Computer Science
Ph.D. Graduate Handbook
2024-2025

Concentrations In:
1. Media Arts & Sciences
2. Cybersecurity

MANUAL OF THE PH.D. DEGREE IN COMPUTER SCIENCE AND CONCENTRATIONS

ARIZONA STATE UNIVERSITY

2024-2025

Ira A. Fulton School of Engineering Arizona State University
PO Box 878809
Tempe, AZ 85287-8809
PHONE: (480) 965-3199

CSE on the web: https://scai.engineering.asu.edu/graduate-computer-science/
Email address: scai.grad.tempe@asu.edu

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I. Introduction to the Computer Science Program

The Computer Science (CS) program of the Ira A. Fulton School of Engineering at Arizona State University (ASU) offers an advanced academic program leading to the Doctor of Philosophy (Ph.D.) degree. The PhD program in computer science aims to prepare students for conducting independent research in computer science while ensuring deep knowledge in the area of specialization and breadth of knowledge in various areas of computer science. The program requires core and elective coursework, written and oral comprehensive exams, a prospectus proposal, a written dissertation, and an oral defense of the dissertation. The Ph.D. degree is offered to exceptional students who have completed, with distinction, a bachelor's or master's degree in engineering or a closely related field. Within this degree, students can pursue their studies in the following concentration and must submit a separate application for consideration of the concentration of choice:

- Media Arts and Sciences (MAS)
- Cybersecurity (CS)

ASU's School of Computing and Augmented Intelligence (SCAI) envisions a society where secure, accurate, and current information is ubiquitously available; data is seamlessly collected, managed, and converted into information that entertains individuals, empowers businesses, and guides the decisions of both in their daily affairs.

We envision our school as a community recognized by its colleagues internationally as a leader in envisioning and enabling an information-driven society and by students as a preferred location for acquiring the knowledge and skills necessary to contribute to this vision.

We envision a community of scholars cooperatively engaged in transdisciplinary research addressing the grand challenges of modern society and supporting the intellectual growth of students and colleagues.

Our mission is to benefit society through excellence in education, use-inspired research from basic to translational, and leadership in service to the profession and community. We seek to provide a supportive environment that promotes creativity, diversity, multidisciplinary teaming, scholarship, and ethical behavior to advance knowledge and practice in computing, information, and decision technologies to enhance society.

ASU prohibits all forms of discrimination, harassment, and retaliation. To view ASU's policy, please see https://www.asu.edu/aad/manuals/acd/acd401.html .

Title IX protects individuals from discrimination based on sex in any educational program or activity operated by recipients of federal financial assistance. As required by Title IX, ASU does not discriminate based on sex in the education programs or activities that we operate, including in admission and employment. Inquiries concerning the application of Title IX may be referred to the Title IX Coordinator, the U.S. Department of Education, Assistant Secretary, or both. Contact titleixcoordinator@asu.edu or 480-

965-0696 for more information. Office located at 1120 S. Cady Mall, INTDSB 284. For information on how to make a report, please go to www.asu.edu/reportit/.

II. Objective of the Handbook

The purpose of this handbook is to provide guidance and information related to admission, degree requirements, and general policies and procedures. Please note that you will find differences between the Graduate College Policies and Procedures and the Computer Science program requirements in some cases. In these cases, Computer Science Engineering (CSE) has established higher standards. Students must satisfy both sets of requirements. Please note that policies and procedures are occasionally amended to improve the program. Changes will be communicated to students through their ASU e-mail, our primary communication form. We will also post any updates to this handbook on our website https://scai.engineering.asu.edu.

III. Student Responsibility and Resources

All students are expected to become familiar with university and program policies and procedures and abide by the terms set forth. Information is available online. Most importantly, you should visit the following websites:

A. The Office of Graduate College – http://graduate.asu.edu
B. Graduate College Policies and Procedures – https://graduate.asu.edu/policies- procedures
C. The Computer Science Program – https://scai.engineering.asu.edu/graduate-computer-science/
D. The International Student and Scholars Center– https://issc.asu.edu/, if applicable.
E. The Ira A. Fulton Schools of Engineering – http://engineering.asu.edu
F. Wellness Resources - We believe graduate education provides an opportunity to grow in our knowledge and expertise, and during our studies, we may face challenges and hardships that can affect our wellbeing. The Graduate College and the ASU Graduate Student Association have put together resources and best practices guides to help your educational journey. "Graduate Wellness Resources" – a one-page guide to Financial, Social, Emotional, and Physical Health and Wellness Resources for ASU Graduate Students, developed by the GPSA
G. We encourage you to contact a graduate advisor at the SCAI Graduate Advising Office if you need additional guidance and support.
H. "10 Best Practices in Graduate Student Wellbeing" – proven ways to help graduate students better care for themselves under the increasing demands of graduate school

IV. Faculty Responsibility

The members of the faculty of Computer Science have diverse backgrounds and knowledge. They are available to assist you in your plan of study and your educational and career goals. We encourage you to take the opportunity to make individual appointments with faculty members with whom you have common interests. Please refer to the SCAI website for a list of the faculty names, areas of expertise, and research interest.

V. Admission and Eligibility to the Doctoral Degree Program

The Computer Science doctoral degree requires a background in engineering, math, statistics, physical science, or a closely related field. However, in some cases, students with non- traditional educational backgrounds will be considered for admission. These students may be required to take undergraduate-level fundamental courses to prepare them better for the program coursework. A student is encouraged to contact the School of Computing and Augmented Information, Advising Office, Centrepoint Suite 105, to obtain advice on their educational pursuits. **GRE scores are not required to be considered for admission to this program.**

A. Eligibility

Before applying to the CS MS program, students are required to have completed 2 semesters or 6 credit hours of calculus, equivalent to Calculus I and II. Discrete math is also recommended prior to admission.

B. Application

All students need to apply and submit all the required supporting materials with the Office of Graduate Admission and pay the required fee to have their application reviewed and processed.

C. Application Deadlines

*** December 31 for the Fall Semester**
*** August 1 for the Spring Semester**
To receive full consideration please submit all required documents by the deadline.

D. Transcripts

At the time of application, students can upload their unofficial complete transcripts (bachelor's and master's degree). Once matriculated at ASU, students are required to submit an official transcript and degree certificate.

E. English Proficiency

The University requires all international applicants from a country whose native language is not English to provide the Test of English as a Foreign Languages

(TOEFL) or the International English Language Testing System (IETLS) scores. CSE uses average scores 575 (paper-based) or 90 (internet-based) for TOEFL or 7 for IETLS or 65 for Pearson, or 115 for Duolingo for admission. **Note that your application will not be processed until the university receives official English Proficiency scores. These scores are valid two years from the start date of the degree program.** Exemption from the English Proficiency requirement can be met by visiting the Graduate Admission site under English Proficiency. Please address all English Proficiency questions to the Office of Graduate Admission. The ASU Institution code is 4007. If a department code is required, use 99 for TOEFL.

F. Personal Statement

The application must include a personal statement. The statement should: 1) explain professional goals and your reasons for enrolling in the doctorate program; 2) describe any research experiences; 3) indicate personal research interests; and 4) identify two or three ASU CSE faculty with matching research interests.

G. Curriculum Vitae (CV) or Resume

All students are required to upload their CV or resume for full consideration. A comprehensive CV should include prior degree, work experience, conference presentations, publications, and past research.

H. Letters of Recommendation

CSE requires three (3) letters of recommendation, at least one must come from a former faculty. There is no standard form for letters of recommendation. Our current application process allows students to electronically submit the recommenders' names and the emails of the recommender while completing the application. The Office of Graduate Admission will send an email to the recommender alerting them to go online and submit a recommendation. We encourage letters from people who know you well, such as teachers, professional associates, and supervisors, without direct conflict of interest. Consider acquaintances who can comment on your academic, emotional, intellectual, and professional development.

I. GPA Requirement

Students applying directly from an undergraduate program must have a minimum cumulative GPA of 3.5 in the last 60 credit hours of the undergraduate degree and have been involved in some form of research at the undergraduate level. Students who are applying after a master’s degree must have a minimum GPA of 3.5 for the last degree awarded.

J. Application Evaluation

The Computer Science Graduate Program reviews and evaluates a student's application. Several factors. These factors are the student's undergraduate cumulative GPA in the last 60 hours, major, institution, previous degrees awarded, personal statement, letters of recommendation, standardized test scores, and performance in individual courses.

K. Admission Deferrals

Students may defer their initial start semester and year of admission to one semester with the recommendation from the degree program. Requests for deferrals must be submitted by the start of the term of original admission. Students need to check the deferral deadlines through Graduate Admissions

L. Notice of Admission

The CSE Program submits its recommendation of admission to the Office of Graduate Admission, and the final notice of admission decision is notified in writing via email by the Office of Graduate Admission. You may check your application status on MyASU (myasu.edu).

M. Deficiencies

Students in the PhD programs are admitted from a variety of backgrounds. To ensure that all students have an adequate background in computer science at the undergraduate level, all students need to show competence in 5 areas: computer organization, operating systems, programming languages, algorithms and data structures, and the theory of computation. Many students meet this requirement by taking courses in these areas during their undergraduate studies. Students who have not taken the equivalent of these courses may be assigned deficiencies in these courses upon admission. Assigned deficiencies must be completed with a grade of C or higher in their first year in the program.

