The PhD Qualifying Exam
Department of Computer Science
New Mexico State University

Overview

The goal of the Qualifying Exam (QE) is to provide a robust framework for students, advisors, and the department in mentoring and assessing students toward PhD candidacy and to assess the readiness of students for research at the doctoral level. The QE is not an assessment of students' research topics; it is an assessment of students' readiness to conduct research at the doctoral level.

It is expected that students will start taking the QE within one and half years of entering the PhD program (when students do not have any deficiencies) or one and half years after finishing their deficiencies. Students must have a thesis advisor before registering for the QE. Students will be allowed two attempts for the QE in two consecutive semesters. If the student fails to demonstrate sufficient research readiness after two attempts, it will be recommended that the student limit their graduate studies to a Master's degree. Exceptions will be considered by written request to the graduate committee which will render a decision in consultation with the departmental faculty committee.

Process

The student will be assessed on critical thinking, inquiry & analysis, integrative learning, and written and oral communication. This assessment will be facilitated by the student's performance in conducting research, synthesizing, and presenting a report on the chosen technical topic/area. Full details and expectations can be found in the QE **Procedure** Document and associated **grading rubric**.

Registration

The Ph.D. Qualifying Exams will be offered each semester.

Important Dates
- Registration: By the 3rd week of a semester.
- Exam materials released to students: By the 5th week of a semester.
- Written report: By the 12th week of a semester.
- Qualifying exam: By the 13th week of a semester.

Procedure

The student is expected to read and analyze research papers assigned by the student's qualifying exam committee. The student should be able to understand key concepts from the papers they read, and be able to explain those concepts to a general computer science (CS) (non-expert) audience. Additionally, the student must think incisively/critically about the assigned papers, critique them, and demonstrate sufficient technical depth while doing so. The exam will also assess the student's oral and written technical communication skills by way of a presentation and a written report. Details are below:

1. Committee: Within one year of enrollment into the Ph.D. program (or within one year of completing deficiency courses), the student will initiate the process for forming the committee and scheduling the exam in consultation with their advisor. The committee will consist of at least three CS faculty. The committee members might work, generally, in the same area as the student. The student's advisor serves as the chair of the committee. A student needs to pass the qualifying exam only once during their Ph.D. studies, regardless of later changes, e.g., change of advisor, etc.

2. Papers: The student will be given five papers by their qualifying exam committee. The student will pick one or two papers from the list given to them. The papers will be research papers from high-quality peer-reviewed conferences and journals (pre-determined by the CS faculty). A survey paper might be included, based on the committee's discretion.

The papers will broadly be in the student's area(s) of research interest but may not be the exact same topic(s) the student is working on. The committee may **not** pick papers published by the student themselves, or by collaborators, e.g., same research lab members or advisor. Any committee member can suggest papers, and the final list will be decided by the committee by consensus.

3. Timeline: The student must start taking the qualifying exam within three regular (Fall or Spring) semesters after enrollment into the PhD program, if there are no deficiencies. If there are deficiencies, the student must start taking the qualifying exam within three regular semesters of completing deficiency courses. Part-time students can request an extension from the graduate advisor. Students need to make reasonable progress towards finishing deficiencies (students must take at least two deficiencies courses in each semester). Students are allowed two attempts at the qualifying exam. If the student needs a second attempt, the selected papers must be different from the paper(s) chosen in the first attempt.

The student must form a qualifying exam committee by the end of the second regular semester and register for the qualifying exam by the 3rd week of the semester in which they will take the exam. Registered students receive the list of papers by the 5th week of that semester. The student will pick one or two papers from the list to prepare for the exam (see point 5 "Exam" below). Students will submit their written report by the 12th week of a semester and have the oral exam

by the 13th week of a semester. Students are expected to work on the papers without the help of their Ph.D. advisor.

4. Deliverables: By the 12th week of a semester, the student is expected to write a technical report on the papers, without the help of their Ph.D. advisor. The report should cover the selected paper(s), as well as other papers that the student has read in relation to the selected paper(s); it is probable that to write a good report, the student will need to expand their reading beyond the selected paper(s). This report should go beyond just a summary of the papers and should clearly demonstrate the student's critical thinking skills.

Some examples are given below:

Research papers: The student can point out questionable assumptions in the papers, suggest interesting directions for follow-up work, analyze the papers' methodologies for technical flaws, give counterexamples where the papers' techniques/results may fail, or explain how their own work relates to and complements the results in the paper (if the student is working on similar lines, and has any results to share), and more.

Survey papers: The student can point out flaws in the classification scheme or survey methodology proposed by the survey paper, and critique the appropriateness of the scope in the survey.

Format: The length of the report will be between 4-10 pages using the ACM Journal template (https://www.acm.org/publications/authors/submissions). The committee will place more emphasis on quality rather than quantity – unnecessary wordiness and details included to expand the length of the work without contributing meaningfully to the report may be grounds for a poor performance assessment. It is expected that the student may spend at least 20 hours per week for three weeks toward this effort. The student will provide this document to their committee no later than one week before their qualifying exam, earlier, if possible.

5. Exam: The qualifying exam will be conducted by the 13th week of a semester. The student is expected to book a meeting room (physically or virtually) for a two-hour time slot, coordinate with committee members and find a day/date convenient for everyone.

The student will give a 40-minute presentation of their findings and opinions on the papers they chose. The committee will ask follow-up questions to the student, with the goal of assessing the student's research preparedness and potential. The questions may cover any part of the report, presentation, and related work in the area.

The committee will discuss the student's performance. Each committee member will individually assess the student's performance according to a pre-defined, established rubric. The majority of the committee members need to vote yes to pass the student.

