11. Overall PhD Degree Guidelines

Important: See individual track guidelines coming later for

1. **PhD in Computer Science**
2. **PhD in Computing Tracks:**

   • **Computer Engineering**

   • **Data Management and Analysis**

   • **Graphics and Visualization**

   • **Human-centered Computing**

   • **Image Analysis**

   • **Robotics**

   • **Scientific Computing**

PHD DEGREES OPTIONS

There are two PhD degree programs within the School of Computing (SoC) at the University of Utah:

- PhD in Computer Science
- PhD in Computing

Transfers between degree programs will be considered between semesters and will occur only once per academic year.

A PhD in Computing is earned within a particular track. Students are, in part, admitted based upon the track that they have selected during the admissions process. If students wish to switch tracks, they should seek approval from DGS and from the track director of the track to which they wish to enter. They should also maintain good Due Progress milestones as specified.

The Director of Graduate Studies (DGS) is the responsible entity for all graduate degree related issues. He/she will act in consultation with the track directors for administration of the Computing Degree program. In the information that follows: statements indicating that something will be done/approved by the DGS should be understood to mean "DGS and/or the track directors".

REGISTRATION REQUIREMENTS

Full-time graduate students in the School of Computing are required to register for 9 hours, which includes regular courses, seminars, and research credits as appropriate. This is especially the case for students being supported via research or teaching assistantships. Students who are not being supported by the school are also required to take nine hours to be classified as full-time by the graduate school.

Graduate School policy dictates that a graduate student who receives tuition benefit during any semester in which he or she holds an assistantship, fellowship or traineeship is required to register for at least nine semester hours, including dissertation research and seminars. Please read through the Tuition Benefit Program Guidelines https://gradschool.utah.edu/tbp/tuition-benefit-program-guidelines/ for additional details.

Students must be registered for at least three hours per semester, exclusive of summer semester, to remain in a graduate degree program. Students who do not maintain continuous registration and who have not been granted a leave of absence by the Graduate School are subject to being discharged from the degree program. Please consult https://gradschool.utah.edu/graduate-catalog/registration/ for full details on continuous registration.

Students doing dissertations must be registered for at least three semester hours during the semester of the student's dissertation defense. Once a student has passed the dissertation defense, the student does not have to register during the next term, but the final dissertation should be turned in within 90 days.

COURSE REQUIREMENTS

All degree programs have certain course requirements. However, these represent a necessary, rather than sufficient, set of courses for graduation. To graduate, this coursework must appear on a student's approved program of study, a customized course plan developed by the student in conjunction with their committee.

Courses that count toward graduation must be on the program of study. The following default restrictions apply to these courses:

- CS courses must have a course number of 6000 or above

- Non-CS courses must be a graduate level course having a course number of 5000 or above, and should be directly related to student's degree
- A grade of at least a B
- The GPA for all required courses must be at least 3.5

In the subsequent pages of this document, each degree program and/or track may specify modifications and/or additions to these restrictions. Students should also consult the Graduate School Handbook concerning any University requirements.

A student may register for CS 6020 if that student writes and publishes a peer-reviewed article based on research performed in the School of Computing at the University of Utah. Registration must be after the article has been accepted for publication. The contribution of the student to the article should be equivalent to that conferred by first authorship. The paper should be published in a respectable outlet. It is the responsibility of the student's advisor and the DGS to determine whether the student has made such a contribution, and whether the outlet is of sufficient quality. This paper must be accepted for publication prior to the end of the second year of study.

RESIDENCY

At least one year (i.e., two consecutive semesters) of the doctoral program must be spent in full-time academic work at the University of Utah. When a student proceeds directly from an MS degree to a PhD degree with no break in the program of study (except for authorized leaves of absence), the residency requirement may be fulfilled at any time during the course of study.

CREDIT FOR PREVIOUS COURSES

PhD students may count some hours of coursework from other graduate degrees toward the coursework requirements associated with the program of study. Unlike for the MS programs, credit for previous courses for PhD students is administered by the DGS so these courses do not need to be officially transferred to the University. The number of hours is specified on a track / program basis. Each track / program determines the number of hours allowed that may count. Approved courses are certified by inclusion of the appropriate SoC form in the student's file. All coursework in the program of study is subject to approval by the student's supervisory committee, the track director, and the DGS.

PhD students with a masters-level degree in a closely related discipline should work with their initial committee to create a program of study that can include graduate courses taken as part of their previous degree program. Unless explicitly specified by a degree/track, the program of study can include up to 21 hours to be counted toward their PhD requirements, and can be used to satisfy some or all of the PhD required courses. Like all programs of study, it must then be approved by the DGS and the graduate school.