Below is a list of prerequisites along with the associated ASU course numbers:

- CSE 230 - Computer Organization and Assembly Language Programming
- CSE 310 - Data Structures and Algorithms
- CSE 330 - Operating Systems
- CSE 340 - Principles of Programming Languages or CSE 355 - Introduction to Theoretical Computer Science

Deficiency coursework completed with a "C" or better grade at the undergraduate level will satisfy the requirements. A "C" or better grade is required for all assigned deficiency coursework at the post-baccalaureate level.

Students have three options to meet the assigned deficiency exam: Waiver process, Test-out exam, or enrolling in the course. For exceptional students, based on the request of the student's advisor, and in concurrence with the Program Chair, the student may be allowed to take a graduate course instead of the deficiency course.

Effective Spring 2024, students must submit the Deficiency Waiver Options 1 and 2 before the first day of the semester of the admission term.

Option 1: Deficiency re-evaluation
Students wishing to have their course syllabi examined as evidence that deficiencies have been satisfied must submit a petition. The request must be submitted using the Petition for Reevaluation of Deficiency Course form along with supporting documents such as a syllabus, catalog description, and university transcripts (including the grade scale), to prove that you have met the requirements. Once the petition has been reviewed, it is final. There will be no future petitions or consideration requests. If the petition is not approved after the evaluation, the student may choose to take the deficiency test-out examination.

Option 2: Deficiency Test-Out Exam
An online course proficiency examination (career catalyst) is available for students to take entering with deficiencies (listed in the admission letter). These exams establish whether a student possesses basic knowledge of the course material sufficient to have an assigned deficiency waived. Each subject examination costs $59, per attempt, which is payable at the time of registration. Students have a maximum of two attempts for each subject.

Below is the testing period, in which the exam needs to be completed depending on the start of the semester admitted, is the only opportunity for deficiency test- outs. No other arrangements will be made for students to test out of assigned deficiencies.

Admit Term	Exam Deadline
Fall	Before the first day of the semester of the admission term
Spring	Before the first day of the semester of the admission term

Option 3: Enrolling in the Course.
Students who could not clear their assigned deficiency through the waiver process or deficiency test-out exam must enroll and pass the course(s) in their first year. A student has a total of two attempts to clear the deficiency. Students assigned CSE 340 can enroll in CSE 340 or CSE 355. For CSE 340/355, two attempts are combined. A student cannot take CSE 340 twice and CSE 355 twice to clear their deficiency, as this would total four attempts.

N. Pre-Admission Credits and Transfer Credit

A student can transfer up to thirty credit hours from an earned master's degree from another accredited institution plus up to 12 credits not used in any previous degree program with the approval of the Program Chair. Credit for course work taken from an accredited institution can be awarded subject to the following constraints:

1. Transferred credit should satisfy degree requirements
2. 0-30 hours of graduate credit from a previously earned master's degree may be transferred with approval from the academic unit. Note that a student is not guaranteed to be able to transfer all 30 credits from a previous master's degree if the credits do not satisfy degree requirements.
3. 0-12 additional credit hours can be transferred if they are not used towards a previously earned degree. A student will have to prove by a Master's plan of study from the previous institution that these credits were not required for their master's as stated in the ASU Graduate College Pre-admission credits policy. Pre-admission credits must be taken within three (3) years of admission to the ASU degree program to be accepted. If coursework older than 3 years from the admission term of a new program is being applied towards the program as pre-admission coursework, the maximum time limit may be updated to reflect the start date of the pre-admission coursework.
4. The equivalent of a grade of B (at ASU) or higher should have been earned on every transferred course. A course with a grade of "Pass," "Credit," or "Satisfactory" is not acceptable for transfer.
5. Courses transferred should match or be sufficiently like courses offered at ASU.

A student who wishes to transfer credits from another institution should contact the graduate advisor in the SCAI Advising Center to initiate the transfer credit process.

See the Pre-Admission Credit section of the Graduate College Policies and Procedures Manual for more details.

O. Transfer Between Programs

Students wanting to change from a master's to a Ph.D. in Computer Science must submit a new application to the Graduate College. Admission to the Ph.D. program can be denied. If admitted, the student can use only twelve credits from the original program to the new program on courses taken within the last three years with grades of "B" or better.

A student who would like to transfer from the PhD program to a master's program should submit a "Degree Change Request form" at the SCAI Advising Office. If approved, the student can submit an official "Request" through MyASU. A request to transfer from the PhD program to a master's program is

subject to program approval. 12 or more transferring credits require the CS Graduate Program Chair and the Dissertation Chair or co-chair's approval. Otherwise, a petition is needed. Students should familiarize themselves with the Graduate College pre-admission transfer policy.

The student's program of study after a transfer from the PhD program to a master's program should satisfy the master's program degree requirements in effect at the time of the transfer.

Ph.D. to MS thesis - Can transfer any number of credits from the Ph.D. program to the MS program as long as the grades in the courses are "B" or higher. A total of 6 credit hours from CSE 590 and/or 790 (combined) can be transferred. At most 6 credits hours from CSE 599 can be transferred. No credits from CSE 792 and 799 can be transferred. Students will still need to finish their culminating event - MS thesis.

Ph.D. to MS portfolio and MS applied project, and MCS Online - Can transfer any number of credits from the Ph.D. program to the MS program as long the grades in the courses are "B" or higher. Credits from courses CSE 590, 790, 599, 792, 799 cannot be transferred. Students will still need to finish their culminating event - portfolio or applied project. Note applied project is not an option for MCS Online as of now.

VI. Doctoral Degree Requirements

The PhD program in computer science aims to prepare students for conducting independent research in computer science while ensuring in-depth knowledge in the area of specialization and breadth of knowledge in various areas of computer science. This section outlines the requirements and the required procedures to be followed to satisfy these requirements.

1. **Breadth Requirement at the Graduate Level: core area courses**
   All students, regardless of their specialization area, are expected to show the breadth of knowledge in computer science at the graduate level. This requirement is satisfied by completing, with a grade of B or better, 3 courses in 3 different core areas - Systems, Applications, and Foundations. **Transfer credits cannot count towards meeting the breadth requirement unless the credit was earned at ASU.**
2. **Depth Requirement at the Graduate Level: depth courses**
   In addition to the breadth requirement, students should show deep knowledge of their specialization area by taking one additional course in one of the core areas related to their specialization. Transfer credits may be used to satisfy depth requirements. This is not required for students doing the concentration.
3. **Additional Courses Requirement**
   In addition to the breadth and depth courses, a student should take formal courses and/or directed study. More is explained in the respective degree program and concentration.
4. **Publication Expectations**
   Before a dissertation can be defended, parts of it must have been published or accepted for publication in at least one journal, conference, or book of a quality acceptable to the dissertation committee.

5. **Comprehensive Exam**
   Students show their depth of understanding of their specialization area by passing a comprehensive exam. The exam has two parts, one written and one oral. The syllabus of the exam is determined, in consultation with the student, by the student's advisor and the supervisory committee. By passing the comprehensive exam, the student shows that he or she has mastered the required knowledge to conduct research in his or her area of specialization.
6. **Research Competence Requirement: research proposal (Prospectus)**
   While the comprehensive exam shows that the student has the needed knowledge to conduct research in the area of specialization, the research proposal shows that the student has mastered the required research methods to identify, formulate, and plan research in a specialization area. The proposal exam has two parts, a written and an oral.
7. **Research Competence Requirement: dissertation**
   The dissertation is the culmination of the doctoral program. By writing and defending a dissertation, the student shows that he or she is ready to conduct independent research in a specialized area.
8. **Degree Requirements for the Ph.D.**
   The degree requirements for the Ph.D. include a minimum of 84 semester hours beyond the bachelor's degree and deficiency courses. A maximum of 30 credit hours taken during the master's degree can be applied to a Ph.D. degree, if coursework is approved as applicable to the doctoral degree.

The Ph.D. is comprised of five (5) major milestones, which all students are required to pass successfully prior to graduation:

1. Completion of coursework
2. Filing an approved Plan of Study
3. Passing the Comprehensive Examination
4. Approval of the dissertation prospectus to advance to candidacy
5. Successful oral defense of an approved written dissertation

The Computer Science Ph.D. program also offers concentrations in Cybersecurity and Media Arts and Science.

A. Formulation of the Plan of Study

The dissertation chair advises the student on the plan of study (iPOS). The iPOS must be submitted by the time a student has completed their first year of coursework and identified a dissertation chair. The iPOS must have the approval of the student's Dissertation Chair, the Academic Unit, and the Graduate College.

84 credit hours, a written comprehensive exam, an oral comprehensive exam, a prospectus, and a dissertation – General

- **Required Core Areas (9 credit hours)**
  - Systems (3)
  - Applications (3)

    - Foundations (3)
- **Depth (3 credit hours)**
    - Three additional credit hours in one core area (6)
- **Research (18 credit hours)**
    - CSE 792 Research (18)
- **Electives and Additional Research (6 – 42 credit hours)**
- **Culminating Experience (12 credit hours)**
    - CSE 799 Dissertation (12)
- **Additional Curriculum Information**

Courses used to satisfy the core area requirement cannot be used to fulfill electives or other requirements. **A grade of B or better is required for core courses.**
18 credit hours of CSE 792 Research is required, and up to 54 credit hours are allowed per the plan of study. Students with research credit hours in excess of 18 add these credit hours to their electives and additional research.