Each member will also have the opportunity to provide feedback on areas of strength and recommendations for areas of improvement. The student's advisor will fill out and sign the official paperwork summarizing the results of the exam to be forwarded to the graduate school and to be included in the student's file. The qualifying exam chair will communicate with the student regarding the result of the exam and provide feedback on areas of strength and recommendations for areas of improvement. This feedback will be provided to the student and retained on the student file. The student and their advisor will work towards implementing the recommendations in the feedback received.

Ph.D. Qualifying Exam Registration Form

Please fill out completely, print, and sign. You may return the completed form to the Qualifying Exam Committee Chair via email. You should receive a confirmation email with information about your exam no later than one week after the registration deadline.

Name: _____

Banner ID: _____

Email: _____

Semester & Year:_____   GPA:_____   Attempt #:____

Graduating requirements courses passed:

Course	Semester	Year	Grade

Exam Topic/Area (4-5 lines):

_____

_____

_____

_____

_____

_____

Committee Members. By signing this form, you are agreeing to participate in the exam with the identified topic and references detailed above.

Name	Email	Signature

As the official advisor of the above-named student, I am aware that the student is registering for the Qualifying Exam.

Advisor's Printed Name: _____

Advisor's Signature: _____ Date: _____

By registering for the Ph.D. Qualifying Exam for the above noted semester, I understand that this registration is a binding commitment to take the exam and that should I not take the exam as outlined in the Qualifying Exam Procedures, it will be entered in my student file as a failed attempt.

Student's Printed Name: _____

Student's Signature: _____ Date: _____

Qualifying Exam Rubrics

Proposed rubrics of the presentation and report in the scales of 100 are as follows. They are adapted from ECE's PhD qualifying rubric [6].

Proposed Rubrics of the QE

Oral communication (presentation)				
Criterion	Grade scale: Capstone (4), Milestones (2-3), Benchmark (1), No Evidence (0)	Score	Weight	Weighted Score
Organization [4]	Organization (e.g., presentation order, slide quality, font and figure visibility, citation usage) is ... 4. Clearly and consistently observable; presentation is cohesive; time used very efficiently 3. Clearly observable within the presentation; time used efficiently; cohesion is moderate 2. Intermittently observable within the presentation; time used less efficiently; cohesion is not observed 1. Not observable within the presentation; poor time management		x7	
Total in organization				/28
Critical Thinking 1: Influence of context and assumptions [1]	4. Thoroughly analyzes key assumptions and locates the work within its broader research context 3. Identifies some assumptions and some relevant context 2. Identifies very few assumptions and several less-relevant contexts 1. Identifies almost no assumptions and/or fails to link assumptions to contexts		x7	
Critical Thinking 2 : Conclusions (and implications) [1]	4. Conclusions/implications are logical and reflect informed evaluation and priorities 3. Conclusion logically tied to some relevant information; implications are clearly identified 2. Conclusion is logically tied to only some selected information; some		x6	

			x4	
	implications identified 1. Conclusion inconsistently tied to some information; implications are oversimplified			
Integrative Learning: Transfer of knowledge [2]	Skills, abilities, theories, or methodologies gained in the situation mentioned in the papers are: 4. Adapted and applied to new situations and efficiently solve them; explore more complex issues 3. Adapted and applied to new situations; and linked to less efficient solutions 2. Used in a new situation to understand new problems or issues, but linked with no efficient solutions. 1. Incorrectly applied to new situations, and linked with no feasible solutions		x4	
Total in critical thing and integrative learning				/72
Delivery [4]	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) ... 4. make the presentation compelling; speaker appears polished and confident 3. make the presentation interesting; speaker appears comfortable 2. make the presentation understandable; speaker appears tentative 1. detract from the understandability; speaker appears uncomfortable		x1	
Total in delivery				/4
Total in presentation				**/100**

In sum, the organization will be assessed by slide quality and information presented; critical thinking and integrative learning will be assessed by the presenter's ability in answering questions by the committee; delivery will be assessed by the public speaking ability of the presenter.

	Written communication (submitted report)			
Criterion	Grade scale: Capstone (4), Milestones (2-3), Benchmark (1), No Evidence (0)	Score	Weight	Weighted Score
Context of and Purpose for Writing [5]	4. Demonstrates thorough understanding of context, audience, and purpose 3. Demonstrates adequate consideration of context, audience, and purpose 2. Demonstrates awareness of context, audience, and purpose 1. Demonstrates minimal attention to context, audience, and purpose		x6.25	
Control of Syntax and Mechanics [5]	Uses language that... 4. Skillfully communicates meaning with clarity & fluency; almost error-free 3. Straightforwardly conveys meaning with clarity; few errors 2. Generally conveys meaning; some errors 1. Sometimes impedes meaning because of errors in usage		x6.25	
Analysis [3]	4. Organizes & synthesizes evidence to reveal insightful patterns, differences/similarities 3. Organizes evidence to reveal important patterns, differences/similarities 2. Organizes evidence, but ineffective in revealing important patterns, differences/similarities 1. Lists evidence, but it is not organized and/ or is unrelated to topic		x7.5	
Conclusions [3]	4. States a conclusion that is a logical extrapolation from the inquiry findings 3. States a conclusion that arises specifically from the inquiry findings 2. States a general conclusion that also applies beyond the scope of the inquiry 1. States an ambiguous, illogical, or unsupportable conclusion		x5	
Total in written communication				**/100**

Passing threshold: There can be a passing threshold for both oral and written communication (reference passing threshold: 80; committee members have some discretion in making their decision).

Final results: majority voting