

## CS Ph.D. Program Course Requirements

\* *This is the course requirements before the new requirements were adopted in fall 2012. Students who entered the program before fall 2012 may choose to follow either the new requirements or the requirements specified in this document.*

### Major Course Requirements

- A total of 90 credit hours of graduate-level course work is required. These courses are defined as any course listed in the university's Graduate School Bulletin that carries graduate credit. Note that no computer science courses in the A500-A999 range may be counted towards the 90 credit-hour requirement, nor towards the 24 credit-hour requirement specified below.
- *Computer Science Course Requirements:* PhD candidates must take at least 24 credit hours, normally eight courses, in computer science at the 500 level or above, subject to the following conditions:
  - *P Requirement:* At least one must be a P course, with a substantial programming or software-development component.
  - *Essentials Requirement:* Of the eight courses, there must be at least one course in Foundations/Logic (indicated by middle digit 0/1) and one course in Software/Hardware Systems (indicated by middle digit 3/4). Both these courses must be passed with a minimum grade of B+.
  - *Area Distribution Requirements:* Of the eight courses, there must be at least one course each in six of the nine areas (indicated by the middle digit 0-8 in advanced Computer Science courses).
  - *Research Course Conditions:* The Y790 course is excluded from these six area courses, and cannot fulfill the P requirement, but up to 6 hours of Y790 may be counted towards the 24 credit-hour requirement. Y890 and G901 are excluded from the 24 credit hours in this requirement.
- A grade average of B (3.0) is required for computer science courses, in addition to the University Graduate School's requirement of a B (3.0) average for all courses taken.

**Minor Area Requirement.** Three options are available:

- An *external minor* awarded by another Indiana University department or graduate program approved by the Computer Science Program.
- An *internal minor:* 9 computer science credits, in courses other than reading and research, and in an area other than the student's specialization. The area and the courses must be approved by the student's advisory committee. These 9 credits cannot be counted towards the six course requirement.
- An *individualized interdisciplinary minor*, as prescribed by the Graduate School Bulletin: at least 12 credits spanning at least two departments, to be recommended by the student's advisory committee and approved by the dean in advance of any course work.

**Areas of Advanced Computer Science Courses.** Most of the Computer Science Program's courses at the 500 level and above are classified into these **areas**:

- Foundations (middle digit 0, e.g., B501, B502, B503);
- Logic (middle digit 1, e.g., B510);
- Programming Languages (middle digit 2, e.g., B521, B522, P523, B524 );
- Software Systems (middle digit 3, e.g., P536, B538);
- Hardware Systems (middle digit 4, e.g., B541, P542, B543);
- Artificial Intelligence (middle digit 5, e.g., B551, B552, B553);
- Databases (middle digit 6, e.g., B561, P565-P566);
- Scientific Computation (middle digit 7, e.g., P573, B673);
- Graphics and Human Interfaces (middle digit 8, e.g., B581, B582).

General courses not associated with a specific area are numbered with a middle digit 9. Courses that involve a major programming project are designated as "Programming-in-the-large," and carry a course number with letter designation P.