A student who has been accepted by the Graduate School is formally admitted to candidacy for the PhD by the University at the recommendation of the student's supervisory committee. Admission to candidacy occurs after the student:

- forms a supervisory committee,
- files an approved Program of Study form,
- completes the course requirements,
- passes the written portion of the qualifying examination, and
- passes the oral portion of the qualifying examination (i.e. proposal defense).

An application for candidacy must be submitted to the Graduate School no later than two months prior to the semester of graduation. For the degree to be conferred, the approved Program of Study form must be completed and the dissertation completed and publicly defended.

A PhD Supervisory Committee conducts the student's written qualifying examination, oral qualifying examination, and dissertation defense. This committee consists of five faculty members, at least one member must be from outside the SoC. The following two policies are in place:

1. The chair of the Supervisory Committee must be a regular faculty member (tenured/tenure track) from the SoC.

2. The majority of the Supervisory Committee must be regular faculty members (tenured/tenure track) within the SoC.

Research or adjunct faculty may chair or may be members of supervisory committees if accorded that privilege by the SoC faculty and the Graduate School. However, exception to only one of the two policies listed above but not both simultaneously will be allowed. For Computing degrees, further restrictions on committee makeup may apply. All official decisions of the committee are decided by a majority vote.

RESEARCH ENGAGEMENT REQUIREMENT FOR FELLOWSHIP STUDENTS ONLY

All fellowship students are required to take a total of 4 credit hours during their first year enrolled in the PhD.

- **CS 7930 - Intro to Computing PhD - 1 credit (required in earliest semester offered during your PhD studies (i.e. first Fall typically))**
- **Seminars and/or Independent Study - total of 3 credits**

(*Students must engage in seminars from different research areas in order to qualify for this requirement.*)

The research engagement requirement can be waived by the DGS or the Director of SoC if a student can demonstrate some other "significant research activity", such as working as an RA in a research group.

TEACHING MENTORSHIP

All PhD students will be required to complete 4 credit hours of Teaching Mentorship with a "Pass" grade. Teaching mentorship will involve working with one or more faculty members (Teaching mentors) on tasks including but not limited to the following:

- Holding student contact hours
- Developing teaching resources (e.g., web pages)
- Lecturing
- Developing and grading assignments

The Teaching Mentorship must be spread across two semesters (2 credit hours each semester). The required tasks will be laid out by the Teaching Mentors before the start of the mentorship each semester. A Pass/Fail grade will be assigned for each semester by the Teaching Mentors based on how well the mentee performs the required tasks. The Teaching Mentorship must be completed before the written qualifying examination (described below). The Teaching Mentorship hours cannot be used to replace course requirements.

The mentorship assignment will be made in conjunction with your advisor and the Undergraduate Faculty Advisor (Jim de St. Germain). The mentorship should be fulfilled by the end of the 4th semester to meet the stipulated good progress criteria.

PhD QUALIFYING EXAMINATION

All PhD students must pass a Qualifying Examination, as specified by the Graduate School. The Qualifying Exam consists of two parts, a written examination covering the candidate's chosen area of specialization and an oral examination involving a defense of the candidate's written thesis proposal.

The written portion of the Qualifying Examination will cover the candidate's general area of specialization in sufficient depth to demonstrate his/her preparation for conducting PhD level research. Each member of the student's supervisory committee will contribute one or more questions to this exam. The supervisory committee will provide a written evaluation of this portion of the exam, including an indication of whether or not the student will be allowed to proceed to the oral portion of the Qualifying Examination. Specific details of the written qualifying exam procedures appear below.

The oral portion of the Qualifying Exam involves a defense of the candidate's dissertation proposal. At the supervisory committee's option, it may also include follow

up questions relating to the written portion of the exam. All members of the candidate's committee should certify that the proposal is ready to be defended prior to conducting the oral portion of the Qualifying Exam.

There are two forms required to be filled out; these forms are available on-line or from the Graduate Coordinator. The first is a report on the written portion of the Qualifying Exam. The second is a report for the complete Qualifying Exam, both written and oral. These forms plus the written examination questions and student answers, will be retained in the student's School of Computing file. Consistent with the requirements of the Graduate School, the Qualifying Examination must be completed at least one semester prior to defense of the thesis.

