

# Doctor of Philosophy in Computer Science

## Bioinformatics Concentration

### Georgia State University

## 1 Admission Requirements

In addition to the general requirements of the College of Arts and Sciences, the Department of Computer Science has the following requirements:

- A baccalaureate or masters degree in computer science, or its equivalent. While we welcome capable students with non-computer-science degrees, they may need some foundation courses.
- A supplemental application for computer science.
- A statement of background and goals
- Three letters of recommendations from individuals who can evaluate the applicant's potential for Ph.D. work in computer science.
- GRE (General) score
- Minimum GPA 3.00/4.00.

## 2 Degree Requirements

Note: Must maintain 3.5 GPA in coursework at GSU.

### 1. Foundation Coursework:

If any of the following foundation courses in Computer Science or Mathematics has not been taken in another program, these must be completed at the earliest. 4000-level foundation courses must be taken as their 6000-level counterparts by graduate students.

- (a) Foundation coursework in computer science with a grade of at least a "B" in each.
  - i. Data Structures (CSc 3410)
  - ii. Computer Architecture (CSc 4210)
  - iii. Operating Systems (CSc 4320)
  - iv. Programming Languages (CSc 4330)
  - v. Software Engineering (CSc 4350)
  - vi. Automata (CSc 4510)
  - vii. Design and Analysis of Algorithms (CSc 4520)
  - viii. Bioinformatics (CSc 4630)

- (b) Foundation coursework in mathematics that includes a standard elementary calculus sequence and Discrete Mathematics (Math 2420), with at least a “B” in each.

## 2. Ph.D. Coursework (48 hours)

Of these 48 hours, no more than 8 hours can be taken at the 6000-level. These 8 hours exclude any of the foundation courses previously listed. No more than 5 hours can be directed study or research.

- **CSc 9900: Seminar in Computer Science (1 hour)** A research training course which must be taken in the first semester.

- **Required Coursework (24 hours)**

Choose six of the following seven topics (take classroom taught CSc courses):

- (a) Algorithms (8520,8530,8550)
- (b) Computer Architecture (6230,6250,8210,8215)
- (c) Operating Systems (6220,8220,8221,8240,8320,8370)
- (d) Parallel and Distributed Computing (6310,8530,8320)
- (e) Programming Languages (6340,8330,8710)
- (f) Software Engineering (6360,8350)
- (g) Theory of Computation (8510)

- **Electives (23 hours)**

- To be chosen in concert with Dissertation committee and approved by Dissertation committee. Should reflect student interest, coursework related to research area, etc.
- Must include the following:
  - (a) CSc 8630 (4 hours)
  - (b) Biology (8 hours): Biol 7800 Molecular Cell Biology, Biol 7810 Molecular Cell Biology Lab, and Biol 7900 Genetics or Biol 6564 Advanced Genetics
  - (c) Chemistry (3 hours): Chem 6150 Introduction to Biophysical Chemistry. Alternatives to Chem 6150 include Chem 6110, Chem 6120, Chem 6660, or Chem 8900-O.
  - (d) Math/Stat (3 hours): Math 6544 Bio-Statistics

## 3. Qualifying Examination (By 3rd semester, excluding summers)

- Offered each Fall (October) and Spring (April); Written examination.
- 3 areas: Computer Architecture, Automata and Formal Languages, Algorithm Analysis and Design.
- Maximum 2 attempts; 3 grades (Pass, Marginally Pass, Fail)  
Must obtain at least 2 *pass* and 1 *marginally pass*.  
On 2nd attempt repeat *marginally pass* and *fail*.
- Second attempt must be taken at the next available examination date.

#### 4. **Dissertation Committee**

- Major advisor plus at least three other members.
- One member must be from outside the department. Major advisor and at least two other members must be computer science graduate faculty. At least one member must be a biologist or chemist (could serve as the outside department member).
- To be formed as soon as a potential research area and a major advisor has been identified.
- This committee should be consulted to plan electives and possibly required courses to ensure depth in the research area (If this committee has not been setup, the initial faculty advisor assigned to the student must be consulted).
- Additional technical writing, mathematics, or computer skill courses may also be suggested by this committee based on student's background.

#### 5. **Candidacy Examination (within 2 years of Qualifying Examination)**

The candidacy examination consists of two parts, both administered at around the same time:

- **Research Proficiency**

- To be administered by the dissertation committee to assess student's ability to conduct independent research *in and around* student's research area.
- Format and content to be determined by dissertation committee; typically would be a combination of written and oral components in some courses related to the research area and may involve literature surveys and critical reviews.

- **Research Proposal**

- Written proposal on research to be carried out, and an oral presentation to the dissertation committee.

Upon successful completion of the candidacy examination, a student is declared a candidate for the doctoral degree. An unsuccessful result in the candidacy examination would require the student to take the candidacy examination a second and last time within 3 semesters (excluding summers).

6. **Dissertation (24 hours of CSc 9999)**: research should involve a current topic in bioinformatics.

#### 7. **Written Dissertation and Oral Defense**