Computer Science Program
PhD Qualifying Examination Guidelines
(Revised 1/21/2021)

The exam is made of two parts; each part is for four hours. Part I is over Computer Science undergraduate core courses and Part II is over one main sub-area of Computer Science.

There will be a total of 10 questions in Part I, two questions from each area of Part I, and a student should answer any 8 questions. Passing score for Part I exam is 70%.

Each student should select one area of Part II at the time of registration for the exam. There will be a total of 4 questions from the selected area of Part II, and a student should answer any 3 questions. Passing score for Part II exam is 70%.

The exam is closed-book and closed-notes. The use of electronic devices is not allowed. Any information, if necessary, will be provided as part of the exam.

Part I

This part tests a student's knowledge over the following five areas:

Computer Architecture
CS 458 Computer Architecture

Operating Systems
CS 537 Introduction to Operating Systems

Programming with Data Structures and Algorithms
CS 351 Data Structures and Algorithms

Discrete Mathematics
CS 317 Discrete Information Structure

Algorithm Design and Analysis
CS 535 Algorithm Design and Analysis

Part II

This part tests a student's knowledge over any one of the following areas.

Artificial Intelligence
CS 422 Introduction to Artificial Intelligence *OR* CS 710 Artificial Intelligence
CS 720 Computational Models of Decision Making
CS 711 Introduction to Machine Learning

Computer Graphics and Image Processing
CS 459 Fundamentals of Computer Graphics
CS 718 Advanced Computer Graphics: Modeling and Animation
EE/CS 712 Image Processing

Natural Language Processing and Text Retrieval
CS 423 Introduction to Natural Language Processing *OR* CS 723 Natural Language Processing
CS 444 Introduction to Text Retrieval *OR* CS 744 Text Retrieval

Programming Languages and Compilers
CS 431 Programming Languages Concepts
CS 654 Introduction to Compilers *OR* CS 754 Compiler Construction and Theory
CS 732 Type Systems for Programming Languages

Theory and Algorithms
CS 417 Introduction to the Theory of Computation
CS 535 Algorithm Design and Analysis
CS 704 Analysis of Algorithms