- **CSE Electives include**

6 – 36 credits of which up to 18 credits can be CSE 590/790. At most 3 credits can be from approved CSE 4xx level courses. Students pursuing Master's in Passing can count 12 credit hours CSE 590 or 790 towards their iPOS. At most six (6) credit hours of electives taken in other academic units or universities can count towards the 6 credits of CSE electives, subject to program chair approval.

At most six (6) credit hours of interdisciplinary electives in other academic units that are subject to program chair approval.
When approved by the academic unit and the Graduate College, this program allows 30 credit hours from a previously awarded master's degree to be used for this degree.

- Comprehensive Examination – Oral and Written
- Dissertation Prospectus - Written
- Prospectus Defense - Oral
- Dissertation Defense- Oral

B. Core Courses

Regardless of their specialization area, all students are expected to show the breadth of knowledge in computer science at the graduate level. This requirement is satisfied by completing, with a grade of B or better, 3 courses in 3 different core areas. It is recommended that students complete the core courses early in their program to ensure they can achieve a "B" in the three core area courses Transfer credit cannot count towards satisfying the breadth requirement unless the credit was earned at ASU

C. Depth

In addition to the breadth requirement, the student should show deep knowledge of their specialization area by taking one additional course in one of

the core areas related to their specialization. Transfer credits can be used to satisfy in-depth requirements.

D. Concentration

The Computer Science Ph.D. program also offers Cybersecurity and Media Arts, and Sciences concentrations. The hours in the elective coursework will be adjusted to accommodate the concentration coursework if students plan on pursuing a concentration. Courses that are used to satisfy the concentration requirement in the plan of study cannot be used to satisfy the core area requirement.

1. CS Ph.D. in Cybersecurity:
credit hours, a written comprehensive exam, a prospectus, and a dissertation

- **Required Core Areas (9 credit hours**)
  - Systems (3)
  - Applications (3)
  - Foundations (3)
- **Concentration (9 credit hours)**
  - CSE 543 Information Assurance and Security (3)
  - Choose two:
    - CSE 539 Applied Cryptography (3)
    - CSE 545 Software Security (3)
    - CSE 548 Advanced Computer Network Security (3)
    - CSE 598/591 Cybersecurity topics (3) * with the approval of the dissertation chair
      *With petition approval
- **Research (18 credit hours**)
  - CSE 792 Research (18)
  - **Electives and Additional Research (36 credit hours)**
- **Culminating Experience (12 credit hours)**
  - CSE 799 Dissertation (12)
- **Additional Curriculum Information**
  - Courses that are used to satisfy the core area requirement cannot be used to satisfy electives or other requirements. A grade of B or better is required for core courses.

    18 credit hours of CSE 792 Research is required and up to 54 credit hours is allowed on the plan of study. Students with research credit hours more than 18 add these credit hours to their electives and additional research.

Electives Include:

- Additional CSE 792 Research credit hours (up to 54 credit hours allowed beyond required 18)

- Computer science courses of which up to 18 credit hours of CSE 590 and CSE 790 Reading and Conference are allowed. See above note about the number of credits counting towards the Master's in Passing (MIP)
- Up to 6 credit hours of interdisciplinary electives in other academic units that are subject to program chair approval.
- When approved by the academic unit and the Graduate College, this program allows 30 credit hours from a previously awarded master's degree to be used for this degree.
- A maximum of three credit hours of approved CSE 400-level coursework may be applied on the plan of study.
- Comprehensive Examination - Oral and Written
- Dissertation Prospectus - Written
- Prospectus Defense - Oral
- Dissertation Defense- Oral

2. **CS Ph.D. in Media Arts and Sciences:**
   84 credit hours, a written comprehensive exam, an oral comprehensive exam, a prospectus and a dissertation.
   - **Required Core Areas (9 credit hours)**
     - Systems (3)
     - Applications (3)
     - Foundations (3)
   - **Concentration (9 credit hours)**
     - Select three courses from the following list:
     - AME 511 Advanced Interactive Sound (3)
     - AME 515 Machine Vision and Pattern Recognition (3)
     - AME 520 Understanding Activity (3)
     - AME 532 Media Synthesis (3)
     - AME 534 Machine Learning for Media Arts (3) *
     - AME 535 Mobile Development (3)
     - AME 551 Designing Extended-Reality Experiences (3) *
     - AME 570 Programming for Social and Interactive Media (3)
     - AME 598 Special Topics (3) with the approval of the dissertation chair*

       * With petition approval
   - **Research (18 credit hours)**
     - AME 792 Research (6)
     - CSE 792 Research (12)
   - **Electives (36 credit hours)**
   - **Culminating Experience (12 credit hours)**
     - AME 799 Dissertation (6) and
     - CSE 799 Dissertation (6)
   - **Additional Curriculum Information**
     Courses that are used to satisfy the core area requirement cannot be used to satisfy electives or other requirements. A grade of "B" or better is required for core courses.

- Additional CSE 792 Research credit hours (up to 51 credit hours allowed beyond required 18). For CSE electives, an additional 3 credits of CSE 5XX are required. At most three (3) credit hours of electives taken in other academic units or universities can count towards the 3 credits of CSE electives, subject to program chair approval.
- Students will choose computer science courses and up to 18 credit hours of CSE 590 and CSE 790 Reading and Conference. At most 3 credits can be from approved CSE 4xx level courses. Students pursuing Master's in Passing can count 12 credit hours CSE 590 or 790 credits towards their iPOS. When approved by the academic unit and the Graduate College, this program allows 30 credit hours from a previously awarded master's degree to be used for this degree.

1. Comprehensive Examination – Oral and Written
2. Dissertation Prospectus - Written
3. Prospectus Defense - Oral
4. Dissertation Defense- Oral

E. Approved 400 and 4XX/5XX Level

A maximum of 3 credit hours of approved CSE 400-level coursework is allowed. If a 400-level course is cross-listed with a 500-level course, students will be required to enroll in the 500 level. Students who have taken any of the 4XX cross-listed courses as 598, cannot take the same class at the 400-level (course lists available at: https://scai.engineering.asu.edu/graduate-computer-science/).

Non-CSE prefix courses outside the unit require the Program Chair's approval before enrolling it to count towards the degree requirement. What is not allowed for non-CSE 5XX electives:

1. A graduate course from another program which is like or is a subset of an undergraduate course in Computer Science.

2. A graduate course from another program which substantially overlaps (more than 30%) with a course that they have taken or are planning to take.

If you are asking about a course from another program that sounds like one that you have taken or are planning to take, please submit the syllabus of both and explain why you think the overlap is less than 30%.

F. Interdisciplinary Studies

In recognition of the interdisciplinary nature of computer science and individual research interests, Ph.D. students are encouraged to acquire a certain level of

knowledge in another discipline by completing up to six (6) credit hours of graduate work in other departments such as biomedical informatics, mathematics, psychology, engineering, philosophy (logic) and linguistics. Although the School wants to maintain uniform standards concerning the academic work of all students, an individual student's educational background, research interests, and future plans must play a role in course selection. Therefore, the members of the student's program committee and the student together are to agree on which area and which courses are permitted for interdisciplinary studies. The guidelines for the selection are:

1. The quality of the course is satisfactory, and the content is relevant to computer science and the students' research.
2. There is no significant overlap between the courses in question and others that the student has already taken to satisfy Ph.D. requirements.

G. Selection of Faculty Advisor

When a student has decided on a primary area of research, the student must select a faculty advisor. The faculty advisor must have the right to chair Computer Science committees. The faculty advisor will serve as the chair of the supervisory committee that supervises the student's dissertation. The list of faculty with the right to chair can be found on Graduate College's faculty website: https://graduateapps.asu.edu/graduate-faculty

H. Dissertation Supervisory Committee

The Computer Science supervising committee serves three (3) roles:

1. The comprehensive examination committee
2. The dissertation proposal committee
3. The dissertation and dissertation defense committee

In consultation, the faculty advisor and the student form a supervisory committee. The faculty advisor serves as chair of the supervisory committee. Membership in the Computer Science supervising committee is a privilege that is extended to tenure/ tenure track faculty members of ASU as well as to other individuals as described in the following membership rules.

1. **Supervising Committee:** A CS PhD supervising committee must have at least 4 members.
2. **Chair**: The chair of the CS PhD supervising committee must be a member of the CS Graduate faculty with the right to chair PhD committees in computer science.
3. **Composition Requirement:** A majority of the members of the PhD supervising committee must be members of the CS Graduate Faculty with the right to chair PhD committees.
4. **CS Graduate Faculty Members**: Members of the CS Graduate Faculty can serve on CS PhD supervising committees. This includes

tenure/tenure track faculties from other units and others (research faculty, for example) who are members of the CS Graduate Faculty.

5. **Other ASU Faculty**: ASU tenure/tenure track faculty members who are not members of the CS Graduate Faculty can serve on CS PhD supervising committees.
6. **Co-Chair**: For a faculty member to serve as co-chair of a CS PhD supervising committee, the faculty member must be a member of the CS Graduate Faculty with the right to co-chair or be approved to serve as co-chair following a one-time approval process. The instructions to individual committee approval can be found here: https://sites.google.com/asu.edu/scaigraduateprogramresources/forms-procedures
7. **External Members**: Individuals who are not affiliated with ASU can serve on the CS PhD supervising committee subject to approval.
    a. **Approval for Serving on the Committee**: To get an individual who is not affiliated with ASU approved to serve as an external member, the individual committee approval process must be followed.
    b. **Approval for serving as co-chair**: To get an external member who is not affiliated with ASU approved to serve as a co-chair, the individual committee approval process must be followed.
8. **MAS and Cybersecurity Concentration**: For students in one (1) of the concentrations, at least one (1) member of the student's committee must be from that program.