Guidelines on PhD Written Qualifying Exams Question Submission

Each member of the student's supervisory committee who holds a faculty rank in the University of Utah School of Computing must submit at least one question. Other committee members may each submit a question at their option.

Question Format

The format of each question can be chosen by the committee member posing the question. Possibilities include (but are not limited to):

- "Take home" question, to be researched by the student using library, web, and other publicly available resources;
- A "closed book sit down" examination, to be written during a fixed period without use of background materials;
- An "open book sit down" examination, similar to (2), but permitting use of reference materials.

Note that in all cases, the examination will be written, not oral.

Exam Administration and Grading

The entire exam should be completed in no more than seven days from initial question assignment to the submission of answers. Grading should be completed within seven days after the student delivers his/her answers. Each committee member contributing a question will grade that question and provide a specific, written evaluation of the quality and correctness of the answer. Allowable grades on individual questions are:

- HP - High-Pass
- P - Pass
- F - Fail

A grade of P signifies the minimal acceptable performance expected from a PhD student. An F grade indicates an answer that is partially correct, but not up to the standards we expect from our PhD students.

The members contributing questions will each cast a Pass/Fail vote on the examination as a whole. An overall passing grade should be given to candidates who, through their answers, demonstrate that they are well prepared to conduct PhD level research in their specialty area of computer science. The overall exam High-Pass / Pass / Fail grade will be determined by a majority vote of those contributing questions. In the event of equal numbers of Pass and Fail votes, the deciding vote will be cast by the Director of Graduate Studies.

Repeating the Exam
A student who fails his/her first attempt may retake the exam once. No conditional pass grades will be given. However, the supervisory committee can at their discretion include fewer questions on repeated exams.

PhD DISSERTATION

The supervisory committee must give preliminary approval of the dissertation prior to the defense. The defense can be scheduled after this approval. To schedule the defense, contact the Graduate Advisor.

The student must provide one copy of the dissertation to the chair of the supervisory committee at least three weeks before the defense, and one copy to each of the other committee members at least two weeks prior to the defense.

After successfully defending the dissertation, the student must obtain approval that the thesis is satisfactory by obtaining signatures from their committee members and the chair of the department by using the Final Reading Approval form, and the Supervisory Committee Approval Form. These forms will be submitted with the final draft of the thesis manuscript to the thesis office. The majority of the signatures of the committee members are required for the thesis editors to start the format approval and the editing process. The Dean of the Graduate School signs the Final Reading Approval form after all editing is completed and before the thesis release. While a student can defend a thesis until the day before the following semester starts, in order to graduate in a certain semester, please see the thesis calendar for submission deadlines on the Graduate School's website https://gradschool.utah.edu/ .

Students should also read the document regarding copyright notices provided by the School and declare their intentions regarding granting the School the right to photocopy the dissertation before notifying the Graduate Advisor of completion of the defense.

The student has one month after the defense to make any revisions prior to submitting the dissertation to the Graduate School Thesis Editor. There will be at most two additional months to complete any changes required by the Thesis Editor before final acceptance. If either of these deadlines are not met, the candidate must redo the oral defense. The final dissertation must be filed one week before the end of the semester of graduation.

Students are expected to offer each committee member a bound copy of the dissertation once it is completed, and one to the School of Computing library. Detailed policies and procedures concerning the dissertation are contained in "A Handbook for Theses and Dissertations" published by the Graduate School.

The completed dissertation must be published either in its entirety (through a legitimate publisher of the student's choice or through University Microfilms) or as one or more articles accepted for publication in approved scholarly journals. An abstract of each dissertation must be published in University Microfilms' Dissertation Abstracts International.

STUDENT RESPONSIBILITIES, MONITORING OF PROGRESS

All students are expected to be reading their UNID-based email (UNID@utah.edu where UNID begins with a 'u') regularly to keep track of all official email correspondence directed at them. Each semester students must update their progress at the website https://gradtrack.cs.utah.edu where the progress guidelines shown below (plus newly added ones) will be offered as fillable entries.

Initial committee: This consists of two University of Utah faculty members and an advisor, who must meet the School of Computing requirements for advising. The initial committee is different from the full committee, who will ultimately administer the qualifier and evaluate the dissertation. The full committee must be chosen to conform to program requirements. The initial committee is automatically dissolved when the student forms a full committee, however, the full committee may consist of the same faculty members as the initial committee.

Good versus acceptable progress: Students completing milestones within the time frame denoted as "good" are generally considered to be in good standing in the program. Students completing milestones within the time frame denoted as "acceptable" are considered to be making acceptable progress in the program and are encouraged to continue on and attempt to meet successive milestones within the time frames denoted as "good."

