



University of Colorado
Colorado Springs

College of Engineering and Applied Science
Department of Computer Science

**Guidelines for
Doctor of Philosophy
Focus Area: Cybersecurity
Last Updated: June 2026**

I. INTRODUCTION

The College of Engineering and Applied Science (EAS) at the University of Colorado Colorado Springs (UCCS) offers the Doctor of Philosophy (Ph.D.) degree in Cybersecurity.

This Degree is multi-disciplinary. At its core, the degree requires a broad and in-depth understanding of cybersecurity technologies. This doctoral concentration combines breadth of knowledge in Computer Science, Electrical and Computer Engineering, and Aerospace Engineering with the depth of technical knowledge in technology-based support of cybersecurity and mastery of independent research, performance analysis, synthesis, and design skills in cybersecurity engineering.

The purpose of this set of guidelines is to help prospective students enter the Ph.D. program and to assist admitted students in meeting the requirements of the program. The degree requirements are determined by the graduate faculty of the Computer Science Department at UCCS. Other regulations may be imposed by the College of Engineering and Applied Science and the Graduate School of UCCS. It is the student's responsibility to know and satisfy all relevant requirements.

Graduate students are encouraged to participate in the professional activities of the College. This includes attending seminars and colloquia, suggesting improvements in curricula (both undergraduate and graduate), suggesting new teaching techniques, and participating in the enhancement of hardware and software facilities within the College.

This degree program is research-oriented with a high course taking flexibility. A student may work on Ph.D. studies full-time or part-time. Up to 9 credit hours of independent study can be taken as distance learning in consultation with the Ph.D. advisor. Beyond the traditional learning component, students in the program will be required to have at least three months of operational cybersecurity experience (as internship, training, etc.), as determined by the Ph.D. in Cybersecurity Committee (PCC). This requirement can be substituted with a publication, which will be defined below, or by passing the CISSP or similar certificate examination.

II. ADMISSION

Students may be admitted in one of two categories:

A. Regular Degree Students

A student can be admitted as a regular degree student if the student satisfies the following conditions:

1. A student holds a Bachelor's or Master's degree in any branch of science, technology, engineering and mathematics (STEM), or closely related field from a college or university of recognized standing. When applicable, a student may be required to complete prerequisite courses in STEM.

A student who is admitted without a Master's degree may earn that degree as a part of the Ph.D. study.

2. A student has at least a 3.3 grade point average (GPA, on a scale of 4.0) in the Bachelor or Master's degree program.
3. If a student is not a graduate of a program of recognized standing or does not meet the minimum GPA requirements, the Graduate Record Examination (GRE) may be required with a minimum score of 148 on the quantitative portion.
4. Students whose native language was not English must take either the TOEFL examination with a minimum score of 80 (internet based) or IELTS with a minimum score of 6.5; or have graduated from an accredited U.S. university and have performed satisfactorily; or complete an approved English as a Second Language program through level 5 or level 112.

B. Provisional Degree Students

Students who do not meet requirements for admission as regular students may be admitted as provisional students upon recommendation of the PCC. Applicants will be evaluated on the strength of their academic background and experiences. With concurrence of the chair of the PCC, the PCC may admit provisional students for a probationary period. After completing the provisional requirements, the student will be considered for regular admission. If admission is denied at this time, the student will be dismissed from the program.

Recommendation for change from provisional status to regular degree status will be based on grades received in all courses taken in the provisional status. Credit earned in the provisional status will count towards the Ph.D. if the student moves from provisional to regular status.

C. Transfer Policy

The chair of the PCC will determine how many credit hours of coursework may be transferred from an earned Master's degree or from another university if the Master's degree was not obtained. This includes courses taken at UCCS before the student is accepted into the Ph.D. program. Only courses at the graduate level for which the student received a grade of B or above are eligible for transfer. Online courses of online degree programs are not eligible for transfer. No hours of Dissertation credit may be transferred. The student may initiate this process after completing their first semester at UCCS. The chair of the PCC must approve all transfers.