The committee's composition must be according to the guidelines of ASU Graduate College. Once the committee is established, changes to the committee are highly discouraged. Any changes to the committee must be submitted by completing a Graduate Committee Change form that is signed by the student and all members of the student's committee.

The supervisory committee, in its role as a comprehensive examination committee, administers and approves the comprehensive examination, which consists of written and oral examinations designed to test the student's mastery of the field of specialization.

The supervisory committee also approves the subject and title of the dissertation and advises the student during the formulation of the research topic and the completion of the research and the dissertation.

I. Master in Passing (Option)

After completing 30 credit hours in the Ph.D. program and successfully passing the PhD Comprehensive Exam, students can request a Master in Passing. For students to be awarded the Master in Passing, the 30 completed credit hours must include 9 credit hours of core coursework and may include up to 12 credit hours of 590 or 790 credits. Eligible students will work with the Graduate Academic Advisor to file a Master in Passing Plan of Study (MIP/IPOS). The

non-thesis master's degree in computer science has a culminating event requirement, a Project Portfolio. PhD students interested in and eligible to obtain a Master's in Passing degree must satisfy the culminating event requirements by completing the PhD Comprehensive Exam. After the MIP/iPOS has been approved and the culminating event requirements have been met, students must then file for graduation, which includes a fee.

J. Comprehensive Examination

The comprehensive exam can be scheduled within the first three (3) years from the program's start. A student who has not taken his/her comprehensive exam by the end of the 4th year will be placed on progress probation for not completing one of the milestones of the degree requirements. The comprehensive examination tests the student's mastery in the specialization and closely related areas, and, when applicable, the specific topic of the intended dissertation. The comprehensive examination aims to show that the student has developed the research tools necessary for the dissertation.

The comprehensive examination consists of two components: an oral component and a written component. The comprehensive exam takes place before defending the dissertation prospectus. The comprehensive exam **takes approximately six (6) weeks**. A student should plan and ensure that he/she is always registered in at least one credit graduate-level course (e.g. 580, 792, 795, or 799). This includes if either part of the written or oral portion of the comprehensive exam will be held in summer.

Important! Checklist Before Starting the Comp Exam:
1. Interactive Plan of Study (iPOS) must be approved.
2. All committee members must be listed in the iPOS.
   a. Please see the Dissertation Supervisory Committee section regarding requirements and paperwork.
   b. The committee request must be requested and approved electronically through the iPOS tab on your MYASU to start your comprehensive exam.
3. A student must be in good academic standing regarding GPA requirements before taking the doctoral comprehensive examination.
4.You must be registered in at least one graduate-level credit hour during the semester in which the exam is held.

There are two (2) options to take the comprehensive examination – option 1 and option 2. The student, their advisor and the committee must decide which option to choose. The steps for the options are explained below.

Option 1:
Step 1 - Examination Syllabus
In consultation with the student, the comprehensive examination committee determines the syllabus for the exam. The syllabus identifies the general area of

research as well as the more specialized area of research that the exam will cover. It lists areas of knowledge the student should show competence in. The syllabus can include a listing of courses, books, papers, or other sources that cover the necessary knowledge on which the student will be examined. The syllabus should be decided and approved by all committee members well ahead of time to allow the student to prepare for the exam. The syllabus for the comprehensive exam is kept on file as part of the student's record. An example of the syllabus is shown in Appendix II.

This step is the same in both option 1 and option 2.

Step 2 - The Written Component

Option 1
In option 1, for the written component, each committee member is required to submit questions for the exam. The questions are submitted to the graduate academic advisor, who forwards them to the student when all questions are received. The student has **10 business days** to answer the questions and submit them to his or her entire committee and graduate advisor.

Each committee member grades and reports the written component's results to the chair of the comprehensive examination committee, which in turn reports them to the whole committee and the graduate advisor. Committee members grade the entire exam. If the student does not pass the written component, the student is not allowed to proceed with the oral component.

Option 2
The written syllabus, approved by the committee, is considered the exam's written component. The student passes when the committee approves the syllabus. Then the student can proceed to step 3.

Each committee member grades and reports the written component's results to the chair of the comprehensive examination committee, which in turn reports them to the whole committee and the graduate advisor. Committee members grade the entire exam. If the student does not pass the written component, the student is not allowed to proceed with the oral component.

The Oral Component (Upon Completion of Option 1 or Option 2)
Once the student passes the written component, the oral component of the comprehensive exam can take place. The comprehensive examination committee attends the oral exam and is open to the department faculty and students. The questions asked in the written and oral components of the exam should be restricted to the approved syllabus. In this exam, the committee asks for oral answers to technical questions. Committee members will ask about the knowledge and concepts covered by the syllabus. If the student and the committee are choosing option 1, then the committee can also ask follow up

questions on the written answers provided by the student in step 2. At the committee's discretion, graduate students may also attend the oral examination.

The student's supervisory committee must sign the form once the examinations are completed. The student submits the form to the graduate academic advisor, who will submit the form to the Graduate Program Chair. The form will be recorded in the system for final approval by the Graduate College.

The written exam questions, the syllabus, and the student answers are kept on file as part of the student record. The student must be enrolled in the semester in which the comprehensive exam is taken.

Retaking the Exam
Failure of the comprehensive examinations and the dissertation prospectus is considered final unless the supervisory committee and the Graduate Program Chair recommend, and the Dean of the Graduate College approves a re-examination. **At any junction in the examination portion, a student fails, he/she is not allowed to proceed to the next examination portion until a re-examination of the failed portion has been passed by petitioning and obtaining approval by the Graduate Program Chair and the Dean of the Graduate College.**

A re-examination of the Comprehensive Examination (written or oral) may be administered no earlier than three months and no later than one year from the date of the original examination. Only one re-examination is permitted.

For prospectus, if a second defense is approved, students must submit the new prospectus by the end of six (6) months (beginning from the date that the first PhD dissertation proposal defense was held). If the academic unit does not grant the student's permission to retake the proposal defense, or if the student fails to pass the retake of the proposal defense, the Graduate College may withdraw the student from the degree program.

Steps to preparing the Written and Oral:
Comprehensive Exam
The Written Portion (Option 1)
Step 1: Student submits an electronic copy of the Comprehensive Exam Syllabus that is approved by the PhD committee to one of the graduate academic advisors. An example of the syllabus is shown in Appendix II. In the subject heading, the student mentions the comprehensive exam and first and last name. In the message, the student mentions all of the committee member names and provides emails of the committee members, especially for external members.

Step 2: The Graduate Academic Advisor emails the committee together with the exam syllabus and gives them a two-week deadline to send their questions to the advisor.

Step 3: The Graduate Academic Advisor gathers all the questions from all committee members and sends them in one email to the student with a 10 business days deadline.

Step 4: The student sends the Q & A back to the committee and copies the graduate academic advisor. The outline of the written paper should include the faculty name, the questions given by the faculty, and immediately following the answer for each of the questions.

The Written Portion (Option 2)
The student works with the advisor and the committee members and prepares syllabus for the comprehensive exam. The committee members can add or subtract from the syllabus as they see fit. They work with the committee until all committee members approve the syllabus. The student then submits the comprehensive exam syllabus by the PhD committee to one of the graduate academic advisors. An example of the syllabus is shown in Appendix II. In the subject heading, the student mentions the comprehensive exam and first and last name. In the message, the student mentions all of the committee member names and provides emails of the committee members, especially for external members.

The Oral Portion (Option 1 and 2)
Step 1: Normally, the oral exam is scheduled after two (2) weeks from the date the student submits the Q & A to the committee or the approved syllabus (option 2). However, if this is not possible to schedule within two (2) weeks, it should be scheduled at the earliest convenience of the committee's availability. It is the student's responsibility to schedule the oral exam by contacting the committee and arranging for room reservation.

Step 2: The student contacts the administrative office (5th floor Brickyard), to reserve a room and provide the date and time. The student should plan to have the room reserved for at least 2-3 hours.

Step 3: After the exam, the Comprehensive Exam Results form will need to be signed by the committee. Please keep a copy for yourself!

Please see Appendix I for Absent Committee Member Procedures

K. Dissertation Prospectus

A student cannot submit a dissertation prospectus in the semester or before the semester in which the comprehensive exam is administered and passed. The comprehensive exam and the prospectus should not be done in the same semester.

The dissertation prospectus must contain:

1. A statement about the proposed research and why it is important.
2. An overview of the relevant literature.
3. A description of the student's competence to conduct the proposed research. Passing the comprehensive examination indicates competence in the area of the examination. The student is encouraged to provide evidence of initial results in the scope of the dissertation research.
4. A discussion of how the research will be approached (including specific criteria for the completion of the research broken down by research tasks and the order in which the tasks will be completed).
5. A projected timetable and outline of the dissertation.

The length of the written dissertation prospectus is not to exceed 20 pages (no exceptions). The student is encouraged to provide the required material in an effective manner. Ultimately, the student's committee chair guides the prospectus writing process.