Students may or may not be considered in good standing, depending upon evaluation of the director of graduate studies (DGS) with input from their advisor and advisory committee. Students not completing milestones within the time frame denoted as "acceptable" are not considered in good standing. Students not in good standing can face consequences including loss of funding or expulsion from the PhD program.

All PhD students are required to submit (online, on the GradTrack system) a due progress form in the Fall semester every year by October 15th. Those students who fail to submit their due progress forms by this deadline can face consequences including loss of funding or expulsion from the PhD program.

The faculty as a whole conducts a Graduate Student Progress Review meeting every Fall semester (typically in November) to review and monitor graduate student progress. Advice generated during this meeting and other monitoring activities will be suitably conveyed to the student (typically via email from their advisor(s) and/or Graduate Advisors).

All PhD students <u>who are found lagging in any of their progress categories</u> are additionally required to update their information on the GradTrack system <u>by April 15th.</u> By this date, they must also inform their advisor(s) how they have responded to comments (if any) passed on to them. Failure to do so can result in consequences similar to those noted above.

> **The School of Computing will make all reasonable attempts to support students and help them make progress in their studies, and convey their advice. They will also point the students to our Campus Help Resources as necessary. The School of Computing reserves the rights to follow prescribed Dismissal Policies if a student does not meet the stipulated progress guidelines.**

GRADUATE STUDENT PROGRESS GUIDELINES FOR THE PhD program (Our GradTrack system is the official place for recording progress)

Milestone	Good Progress	Acceptable Progress	Comments
Choose advisor and initial committee	1 Semester	2 Semesters	
Ethics Training	1 Semester	2 Semesters	
Program of study approved by advisor and initial committee	4 Semesters	5 Semesters	
Complete Teaching Mentorship	4 Semesters	4 Semesters	
Complete required courses	5 Semesters	6 Semesters	
Written qualifier	5 Semesters	6 Semesters	U requirement: one semester before defense
Full committee formed	6 Semesters	7 Semesters	U requirement: After written qualifier and one semester

			before defense.
Program of study approved by committee	6 Semesters	7 Semesters	
Oral Qualifier (proposal)	7 Semesters	8 Semesters	
Dissertation defense	10 Semesters	12 Semesters	
Final document			U requirement: Document finalized within three months of the defense

All students are strongly advised to plan their own customized schedule for completing the required courses in frequent consultation with their advisor, as they may run the risk of lagging in publications if they do not start on research early.

15. PhD in Computing: Graphics and Visualization

Course work listed on the approved Program of Study form must comprise at least 50 semester hours of graduate   course-work and dissertation research, exclusive of independent study. Graduate course-work applied toward an MS degree may be included. At least 14 semester hours of dissertation research (CS 7970) and 27 semester hours of graduate course-work must be included. Up to 20 hours of graduate level course-work already applied to other degrees may be used in the program of study.

PhD students must demonstrate core knowledge in computer graphics and visualization by passing three required courses, prior to the start of their fifth semester of study, with grades of at least a B in each course and an overall GPA in the required courses greater than 3.5.

COURSE REQUIREMENTS Three of the following five courses are required:	
CS 6610	Interactive Computer Graphics
CS 6630	Visualization for Data Science
CS 6635	Visualization for Scientific Data
CS 6640	Image Processing
CS 6670	Computer-Aided Geometric Design

ELECTIVE COURSES

The School of Computing Computer Science courses on the Program of Study must be at the 6000 level or above, excluding independent study, and research credits. Of the required 27 semester hours, up to nine credit hours may be graduate courses outside of the School of Computing. Admissible elective courses within the School of Computing are as follow:

CS 6160	Computational Geometry
CS 6170	Computational Topology
CS 6210	Advanced Scientific Computing I
CS 6220	Advanced Scientific Computing II
CS 6320	3D Computer Vision
CS 6360	Virtual Reality
CS 6540	Human/ Computer Interaction
CS 6600	Mathematics of Computer Graphics
CS 6620	Ray Tracing for Graphics
CS 6650	Perception for Graphics
CS 6660	Physics-Based Animation
CS 6680	Computer-Aided Geometric Design II
CS 7650	Realistic Image Synthesis

Courses not on the list above must be approved by the student's committee to count toward the elective requirements. Independent study (CS 6950 and CS 7950) can not be included in the Program of Study for the PhD degree.