D. Application Materials

The online application system can be found at <https://www.uccs.edu/>. Generally speaking, applicants should hold a technical degree in STEM. The supporting documentation (transcripts, etc.) should be sent directly to the Admissions office, 1420 Austin Bluffs Parkway, Colorado Springs, CO 80918-3733.

The PCC meets periodically for action on completed applications. It is the responsibility of the applicant to ensure that all materials are received in a timely manner. The applicant being considered for admission will be notified in writing of the results of the decision.

All applicants for regular admission should have all application materials in by February 1 for the Fall Semester and by October 1 for the Spring Semester. These deadlines permit time for the Department, the College, and the Graduate School to process application. It is the applicant's responsibility to make sure all materials are received on time. If these deadlines are not met, an application for regular admission will be considered for the following semester.

III. DEGREE REQUIREMENTS

A. Curriculum Description

The Ph.D. is a degree that is conferred on a student who has demonstrated proficiency in some broad area of study, and who has proven that he or she has the capability to critically evaluate work in the cybersecurity field. In addition, the student must have demonstrated the ability to work independently and make original contributions to the cybersecurity field. No single prescribed set of courses can guarantee that a student has attained this high level. Rather, the degree is conferred after the student has satisfied both the coursework and the independent research requirement under the supervision of a committee, primarily the advisor(s). Minimum coursework, independent study requirements, and the composition of the advisory committee for the Ph.D. program are described below.

B. Credit Hours

For students entering the program with a Bachelor's Degree in STEM, a minimum of 30 credit hours of coursework at the 5000-level or above, including independent study, which may be taken as distance learning, are required. For candidates entering the program with a M.S. Degree in STEM, up to 24 credit hours of coursework from a previously earned Master's Degree may be transferred to the Ph.D. program to meet the 30 credit hour course requirements. In all cases, 30 semester hours of Dissertation credits are required. All Ph.D. students are required to take CS 6000, Intro to Computer Science Research. A waiver to take CS 6000 may be entertained with a publication while at UCCS, as first author, and with approval of the PCC; the notion of publication will be defined below.

Beyond the traditional learning component, students in the program will be required to have at least three months of operational cybersecurity experience (as internship, training, etc.), as determined by the PCC. This requirement can be substituted with a publication while at UCCS, as first author, and with approval of the PCC, or by passing CISSP or similar certificate examination. One publication cannot be used for multiple purposes.

Some prerequisite courses may be required for students who have not taken these courses or their equivalents before. The specific required courses will be determined by the Ph.D. advisor according to the study area and research topic. These prerequisite coursework hours do not count towards the hours required for Ph.D. study.

Most coursework will require an on campus presence, but some coursework, including independent study, may be taken as distance education. Research toward Dissertation may be done remotely.

No more than 24 Dissertation hours can be taken prior to the semester in which the Dissertation Proposal, which will be described below, is passed.

C. Plan of Study

A Ph.D. plan of study is a document that lists the courses that a student has/will take to fulfill the degree requirements. It also lists course deficiencies and transferred courses. A student must develop a plan of study by the end of the first semester after passing the written qualifying examination. The plan of study is developed with the assistance of the student's advisor. Any subsequent changes of the plan must be approved by the advisor.

D. Advisory Committee

A student should choose an advisor by the end of the first year in the program, if not at the beginning of study. A student may change advisor by mutual agreement at any time. The advisory committee shall be formed early in the Dissertation research so that the committee can guide the research.

The student and the advisor will form the advisory committee subject to the following requirements:

1. The advisory committee consists of 5 graduate faculty members, who are full-time faculty with PhD degrees. External graduate faculty members are approved by the Graduate School of UCCS. Three or more committee members must be from the EAS College. At least one member of the committee must be from outside the EAS College, and a maximum of two members from outside the college of EAS may serve on the committee. All committee members must be members of the graduate faculty.
2. The committee should reflect the focus area of the Dissertation work and be able to support and evaluate the student's work.