After the student's committee chair is satisfied with the student's dissertation prospectus, the student must submit a copy of the dissertation prospectus to each member of the supervisory committee at least two (2) weeks before the defense. The student must also post and submit a Defense Announcement of the dissertation prospectus defense at least two (2) weeks before the defense. The candidate must be enrolled at the time of the prospectus defense.

Before the student submits the announcement, the student must schedule a room through the administrative office (5th floor Brickyard) for the date and time agreed to by the supervisory committee. The announcement must include an abstract, the student's name and the committee members' names, and specifying the time, date, and place of the dissertation prospectus presentation. The presentation must be announced and open to the school faculty. Attendance by others is left to the discretion of the supervisory committee. The committee evaluates the prospectus in terms of:

1. The value of research.
2. The feasibility of the research plan.
3. The student's preparation for carrying out the proposed research.
4. The committee will either accept the dissertation prospectus, accept it with changes or fail it.

If the committee deems the student's work on the dissertation prospectus to be unsatisfactory, the student may request one more opportunity to submit a dissertation prospectus. Failure of the doctoral dissertation prospectus of the written and oral defense is considered final unless the supervisory committee, the head of the academic unit, and the Dean of the Graduate College approve a second proposal defense. If a petition is approved, the student must submit the new prospectus by the end of six (6) months (the six (6) months begins from the

date that the first doctoral dissertation proposal defense was held). If the academic unit does not grant the student permission to retake the proposal defense, or if the student fails to pass the retake of the proposal defense, Graduate College may withdraw the student from the degree program.

If the committee accepts the dissertation prospectus with changes, the supervisory committee indicates a description of the required changes in a separate email. The student must submit the revised dissertation prospectus to the supervisory committee no later than one (1) month after the oral presentation of the prospectus. The committee must evaluate the revised prospectus no later than one (1) month after the student submits the revision. When the committee accepts the proposal, each member must sign the Prospectus Results Form. Then, the student is required to submit the form to the graduate advisor for approval by the Graduate Program Chair. The graduate college will then approve the student for candidacy.

Please see Appendix I for Absent Committee Member Procedures.

L. Dissertation

Before a dissertation can be defended, parts of it must have been published or accepted for publication in at least one journal, conference, or book of a quality acceptable to the dissertation committee.

A student must be enrolled in at least one (1) graduate-level credit at the time of the defense. If the defense is held during the interim period between semesters, the student must be registered the following semester. The student must be registered for the summer session if the defense is being held between the Spring and summer semesters. If the defense is being held during the period between the Summer session and Fall semester, then the student must be registered in the Fall semester. Please see the Graduate College policies.

The graduate college publishes information regarding the details of dissertation preparation, formal requirements, deadlines, and oral examinations. The student must comply with all guidelines that the graduate college publishes regarding submitting a dissertation and scheduling a final oral examination.

Students must be physically present at the oral defense of their thesis or dissertation. It is expected that oral defenses will be held on an ASU campus (for in-person defenses) and during regular business hours (8am-5pm AZ Mountain Standard Time) in order to facilitate student, faculty, and public accessibility. A student may include a virtual link to encourage audience attendance. When there are sound educational reasons for holding a defense under different circumstances, contact the graduate college for approval before scheduling the defense.

All members of a student's supervisory committee must attend the final oral defense of a thesis or dissertation. However, some situations (e.g. faculty travel, faculty emergencies and/or faculty leave) may necessitate holding a defense with one or more committee member(s) absent. The committee chair must be in attendance. If a committee member cannot attend, a qualified substitute must be appointed to participate in their place. The substitute should be a regular faculty member within the academic unit. In these circumstances, the graduate college must be notified with the name of the member who will be absent, the faculty member who will attend as a substitute, and the student's name and ID number. This information must be submitted before the defense.

Once a defense has been scheduled and approved in the iPOS, students must submit it within 10 days. This includes a complete draft copy of the thesis/dissertation to be defended by uploading the document to their Interactive Plan of Study.

Once the dissertation is completed, the candidate will submit it to the committee members. The dissertation defense will take place no earlier than four (4) weeks after the committee receives the dissertation.

There will be an open oral defense following the completion of the dissertation. A student can schedule the defense after the committee chair approves the student's dissertation. The student must schedule their defense on MyASU at least 10 working days before the defense announcement. The student must also post and submit a Defense Announcement at least 2 weeks before the defense.

After the oral defense, the supervisory committee evaluates the dissertation and the student's performance on the defense. The committee accepts the dissertation as pass, pass with minor revisions, pass with major revisions, or fail (the overall execution of the study is flawed, or the candidate's performance in the oral examination is seriously deficient).

Once the dissertation has been approved, the student is required to upload their dissertation to Pro-Quest.

Please see Appendix I for Absent Committee Member Procedures.

Steps to Preparing for Your Defense

Before Defense:
1. Obtain a consensus of approval from the committee chair and the members to proceed with the oral defense.
2. Schedule a date and time with your committee for the oral defense.
3. Important: Ensure that a minimum of 50% of the official committee is physically present at the defense. If at least 50% of the committee cannot be

physically present, the defense must be rescheduled. This is true for virtual defense.
4. Visit the Graduate College website to become familiar with the dates and deadlines for format approval and oral defense.

10 days Prior to the Defense:
These steps are required to be completed before 10 working days from the date of the oral defense.

1. Reserve a room through here with the SCAI front desk (Brickyard 5th floor).
2. Submit an electronic version of your abstract with title, full names of your committee members, defense date/time/place, and your name as you want it to appear on the defense announcement to the SCAI front desk.
3. Schedule your defense through the iPOS/MyASU

On the Day of the Defense:
1. Set up all your equipment at least one half-hour before your presentation to make sure it works.

After the Defense
Your committee will discuss the results of the exam with you and may have additional comments for you. In the end, the committee will make a recommendation: Pass, Pass with minor revisions, Pass with major revisions, or Fail. All committee members must submit the preliminary defense results via the defense results tab in the iPOS within 10 days after the defense occurrence. If the committee requires revisions, they must be completed and approved by the committee before a full "Pass" can be designated in the iPOS. If the committee's requested revisions are not completed by the graduation deadlines for the defense semester, the student will need to maintain continuous enrollment until they are completed. If they are not successfully completed within one (1) year of the defense, re-submission of the document and a re-defense of the thesis or dissertation may be required to ensure the research's currency. Please note the following:

1. Failing a dissertation defense is final.
2. Revisions are normal and are expected to be completed within one year. Students must comply with the continuous registration policy until the finished document is uploaded on ProQuest.
3. Follow the steps on MyASU to upload your final dissertation through the Office of Graduate College and ProQuest.

M. Checklist for Graduation

1. Every deficiency course is completed with a "C" or higher grade within the first two (2) terms.
2. Core course grades are "B" or higher.
3. File an application for graduation on My ASU with the Graduation Office of the Registrar.

4. Defend your dissertation.
5. Upload your dissertation on ProQuest.

VII. General Information, Policies, and Procedures

A. Research Standards for Publication of Dissertation

Graduate research is the study of an issue of sufficient breadth and depth to be publishable in a CSE-related journal. The effort should reflect a minimum of 1,500 hours of thoughtful work for a dissertation (Ph.D.). The research should follow the 'scientific method' and thus be both objective and reproducible. The dissertation should demonstrate independent, original, and creative inquiry. There should be predefined hypotheses or developmental goals and objectives that are measurable and can be tested. Before a dissertation can be defended, parts of it must have been published or accepted for publication in at least one journal, conference, or book of a quality acceptable to the dissertation committee. The document should demonstrate written English proficiency and conform to the Office of Graduate College format guidelines.

B. Financial Assistance and/or Fellowships

The Computer Science Program's goal is to provide support to all incoming Ph.D. students. According to the student's academic performance and past academic research, funding offers will be extended to individual students with the highest academic achievements. We encourage students to highlight their academic achievements in their personal statements and resume.

C. Continuous Enrollment

Once admitted to a graduate degree program or graduate certificate program, students must be registered for at least one (1) credit hour of graduate-level coursework during all phases of their graduate education, including the term in which they graduate. This includes periods when students are engaged in research, conducting a doctoral prospectus, working on or defending theses or dissertations, taking comprehensive examinations, working on their dissertation corrections or any other way utilizing university resources, facilities or faculty time.

D. Medical/Compassionate Withdrawal

There are appropriate circumstances when students may need to withdraw from the university (i.e., medical withdrawal, compassionate leave). The policies for such withdrawals are the same for undergraduate and graduate students. An approved Medical/Compassionate Withdrawal is valid toward meeting the continuous enrollment policy.

E. Leave of Absence Policies

Graduate students planning to discontinue registration for a semester or more, must submit a petition via their IPOS to maintain continuous enrollment. **Requests should have enough detail to fully understand the situation and steps you should take so that you can continue in the next semester.** This request must be submitted and approved **before** the anticipated semester of non-registration. Students may request to maintain continuous enrollment without course registration for a maximum of two (2) semesters during their entire program**.**

Having an approved leave of absence approved by the Graduate College will enable students to re-enter their program without re-applying to the university.

Students who do not register for a fall or spring semester without an approved leave of absence are considered withdrawn from the university under the assumption that they have decided to discontinue their program. Students removed for this reason may reapply for admission to resume their degree program. The application will be considered along with all other new applications to the degree program.

A student with a Graduate College approved leave of absence is not required to pay tuition and/or fees. However, the student is not permitted to place any demands on university faculty or use any university resources. These resources include university libraries, laboratories, recreation facilities, and/or faculty time.

