



**University of South Florida
College of Engineering
Department of Computer Science and Engineering**

To: Ph.D. Qualifying Examination Applicants
From: Graduate Examination Committee
Date: 12th November 2008
Re: Spring 2009 Ph.D. Qualifying Examination

The Spring 2009 Ph.D. Qualifiers will be given on **23rd and 26th January 2009** in ENB 346. Please find below the exact location, hours, and suggested texts for preparation.

Some links to sample questions are provided below in each subject area, which are only intended to be used as guides. However, questions in these exams may be formatted differently, cover different subtopics, and may vary in degree of difficulty.

Students who are admitted to the Ph.D. program are expected to pass the exam within their first three semesters in the program.

Sign-up for the Ph.D. Qualifiers should be done on or before **12th December 2008**. Please see attached or see Ms. Theresa Collins in room ENB 342 for a sign-up slip. Students are expected to pass in the first attempt. **If a student does not pass in the first attempt, he/she may request in writing to repeat the exam. It is noted that a poor performance by a student in any one area of the Qualifiers may result in the student failing the entire Qualifiers based on the judgment of the committee.** Based upon the student's academic standing and on the results of the qualifiers, the Graduate Examination Committee may grant a second test.

Students may withdraw their applications in writing one week before the exam is scheduled. Late withdrawals are not accepted and no shows are counted as one failed attempt.

The examinations are scheduled in ENB 346 as follows:

- ***Friday, January 23,*** ***8:30 to 11:30 am – Operating Systems,
1:30 to 4:30 pm – Theory of Algorithms***

- ***Monday, January 26,*** ***8:30 to 11:30am – Computer Organization & Architecture,
1:30 to 4:30pm – Specialty Area***

The required areas are **(1) Computer Architecture, (2) Operating Systems, (3) Theory of Algorithms, and (4) Specialty Area. Instructions for the core exams follow. The specialty exam follows the instructions of the major professor preparing the exam.**

Recommended texts along with a selection of topics in each area are as follows:

OPERATING SYSTEMS:

Texts

1. *Operating Systems Concepts* 7th edition, by Silberschatz & Galvin
2. *Distributed Operating Systems* latest edition by A. Tanenbaum

Topics:

- Stand-Alone Operating Systems – (Process Scheduling & Coordination, Deadlocks, Main and Virtual Memory Management, File Management, Disk Storage Management)
- Distributed Operating Systems – (General Concepts, Fully Distributed Process Coordination and Communication, Client/Server model, RPC's, Deadlocks, Distributed File Systems)

The Operating Systems exam is closed book, closed notes exam.

COMPUTER ARCHITECTURE:

Texts:

1. *Computer Organization & Design, The Hardware/Software Interface*, 3rd Edition David Patterson & John Hennessy, Morgan Kaufmann Publishers, 2007.
2. *Computer Architecture: A Quantitative Approach*, 4th Edition, John Hennessy & David Patterson, Morgan Kaufmann Publishers, 2006.
3. *Advanced Computer Architecture: Parallelism, Scalability, Programmability*, K. Hwang, McGraw-Hill Computer Science Series, 1993.

Topics:

- Basic computer architecture principles, instruction set design, performance metrics, analysis, Benchmarking, basic pipelining principles, processor design principles (datapath and control unit design), RISC, CISC, computer arithmetic, impact of VLSI on computer architecture
- Multiprocessors, multicomputers, SIMD/MIMD Computers, PRAM Models, Interconnect architectures, performance metrics and laws, scalability, parallel algorithms and architectures

- Advanced processor technology, superscalar, superpipeline, vector processing, memory hierarchy, virtual memory, cache memory, shared/distributed memory, cache coherence, instruction pipeline design, pipeline hazards

The Computer Architecture exam is closed book, closed notes exam.

ALGORITHMS:

Texts:

1. Thomas H. Cormen, Charles E. Leiserson, and Ronald L. Rivest. *Introduction to Algorithms*, 1990. The MIT Press, Cambridge, as well as Massachusetts McGraw-Hill Book Company, New York.
2. Michael R. Garey and David S. Johnson. *Computers and Intractability: A Guide to the Theory of NP-Completeness*, 1979. W. H. Freeman and Co., San Francisco, CA.

Topics:

The list of topics is as follows, along with the corresponding chapters of Cormen, Leiserson and Rivest (where applicable):

- Basic combinatorics, number theory, and probability
- Time/space complexity and recurrences (Chapters 2-4)
- Math foundations (Chapters 5-6)
- Sorting (Chapters 7-10)
- Data structures: stacks, queues, hash tables, binary search trees, etc. (Chapters 11-13)
- Red-black trees (Chapter 14)
- Dynamic programming and greedy algorithms (Chapters 16-18)
- Disjoint sets (Chapter 22)
- Graph algorithms (Chapters 23-26)
- String matching (Chapters 34)
- NP-completeness (Chapter 36)
- Approximation algorithms (Chapter 37)

Students are allowed to bring only the textbook *Introduction to Algorithms* by T. Cormen, C. Leiserson, R. Rivest, and C. Stein. The book should not have any substantial writing on its pages. No other book is allowed. Students are allowed one page of hand-written notes during the exam. Lecture notes, printouts, solutions from the web are not allowed. No laptops, calculator, or cell phones are allowed.

NOTE: This is a comprehensive exam that can contain questions from different courses. For example, the Algorithms section might require knowledge of basic data structures and mathematics taught during your undergraduate studies.

APPROVAL/SIGN-UP TO TAKE Ph.D. QUALIFIERS

Spring 2009

Student Name (printed)

_____ Date: _____
Student Signature

_____ Date: _____
Major Professor

_____ Date: _____
Dr. Srinivas Katkoori
Chair of Graduate Committee

Last day to sign-up: 12th December 2008.

Test Dates: January 23 and 26, 2009

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Ph.D. QUALIFYING EXAMINATION SAMPLE EXAMS

Algorithms
Computer Architecture
Operating Systems

Please visit:

<http://www.cse.usf.edu/index.php?sec=83>