Advisory Committee Authority: Subject to the requirements for the PCC, the committee, especially the advisor, is fully responsible for all aspects of the student's academic program.

IV. Examinations

Satisfactory performance of the student is judged not only by course grades and dissertation credit, but also by performance on a series of examinations as described below.

A. Qualifying Examination

The qualifying examination consist of two parts, one **comprehensive** (oral) examination and one **written** examination.

1. The **comprehensive** examination is an oral presentation with a written report that surveys the literature in the planned research area that a student may pursue. A few example papers, recommended by the Ph.D. advisory committee will be posted and available to students for reference. The examining committee will be organized by the advisor. The examining committee consists of 3 graduate faculty members from appropriate departments or institutes at UCCS as approved by the PCC. This Comprehensive Exam should be complete prior to enrolling in Dissertation credit hour 16.

The topic of the exam will be determined by the student's advisor in consultation with the examining committee.

Students having any sponsorship via the advisor's research funding or departmental teaching assistantship should pass the comprehensive examination by the end of the first year after admission to the program. Other students should pass the comprehensive examination by the end of the second year after admission to the program. A student has one chance to take the oral exam. The advisor or the program director may request one additional year and one additional attempt for a student to take the examination. The request needs the approval of the PCC.

Waiver to the comprehensive exam may be given if a student has one publication as first author while at UCCS. The request is initiated by the advisor.

2. The **written qualifying** examination consists of four distinct topics:

- CS 5220 Computer Communication;
- CS 5910 Fundamentals of Network & Computer Security;
- CS 5920 Applied Cryptography; and
- Either CS 5985 Cybersecurity Metrics, CS 5200 Computer Architecture, or CS 5720 Algorithms

The examination is formally defined by the syllabus of material it will cover. Students may take courses to help prepare for the examination, but the syllabus, not the course, defines the expectations for the examination. Students should be aware that the standard will be all self-study as if no courses exist in the area.

To pursue research in Cybersecurity, each Ph.D. student is expected to demonstrate proficiency in fundamentals of Cybersecurity, which are covered the topics taught in the above four courses. A student shows proficiency in each class by either getting a grade of A- or above in the class or passing appropriate

parts of the Written Qualifying Examination, as discussed below. That is, a student **must qualify** in each of the four topics **either** by passing a section of the Written Qualifying Exam **or** by getting a grade of A- or above in the corresponding course.

The Written Qualifying Exam is given once a year: early in the Spring term. Every Ph.D. student is required to take the exam the first time it is offered after the student's first semester at UCCS.

The advisor or the program director may request one additional year and one more attempt for a student to take the written examination with a sound reason; for example, the student has made significant progress in research with good publication(s). The request needs the approval of the PCC.

Students may transfer in classes after successfully completing their first semester at UCCS, to include possibly qualifying examination classes. Classes must be from a R1/R2 university as defined by Carnegie Foundation's Research Universities. In the case a student requests to using the credit taken from another R1/R2 university or from UCCS prior to entering the Ph.D. Cybersecurity program to replace one of the aforementioned four courses, the PCC will decide if the grade of a transferred class from R1/R2 universities can be used for this purpose.

B. Publication

A *publication* is defined as a *peer-reviewed paper* with (i) multiple formal-written reviews, (ii) indexed in a major library database, and (iii) at least 5 double-column pages or 10 single-column pages. Petition to accommodate a specific paper can be made with support from the advisor and approved by the chair of the PCC.

A *significant student publication* is a peer-reviewed paper with (i) multiple formal written reviews, (ii) indexed in a major library database, (iii) at least 5 double-column pages or 10 single-column pages, and (iv) meeting one of the following three requirements:

- The venue in which the paper is published is in the top 20 of any Google Scholar Engineering and Computer Science subcategory, *or* has a Google metric h-index of at least 20.
- The paper has at least 30 non-self-citations in Google Scholar.
- The venue has an acceptance rate lower than 40%.

