.

See also: A 4-year plan of study grid showing course template by
semester.

Note: International perspectives and U.S. diversity courses are used to
meet the general education electives.

Cyber Security Engineering, B.S.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 1670</td>
<td>4</td>
<td>COMS 2270</td>
<td>4</td>
</tr>
<tr>
<td>CPRE 1850</td>
<td>3</td>
<td>CPRE 1660</td>
<td>R</td>
</tr>
<tr>
<td>ENGL 1500</td>
<td>3</td>
<td>MATH 1660</td>
<td>4</td>
</tr>
<tr>
<td>ENGR 1010</td>
<td>R</td>
<td>PHYS 2310</td>
<td>4</td>
</tr>
<tr>
<td>LIB 1600</td>
<td>1</td>
<td>PHYS 2310L</td>
<td>1</td>
</tr>
<tr>
<td>MATH 1650</td>
<td>4</td>
<td>General Education Elective</td>
<td>3</td>
</tr>
</tbody>
</table>

15 16

Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPRE 2810</td>
<td>4</td>
<td>CPRE 2880</td>
<td>4</td>
</tr>
<tr>
<td>COMS 2280</td>
<td>3</td>
<td>ENGL 2500</td>
<td>3</td>
</tr>
<tr>
<td>MATH 2670</td>
<td>4</td>
<td>Math Elective</td>
<td>3</td>
</tr>
<tr>
<td>CYBE 2300</td>
<td>3</td>
<td>CYBE 2310</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CYBE 2340</td>
<td>3</td>
</tr>
</tbody>
</table>

14 16

Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPRE 3810</td>
<td>4</td>
<td>CPRE 3080</td>
<td>4</td>
</tr>
<tr>
<td>CPRE 3100</td>
<td>3</td>
<td>COMS 3110</td>
<td>3</td>
</tr>
<tr>
<td>COMS 3090</td>
<td>3</td>
<td>ENGL 3140 or ENGL 3090</td>
<td>3</td>
</tr>
<tr>
<td>CYBE 3310</td>
<td>3</td>
<td>General Education Elective</td>
<td>3</td>
</tr>
<tr>
<td>General Education Elective</td>
<td>3</td>
<td>Cyber Security Elective</td>
<td>3</td>
</tr>
</tbody>
</table>

16 16

Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPRE 4910</td>
<td>3</td>
<td>CPRE 4920</td>
<td>2</td>
</tr>
<tr>
<td>CPRE 4940</td>
<td></td>
<td>R Tech Elective</td>
<td>6</td>
</tr>
<tr>
<td>STAT 3300</td>
<td>3</td>
<td>General Education Elective</td>
<td>3</td>
</tr>
<tr>
<td>Cyber Security Elective</td>
<td>6</td>
<td>Cyber Security Elective</td>
<td>3</td>
</tr>
<tr>
<td>CPRE Elective</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Education Elective</td>
<td>3</td>
<td>18</td>
<td></td>
</tr>
</tbody>
</table>

14

Cyber Security Engineering Minor

The cyber security engineering minor (http://catalog.iastate.edu/
collegeofengineering/cybersecurityminor/) is intended for students
studying computer engineering, computer science, software engineering,
or management information systems with the goal of enabling them
to work in cyber security. The minor consists of a series of lab-based
courses that are designed to provide students with both the technical
background and the hands-on experiences along with the theoretical
background to allow them to compete for jobs in cyber security.

Cyber Security Engineering students have the opportunity to become a
concurrent undergraduate/graduate student in a few programs.

CONCURRENT B.S./M.ENG OR M.S. IN
COMPUTER ENGINEERING
CONCURRENT B.S./M.ENG OR M.S. IN
ELECTRICAL ENGINEERING
CONCURRENT B.S./M.ENG OR M.S. IN
CYBER SECURITY

Cyber Security Engineering students have the opportunity to begin their
coursework towards their master's degree in computer engineering,
cyber security during, or electrical engineering their final semester(s) of
undergraduate coursework. In order to be eligible, student must have a
3.0 cumulative GPA or higher to begin a Master of Engineering ("M.ENG")
degree or a 3.3 cumulative GPA to begin a Master of Science ("M.S.")
degree. Students should meet with their academic advisor to discuss this option.

**CONCURRENT B.S./MBA**

Juniors and Seniors have the opportunity to continue their undergraduate coursework while also pursuing a Master of Business Administration (MBA) degree. For additional information please visit the concurrent MBA website www.ivybusiness.iastate.edu/full-time-concurrent-mba (https://www.ivybusiness.iastate.edu/full-time-concurrent-mba/).

The department offers work for the degrees Master of Science and Doctor of Philosophy with a major in cyber security and minor work to students with other majors. Minor work for cyber security majors is usually selected from a wide range of courses outside cyber security.

Master of Engineering degree is coursework only. It is recommended for off-campus students.

The degree Master of Science with thesis is recommended for students who intend to continue toward the Doctor of Philosophy degree or to undertake a career in research and development. The non-thesis Master of Science degree requires a creative component.

The department also offers a graduate certificate program in cyber security.

The normal prerequisite to major in graduate work in cyber security is the completion of undergraduate work substantially equivalent to that required of cyber security students at this university. Because of the diversification in the cyber security graduate program, however, it is possible for a student to qualify for graduate study in certain areas of cyber security even though the student’s undergraduate or prior graduate training has been in a discipline other than cyber security. Supporting work, if required, will depend on the student’s background and area of research interest. Prospective students from a discipline other than cyber security are required to submit, with the application for admission, a statement of the proposed area of graduate study.

The department requires submission of GRE General test scores by applicants. All students whose first language is not English and who have no U.S. degree must submit TOEFL examination scores. Students pursuing the Doctor of Philosophy must complete the department qualifying process.

The Department of Electrical and Computer Engineering is a participating department in the interdepartmental Master of Science and Doctor of Philosophy degree programs in bioinformatics and computational biology. Students interested in these programs may earn their degrees while working under an advisor in electrical and computer engineering.

Well-qualified juniors or seniors in cyber security who are interested in graduate study may apply for concurrent enrollment in the Graduate College to simultaneously pursue both the Bachelor of Science and Master of Science degrees, the Bachelor of Science and Master of Business Administration, or the Bachelor of Science and Master of Engineering degrees. Under concurrent enrollment, students are eligible for assistantships and simultaneously take undergraduate and graduate courses. Details are available in the Student Services Office and on the department’s website.