

## CMIX REQUIREMENTS FOR PHD BREADTH AND CANDIDACY

REVISED: OCTOBER 31, 2017

To obtain PhD candidacy, the student must satisfy the breadth requirement and pass a written comprehensive exam.

**Breadth requirement:** The breadth requirement is satisfied by course work and involves completing six 500-level courses in CACS with a GPA greater than or equal to 3.5.

**Part I: Hardware:** Computer architecture, Computer design and implementation, Logic design and switching theory, VLSI. (530, 581, 583, 585, 586)

**Part II: Software:** Operating systems, Compilers, Programming languages, Database systems, Software engineering. (550, 551, 553, 555, 556, 561, 562, 564, 565, 566)

**Part III: Theory:** Design and analysis of algorithms, Theory of computation, Automata and formal languages. (500, 540, 542)

**Part IV: Others:** Analog VLSI design (573), Artificial intelligence (520), Automated reasoning (521), Cognitive science (527, 528), Combinatorics and geometric algorithms (572), Computational basis of intelligence (523), Computer arithmetic (582), Computer communication networks (513, 613), Computer graphics (515), Cryptography and data security (516), Data compression (518), Data mining (566), Digital signal processing (507), Distributed computing (533), Error-control codes (514), Fault diagnosis (584), Fault-tolerant computing (614), Fuzzy-logic systems (589), Image processing (508), Intelligent machines (526), Computer Vision (608), Modeling and performance evaluation (534), Mobile computing and applications (576), Neural networks (588), Parallel algorithms and architectures (535), Parallel processing (531, 631), Pattern recognition (509), Robotics and automation systems (525), Signal analysis (504), Silicon compilation (571), Software testing and verification (557), System theory (506), VLSI fabrication principles (587), Wireless computing and networking systems (575).

**For CS:** Two courses from Part II; one course each from Parts I, III, IV; one chosen by student.

**For CE:** Two courses from Part I; one course each from Parts II, III, IV; one chosen by student.

**Written comprehensive exam:** Two areas must be passed from the list below. Each comprehensive exam is based on a syllabus available from Nancy Franks. Courses suggested to take in preparation for the exams are listed in parentheses below. Additionally please consult the syllabus for the exam you wish to take.

- (1) Computer architecture (CMPS 430, CSCE 530)
- (2) Operating systems (CMPS 455, CSCE 555)
- (3) Algorithms and theory of computation (CSCE 340, CSCE 500)
- (4) Knowledge and data systems (CMPS 460, CSCE 561, CSCE 566)
- (5) Programming languages (CMPS 450, CSCE 550, CSCE 551)

- (6) Artificial intelligence (CMPS 420, 520)
- (7) Software engineering (CSCE 553)
- (8) Computer design & implementation and VLSI (CSCE 585, CSCE 586)
- (9) Computer communications and networks (CSCE 513)
- (10) Computer graphics (CSCE 515)

**For CS:** One area in {2, 3, 4, 5, 6, 7, 9, 10} and one area chosen by the student.

**For CE:** One area in {1, 8, 9} and one area chosen by the student.