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