F. Maximum Time Limit

Doctoral students must complete all program requirements within 10 years. The ten-year period starts with the semester and year of admission to the doctoral program. Graduate courses taken before admission that are included in the Plan of Study must have been completed within three (3) years of the semester and year of admission to the program (previously awarded master's degrees used on the Plan of Study are exempt). If coursework completed over three (3) years ago is being applied towards a degree program as pre-admission coursework, the maximum time limit may be updated to reflect the start date of the pre-admission coursework.

Any exceptions must be approved by the supervisory committee and the Office of Graduate College Dean and ordinarily involves repeating the comprehensive examinations. The Office of Graduate College may withdraw students who are unable to complete all degree requirements and graduate within the allowed maximum time limits.

G. Registration Requirements for Research Assistants (RA) and Teaching Assistants (TA)

Students awarded an assistantship within the Ira A. Fulton School of Engineering are required to be registered for 12 credit hours. Audit credit hours do not count toward the 12 credit hours.

Students who obtain an assistantship outside the Ira A. Fulton School of Engineering are required to be enrolled in a minimum of six (6) credit hours. Audit credit does not count towards the six (6) credit hours.

Students with TA/RA .50 FTE appointments (i.e., 20 hours per week), who are appointed within the first eight (8) weeks of a semester during the academic year, receive an award covering tuition for the semester. Students with TA/RA .50 FTE appointments during the summer session(s) receive an award covering tuition.

Students with TA/RA .25–.49 FTE appointments (i.e., 10–19 hours per week), who are appointed within the first eight (8) weeks of a semester during the academic year, receive an award covering 100% of the nonresident portion of tuition and an award covering 50% of the remaining tuition for the semester. Students with TA/RA .25–.49 FTE appointments during the summer session(s) receive an award covering 100% of the nonresident portion of tuition and an award covering 50% of the remaining tuition.

The university provides an award covering the premium for individual health insurance for teaching and research assistants/associates who meet the minimum eligibility requirements during the duration of their appointment (coverage periods are August 16– January 15 and January 16–August 15). These are:

a. appointment at 50% time (20 hours per week)
b. hired as a TA or RA no later than the end of the eighth week of semester classes.

There are four (4) ways a student can fulfill the TA English language requirement. Any of the following will fulfill the language requirement:

1. Take and pass the SPEAK test with a score of 55 or higher. Only SPEAK scores from Global Launch are allowed.
2. Take the iBT (Internet-based TOEFL) test and receive a score of 26 or higher on the oral portion of the test.
3. Take the IELTS test and receive a score of 8 or higher on the speaking portion of the test.
4. Complete the ITA Teacher Training Course with a score of ‘certified.’

H. Policy for Maintaining Academic Satisfactory Progress

After each completed semester, the school will conduct an audit to determine if the student is maintaining the required minimum satisfactory progress. This audit includes progress on academic (GPAs and deficiencies) and probationary issues. Any student that is not in compliance with the satisfactory academic/ progress requirements is notified that she/he is either:

a. on academic probation and is given the next 9 credit hours or semesters (fall and spring) to bring the GPA up to the proper level or
b. on continued progress probation and is required to meet the conditions outlined in the continued probation letter.

Failure to properly remediate the GPA or the conditions outlined in the letter within the time frame will result in the school recommending that the student be dismissed from the program.

Note: Fully admitted students who take optional summer courses are placed on probation after the summer term if the earned grade(s) causes their GPA to fall below the satisfactory progress GPA minimum.

If applicable, the above-noted audit will also review each student's progress towards removing enrollment deficiency courses and/or any other degree requirement milestone(s). Failure to satisfactorily complete all deficiency course(s) and/or required milestones by the stipulated deadline may result in a recommendation for dismissal to the Graduate College.

Each semester, the Computer Science Program reviews students' files to ensure satisfactory progress toward completion of their degree. All students fall into one of the following four categories. Those in categories 2-4 are placed on probation or withdrawn from the program:

1. Satisfactory progress
2. Academic probation
3. Progress probation
4. Withdrawal from the CS Program

The following table suggests satisfactory progress in checking the schedule:

PhD Satisfactory Progress Checking Schedule

Phases	Years	Checking
I	1-3 years	Students submit an iPOS within the 1st year. Finalize the rest of the committee by the end of the second year to prepare for the Comprehensive Exam. Student works with the dissertation chair to ensure satisfactory progress is made towards completing all the coursework and preparing for the Comprehensive Exam
II	3.5 years	The reminder is sent to students who have not taken comprehensive exams
III	4 years	A personal meeting with the program chair
IV	4.5 years	The maximum time for students to finish the comprehensive exam
V	5 years	Proposal defense needs to be taken before the 5th year mark. Students need to finish all formal coursework. Student needs to work on taking the Prospectus Exam
VI	6-9 years	Reminder sent an explanation needed for the reason the final PhD dissertation defense has not been done. GPC will look at each case and provide suggestions.
VII	10 years	Students need to defend before the 10th year mark.

1. **Satisfactory progress**

Student is meeting all program requirements. In addition to the probationary rules, satisfactory progress includes communication each semester with the student's Committee Chair regarding his/her progress. When the formal coursework has been completed, evidence of adequate progress consists of completing one or more major chapters of the dissertation and submitting refereed papers.

2. **Academic Probation**

A student who has been admitted to a graduate degree program in the School of Computing and Augmented Information with either regular or provisional admission status, must **maintain a grade point average (GPA) of 3.25**:

a. in all work taken for graduate credit (courses numbered 500 or higher),
b. in the coursework in the student's approved plan of study, and
c. in all course work taken at ASU (overall GPA) post-baccalaureate.

A student will be placed on academic probation if one or more of the student's semester GPAs listed above fall below 3.25. Students will be notified by email when placed on academic probation.

A student will achieve good academic standing by obtaining a semester 3.25 or better in the GPAs listed above by the time the next nine graduate hours are completed. A maximum of two (2) semesters is allowed to complete the nine (9) hours of graduate-level coursework to raise the GPA, whichever comes first. Coursework such as research and thesis registration for Z or Y grades cannot be included in these nine (9) hours. It is strongly recommended that students focus on improving their grades and meeting deficiency requirements.

Students who choose to take graduate coursework and not enroll in deficiency courses will be subject to dismissal.

3. Progress Probation

A student under probation who is not making progress towards a degree. The following are notices/letters you will receive if one (1) of these is of concern to your academics:

a. Lack of progress toward removing deficiencies as listed in your admission letter.
b. Lack of progress toward completing the three (3) core courses.
c. Failure to pass the Ph.D. Comprehensive Examination.
d. Failure to take the Ph.D. Comprehensive Examination at the end of 4th Year.
e. Failure to complete the PhD Prospectus at the end of the 5th year.
f. Failure to pass the Ph.D. Prospectus.
g. Failure to stay in touch with your dissertation chair every semester.
h. Failure to submit an iPOS by the end of the 1st year.
i. Failure to finalize the Supervisor Committee by the end of the 2nd year.
j. Failure to complete one or more major chapters of the dissertation and submitting refereed papers.

4. Withdrawal from the CS Program

A Ph.D. student may be removed from the program for any of the reasons listed below:

a. Cumulative, graduate, or iPOS GPA is less than 3.25 for two (2) consecutive semesters. (The student with such a cumulative GPA will be put on probation after the first semester.)
b. Failure to make up deficiencies within the time allowed, as determined by the admissions committee.
c. Failure to meet a requirement specified for the Ph.D. degree, including not making satisfactory progress toward the completion of the degree.

A student is recommended for withdrawal from the CSE Program if she or he fails to meet the probationary standards placed upon in the semester mentioned in the probationary letter. The student will receive a letter from the Computer Science Program explaining the reasons for the withdrawal. The student will have **five (5) calendar days** from the date of the letter to appeal the decision. The CSE Graduate Program Committee (GPC) will review the case and will make the necessary recommendation. The Graduate Program Chair, on behalf of the GPC, will provide a written explanation of the outcome. If the outcome is favorable, the student will have to meet all the outlined requirements at the end of the specified period. The student will be required to sign an agreement acknowledging the recommendations and the consequences if the agreements are not met. If the GPC recommends that the appeal is not granted in favor of the student, the Graduate Program Chair, on behalf of the GPC, will recommend to the Dean's Academic Affairs to withdraw the student from the CSE Program. The student's appeal together with all supporting documents will be forwarded to the Ira A. Fulton Schools Standards Committee, which reviews the student's case and makes the final ruling to Associate Dean and the CSE Program. If the appeal is not granted in favor of the student, the Dean's Academic and Student Affairs will recommend that the Office of Graduate College withdraw the student from the CSE Program. Please refer to the Office of Graduate College on policies and procedures or contact the graduate advisor in the SCAI Advising Center.

I. Filing for Graduation

During the final semester, a student must file an application for graduation with the Graduation Office of the Registrar on My ASU. The student's approved final plan of study (iPOS) must be on file with the Graduate College before the student can apply for graduation.

J. Academic Integrity

The highest standards of academic integrity are expected of all graduate students, both in the academic coursework and in their related research activities. The failure of any graduate student to meet these standards may result in serious consequences. These consequences include suspension or expulsion from the university and/or other sanctions as specified in the academic integrity policies of individual schools and the university.