Petition to accommodate specific papers can be made with support from the advisor and approved by the chair of the PCC.

C. Dissertation Proposal

The minimal requirement for a Ph.D. student to do Ph.D. Dissertation Proposal includes:

- Having taken CS 6000, Intro to Computer Science Research, with a grade B or above, or having successfully waived CS 6000 via a publication, as described above. In the case the student's grade is below B, the student may repeat this course once, with the approval of the chair of the PCC, provided the course has not been previously applied toward a degree. In the case the student's grade is still below B, the student should have had a publication, as first author, after taking CS 6000 and before doing the Proposal. Petition can be made with support from the advisor and approved by the PCC.
- Having successfully passed the Comprehensive (oral) examination, or having successfully waived it with a publication, as described above (while noting that one publication can only be used for one waiver purpose).
- Having successfully passed the Written examination, or having successfully waived it as described above.

The purpose of the Dissertation Proposal, which must be taken before more than 24 hours of Dissertation credit is earned, is to ensure that the student possesses the following:

1. Sufficient grasp of the fundamentals of the chosen Dissertation area to begin research, normally achieved through a thorough study of the current literature on the topic
2. Ability to conduct innovative research

3. Ability to exchange ideas and information with members of the Advisory Committee

Comprehension of existing literature and course material pertinent to the Dissertation research, as well as the reasonableness of the unknown or undeveloped concepts that the student proposes, will be assessed by the Advisory Committee. The responsibility of the Advisory Committee is to review the research proposal and the qualifications of the student to complete the research successfully. If the research and the approach are found to be significant and appropriate and the student is judged capable of completing the research, the Advisory Committee will approve the research direction. If the Advisory Committee does not find the student ready to begin Dissertation research, it must suggest further preparation by the student and plan on a subsequent taking of the comprehensive examination.

A passing grade in the examination is given if at least 4 of the 5 members of the Advisory Committee, including the student's advisor, vote affirmatively. After passing the Ph.D. proposal, the Ph.D. student becomes a Ph.D. Candidate.

D. Final Examination (Dissertation Defense)

The final examination can only be applied after at least three months of operational cybersecurity experience (as internship, training, etc.), as determined by the PCC. This requirement can be substituted with a publication or by passing the CISSP or similar certificate examination.

In addition, before a Ph.D. candidate applies to take the Dissertation Defense, the candidate must have at least one significant publication as first author during the Ph.D. study. In the case a candidate has no significant publication, the candidate's advisor can request the Dissertation Committee to consider other justifiable criteria such as patents or major software packages in widespread use, which should be largely based on the study and research during the degree work.

The Dissertation must be based on original investigation. It must demonstrate mature scholarship and critical judgment, as well as a familiarity with the tools and methods of research. It must be written on the subject approved in the comprehensive examination.

After the dissertation has been completed, a final examination on the Dissertation and related topics is conducted. This examination, which is conducted by the Advisory Committee mentioned above, is oral and is open to anyone who wants to observe. More than one negative vote by members of the Advisory Committee disqualifies the candidate in the final exam. In case of failure, the final examination may be retaken after a period of time determined by the Advisory Committee.

V. RESIDENCY REQUIREMENT

The minimum residency requirement is six credit hours of regular courses per semester at the 5000 level and above, not including Dissertation credit hours.

VI. TIME LIMIT FOR COMPLETION OF DEGREE

Individuals who are admitted as Ph.D. students normally are expected to complete all degree requirements within nine years from the date of the start of coursework in the Ph.D. program. For students who fail to complete the degree in the nine-year period, the PCC must file an annual statement with the Graduate School Dean giving the reasons why the Program Director believes that the student is making adequate progress and should be allowed to continue in the program. This request must be signed by three members of the graduate faculty who serve on the student's Advisory Committee. If the Graduate School Dean approves this statement, the student may continue his/her studies for one additional year.

VII. Further Information

For more information, call (719) 255-3325, visit our Web site at <http://eas.uccs.edu/cs>, or e-mail csinfo@uccs.edu.