Violations of academic integrity include, but are not limited to cheating, fabrication, tampering, plagiarism, or aiding and/or facilitating such activities. At the graduate level, students are expected to be familiar with these issues and each student must take personal responsibility in their work. Graduate students are expected to follow university guidelines related to the Student Code of Conduct. University policies related to academic integrity and code of conduct

are available in the Office of Student Life, or at Academic Integrity | Graduate College (asu.edu)

K. CSE 584 Internship

Curricular Practical Training (CPT) is an academic experience usually obtained at off-campus work settings, allowing the student to apply knowledge and skills gained in various classes. It is intended as a unique, hands-on learning experience to provide students with several valuable skills that they can use upon graduation from their graduate degree programs. Accordingly, it is not available to full-time or part-time workers regularly employed by the company where the internship is proposed.

The CPT is available to both domestic and international students. International students must work with the International Students and Scholars Center (ISSC) and submit additional documentation to obtain work authorization. Furthermore, students must include the CPT course CSE 584 (1 credit hour) as an integral part of their Program of Study, reflected by their approved iPOS. SCAI recommends listing at least three (3) individual CSE 584 (1 credit hour) in the iPOS

The CPT course(s) should be added at the initial submission of the student's iPOS. The Internship course cannot be added to an approved iPOS once all coursework has been completed. Exceptions may be made if the internship is relevant to dissertation research.

The CSE Program Chair will determine the need for a CPT internship in such cases in consultation with the Graduate Academic Advisor. Note that approval of an iPOS with the CSE 584 course confirms that the internship is an integral part of the degree requirements as planned by the student. Note: Only internship courses can be removed from the iPOS. Courses that are approved as part of the overall degree program in the iPOS can only be substituted with another approved coursework.

To be eligible for an internship, a student must be in **good academic standing (cumulative, graduate and iPOS GPA of 3.25 or above).**

a. Summer:

- Students can participate in an out-of-state or an in-state internship, full-time or part-time, in the summer semester if ALL of their GPA's (graduate, iPOS, and CUM GPA) are at least 2.5.

b. Fall/spring semesters:

- **Students with a GPA of 3.0-3.24 may participate in an in-state internship part-time. Campus presence is required.**
- Students **with a GPA of 3.25 or higher may participate in an in-state or out-of-state internship, full or part-time. Campus presence is required.**

Full-time CPT is 21 hours more. Part-time CPT is 20 hours or less.

For students doing CPT in their last semester, the end date is the last day of finals (Fall/Spring) or last day of class (Summer).

Internship registration is for one (1) credit hour per semester. Internships for Ph.D. degrees are limited to no more than four (4) semesters and two (2) summer sessions. Internships may be part-time (20 hours per week) or full-time (40 hours per week). Exceptions may be made if the internship is relevant to dissertation research.
An international student with 12 months or more of a full-time internship will be ineligible for Optional Practical Training (OPT).

International students need to be aware of immigration policies and regulations, which may jeopardize their academic status. It is strongly recommended for international students to consult with the International Students and Scholars Center (ISSC).

All students (domestic and international) may take part in an Out-Of-State internship in the summer semester. The eligibility requirements for CPT internships remain the same as mentioned.

During the regular fall and spring semesters, international graduate students in F-1 status must register for a minimum of nine (9) credit hours to maintain full-time status and be enrolled in a minimum six (6) credit hours of in-person, on-campus coursework at the ASU Tempe campus. A maximum of three (3) credit hours of online courses are permitted. The CSE 580 Practicum course will not count as satisfying the student's "physical presence" at ASU. Students cannot take part in internships outside the Phoenix metropolitan area. In some cases, students may be approved to do an internship in Tucson or other nearby locations in Phoenix, as long as the student can prove they can physically attend their courses on campus.

Required documents and forms for the internship proposal must be submitted online at least four (4) weeks before the beginning of the semester in which the internship is planned. Students will not be able to request late-add registration of the CSE 584 Internship credit to their class schedule after each semester's drop/add deadline. Students will be asked to enroll in the next session within the term.

An approved application is required before commencing the internship. The request will include a statement from the employer that indicates they understand the work is to satisfy a degree requirement. A sample letter and other required forms are available on the SCAI CPT website. At the Ph.D. level, an internship is intended to enhance the student's research capabilities in the area related to the dissertation. Therefore, the internship plan must show the relationship between the work proposed and the intended research program. The

dissertation advisor may be asked to write a separate letter explaining why the internship is required. To register for the CSE 584 - Internship, a student must have a **cumulative, graduate and iPOS GPA of 3.25 or above.** A final Plan of Study must be filed with the Office of Graduate College showing the Internship course before registering for CSE 584. All application materials for an internship must be completed by the last day of regular registration for any semester. The student must take classes that appear on the Plan of Study for the semester following the internship.

c. Renege: (verb) to fail to carry out a promise or commitment
It is unethical for students to continue to seek or consider other employment opportunities once an offer has been accepted. SCAI expects students to honor an acceptance and withdraw from all employment-seeking activities. Students who accept an offer from an organization and later renege/decline the offer will be prohibited from further requesting future CPT pending a meeting with the Associate Director.

d. Final Report
A Five-Page Final Report is Required at the end of the internship before a grade, and credit is given. The final report must be submitted to the reporting supervisor for comments and then to the faculty advisor for grade assignment. Refer to the SCAI CPT website for guidelines to prepare the final report.

L. CSE 790 Independent Study

Independent study is available for Ph.D. students. The student must get written approval from the supervising faculty outlining the content to be covered. The Faculty Advisor must approve the Independent Study form and will be placed in the student's file. A final paper assignment is required for each registered Independent Study. **A maximum of 6 credit hours is allowed for each semester.**

M. Student Chapters of Professional Societies

Our graduate students are involved in many professional societies. Most branches of Computer Science have professional societies associated with them. Participation in professional societies is an excellent road to career and interest group connections. Student membership typically costs less than $30 and includes many benefits, including a monthly magazine.

N. Engineering Student Organizations

There are dozens of engineering student organizations and teams ranging from honors and professional associations to groups creating underwater robots, concrete canoes, and launching rockets. Student organizations are excellent opportunities to learn about career possibilities as many of the student groups operate in conjunction with industry professional societies … get involved today!

Please visit http://studentorgs.engineering.asu.edu/ for a list of Engineering Student Organizations.

O. Instructional Concerns and Course-Related Complaints

Being part of a large university creates opportunities to learn from a diverse instructor population with different teaching styles and modalities for delivering course content. Courses are offered by a diverse set of faculty, including those who are research-intensive, those whose primary responsibility is teaching, GSA/TA instructional staff and part-time faculty who are working in the field. Based on enrollment or the modality of the offerings, faculty may also be supported by graduate student teaching assistants, GSAs, and graders. This diverse higher education delivery platform may differ significantly from previous experiences, and while it provides an opportunity to expand the student's ability to learn and develop problem-solving skills, concerns and conflicts with requirements and instructors may occasionally arise. SCAI students with instructional concerns should review and adhere to the following guidelines to attempt to resolve their issues. Please keep in mind that the faculty and advising staff are experienced, dedicated educators that are here to help you achieve your educational goals. At the same time, as an engineering and computer science programs are responsible for ensuring standards are maintained and student outcomes are achieved before graduation. University culture recognizes the value of diversity in multiple dimensions as well as the presumption of expertise and academic freedom of the faculty.

Studying Suggestions
As a graduate student, you are expected to keep up with your coursework. If any assignment appears unclear to you, please contact your instructor immediately. A suggestion for hours dedicated to a class as homework are as follows:

- 8-10 hours per week for each 3-hour course credit for a 15-week course
- 18 hours per week for each 3-hour course credit for a 7.5-week course

P. Addressing Concerns with your Instructor

Should any concerns arise in class, please visit your instructor or TA/GSA during their office hours. Instructors and TA/GSAs are also available through email. They are here to help! Remember the student code of conduct when speaking with faculty.

If you are still having problems in the course after communicating with your instructor, TA or GSA, connect with your academic advisor to understand your options moving forward.

Q. Connect with your CSE Program Chair

If you are unable to resolve the concern after initial contact with the instructor GSA or TA, and you have met with your academic advisor, you should then contact the program chair for your degree (or the department offering the course). The program chair will confer with the instructor and/or GSA/TA to better understand the concern and try to resolve the problem. Please note that before meeting with the program chair, you should have made a reasonable effort to meet with the course instructor (not just the support GSA or TA) and get the issue resolved. When contacting the program chair, provide all the relevant details such as the course syllabus, assignment handout, email exchange with the instructor, etc., so the program chair can promptly act on your concerns. Please be brief and precise in the description of your concerns. In some cases, the graduate program chair would like to meet with you. Please bring with you to the meeting all of the relevant documents.

If the instructional concern is not resolved with the program chair or the department offering the course, contact the Associate Dean of Academic Affairs Office for the college offering the course for assistance through the grade grievance process. https://engineering.asu.edu/grade-grievance/ .

R. Remain Focused

When faced with instructional concerns, it is important to remain focused on the rest of the course while addressing specific areas that are under review. Be sure to stay connected with your academic advisor if there are any changes in your situation.
NOTE:

a. Misrepresentation of facts or disrespectful behavior when confronting your instructor or teaching assistant is considered an academic integrity violation.
b. Maintain all documentation.
c. Act proactively and promptly.

S. In Summary, Guidelines for Avoiding Problems

a. Be sure you have the prerequisite knowledge before starting a course
b. Attend class and online exercises regularly
c. Devote time each week to studying to avoid getting behind

d. Contact the TA (if assigned) or instructor during office hours at the first sign of trouble and come prepared to ask precise questions and to explain your difficulty.
e. Accept the fact that you grow intellectually and professionally by being challenged and learning to deal with diverse expectations and environments.

Process for Resolving Conflicts in Grading, Course Expectations, etc.

a. Contact the TA (if available) or instructor to explain your concern and seek resolution
b. If the TA/instructor has attempted to assist you, but you are still having an academic difficulty that is causing personal stress or hindering your academic success, see your Academic Advisor
c. If the TA/instructor is not responsive or does not provide a legitimate response/accommodation, then contact your Graduate Program Chair.
d. If you still feel there is a legal, ethical or procedural violation that is victimizing you, contact the Office of the Associate Dean of Engineering for Academic Affairs.
e. Circumventing this process will be considered a violation of professional ethics and protocol.

Appendix I - Absent Committee Member Procedure

Appendix II – Comprehensive Exam Syllabus Example

Comprehensive Exam syllabus for Name

General Area of Research Name's area is at the intersection of Software Engineering, Programming Language Semantics and Static Analysis.

Specific Area of Research Name is working on software updates, namely dynamic software updates

COMPREHENSIVE EXAM SYLLABUS

I.Programming Languages Semantics

1. Semantics of Programming Languages. Wiley, 1990. by Matthew Hennessy. Wiley, 1990.
2. Types and Programming Languages by Benjamin C. Pierce. MIT Press, 2007. ISBN- 10:0-262-16209-1.

II. Static Analysis

1. Horwitz, Susan, Jan Prins, and Thomas Reps. "On the adequacy of program dependence graphs for representing programs." Proceedings of the 15th ACM SIGPLAN-SIGACT symposium on Principles of programming languages. ACM, 1988.
2. Horwitz, Susan, Thomas Reps, and David Binkley. "Interprocedural slicing using dependence graphs." ACM Transactions on Programming Languages and Systems (TOPLAS) 12.1 (1990):26-60.
3. Emami, Maryam, Rakesh Ghiya, and Laurie J. Hendren. "Context-sensitive interprocedural points- to analysis in the presence of function pointers." in Proceedings of ACM SIGPLAN'94 Conference on Programming Language Design and Implementation, pp. 242-256, June 1994.
4. Shapiro, Marc, and Susan Horwitz. "Fast and accurate flow-insensitive points-to analysis." Annual Symposium on Principles of Programming Languages: Proceedings of the 24th ACM SIGPLAN- SIGACT symposium on Principles of programming languages. Vol. 15. No. 17. 1997.
5. Sinha, Saurabh, Mary Jean Harrold, and Gregg Rothermel. "System-dependence-graph- based slicing of programs with arbitrary interprocedural control flow." Software Engineering, 1999. Proceedings of the 1999 International Conference on. IEEE, 1999.

III. Software Updates

1. Deepak Gupta and Pankaj Jalote, "Online software version change using state transfer between processes," Software - Practice and Experience, vol. 23, no. 9, pp. 949–964, 1993
2. Gupta, Deepak, Pankaj Jalote, and Gautam Barua. "A formal framework for online software version change." Software Engineering, IEEE Transactions on 22.2 (1996): 120- 131.
3. Michael Hicks, Jonathan T. Moore, and Scott Nettles, "Dynamic software updating," in Proceedings of the ACM SIGPLAN Conference on Programming Language Design and Implementation. June 2001, pp. 13–23, ACM.
4. Andrew Baumann, Gernot Heiser, Jonathan Appavoo, Dilma Da Silva, Orran Krieger, and Robert W. Wisniewski, "Providing Dynamic Update in an Operating System," in USENIX Symposium on Operating Systems Design and Implementation. April 2005.
5. Gautam Altekar and Ilya Bagrak and Paul Burstein and Andrew Schultz, "OPUS: Online Patches and Updates for Security," in 14th USENIX Security Symposium, July 2005, pp. 287–302.
6. Iulian Neamtiu, Michael Hicks, Gareth Stoyle, and Manuel Oriol. "Practical Dynamic Software Updating for C" Proceedings of the ACM Conference on Programming Language Design and Implementation (PLDI'06), June 2006.
7. Sameer Ajmani and Barbara Liskov and Liuba Shrira, "Modular Software Upgrades for Distributed Systems," in European Conference on Object-Oriented Programming (ECOOP), July 2006.
8. Gareth Stoyle, Michael Hicks, Gavin Bierman, Peter Sewell, and Iulian Neamtiu, "Mutatis Mutandis: Safe and flexible dynamic software updating," ACM Transactions on Programming Languages and Systems (TOPLAS), 2006.
9. Haibo Chen, Jie Yu, Rong Chen, Binyu Zang, and Pen-Chung Yew, "Polus: A powerful live updating system," in ICSE '07: Proceedings of the 29th International Conference on Software Engineering, Washington, DC, USA, 2007, pp. 271–281, IEEE Computer Society
10. Jeff Arnold and M. Frans Kaashoek, "KSplice: Automatic Rebootless Kernel Updates," in EuroSys 2009, April 2009.
11. Kristis Makris and Rida Bazzi, "Immediate Multi-Threaded Dynamic Software Updates Using Stack Reconstruction," in Proceedings of the USENIX '09 Annual Technical Conference, June 2009.
12. Iulian Neamtiu and Michael Hicks, "Safe and timely dynamic updates for multithreaded programs," in Proceedings of the ACM Conference on Programming Language Design and Implementation, 2009.
13. Christopher M. Hayden, Edward K. Smith, Michail Denchev, Michael Hicks, and Jeffrey S. Foster. "Kitsune: Efficient, General-purpose Dynamic Software Updating for C." In *Proceedings of the ACM Conference on Object-Oriented Programming Languages, Systems, and Applications (OOPSLA)*, October 2012.

14. Christopher M. Hayden, Edward K. Smith, Eric A. Hardisty, Michael Hicks, and Jeffrey S. Foster. "Evaluating Dynamic Software Update Safety Using Efficient Systematic Testing." *IEEE Transactions on Software Engineering*, 38(6):1340-1354, December 2012.

15. Gupta, Deepak, Pankaj Jalote, and Gautam Barua. "A formal framework for online software version change." Software Engineering, IEEE Transactions on 22.2 (1996): 120-131.
16. Michael Hicks, Jonathan T. Moore, and Scott Nettles, "Dynamic software updating," in Proceedings of the ACM SIGPLAN Conference on Programming Language Design and Implementation. June 2001, pp. 13–23, ACM.
17. Andrew Baumann, Gernot Heiser, Jonathan Appavoo, Dilma Da Silva, Orran Krieger, and Robert W. Wisniewski, "Providing Dynamic Update in an Operating System," in USENIX Symposium on Operating Systems Design and Implementation. April 2005.
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19. Iulian Neamtiu, Michael Hicks, Gareth Stoyle, and Manuel Oriol. "Practical Dynamic Software Updating for C" Proceedings of the ACM Conference on Programming Language Design and Implementation (PLDI'06), June 2006.
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22. Haibo Chen, Jie Yu, Rong Chen, Binyu Zang, and Pen-Chung Yew, "Polus: A powerful live updating system," in ICSE '07: Proceedings of the 29th International Conference on Software Engineering, Washington, DC, USA, 2007, pp. 271–281, IEEE Computer Society
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26. Christopher M. Hayden, Edward K. Smith, Michail Denchev, Michael Hicks, and Jeffrey S. Foster. "Kitsune: Efficient, General-purpose Dynamic Software Updating for C." In *Proceedings of the ACM Conference on Object-Oriented Programming Languages, Systems, and Applications (OOPSLA)*, October 2012.
27. Christopher M. Hayden, Edward K. Smith, Eric A. Hardisty, Michael Hicks, and Jeffrey S. Foster. "Evaluating Dynamic Software Update Safety Using Efficient Systematic Testing." *IEEE Transactions on Software Engineering*, 38(6):1340-1354, December 2012.

Ph.D. in Computer Science Program **General, Cybersecurity, Media Arts and Sciences (MAS) concentrations**			
Requirements	**General**	**Cybersecurity**	**MAS**
[1,2]**Core**	9 credits (CSE)	9 credits (CSE)	9 credits (CSE
Depth	3 credits (CSE)	0	0
Concentration	0	9 credits (CSE)	9 credits (AME courses)
Dissertation 799	12 credits	12 credits	CSE (6 credits), AME (6 credits = 12 credits
Sub-total (core + Depth + concentration +Dissertation credits)	24 credits	30 credits	30 credits
Minimum Remaining	60 credits	54 credits	54 credits
Research 792	18-54 credits	18-54 credits	18 – 51 (2/3 of the research credit hours must be CSE prefix), e.g. CSE (12 credits) AME (6 credits) = 18
Interdisciplinary	0 – 6 credits	0 – 6 credits	0 - 6 credits
[3]**CSE electives**	6 – 36 credits of which up to 18 credits can be CSE 590/790	0 - 36 credits of which up to 18 credits can be CSE 590/790	3 - 33 credits of which up to 18 credits can be CSE 590/790
Total	84	84	84

[1]A grade of B or better is required for each core coursework – one from each of the areas mentioned below.

[2]Core courses must be taken at ASU.

[2]Core: One course from each of the core – Foundations, Systems, and Applications

[3]Electives: At most 3 credits can be from approved CSE 4xx level courses.