Each degree candidate will be required to pass, with an average of B or better, and not more than two grades below B, the following minimum number of credits, distributed to include core courses and electives.

**Core courses** (12 credits, 4 courses):
- 91.503 Algorithms
- One course from Group II
- One course from Group III
- One course from Group IV

**Group I (Foundations):**
- 91.500 Fundamentals of Computer Science
- 91.502 Foundations of Computer Science
- 91.503 Algorithms
- 91.504 Advanced Algorithms: Computational Geometry
- 91.531 Design of Programming Languages
- 91.534 Compiler Construction
- 91.604 Network Optimization
- 91.710 Approximation Algorithms

**Group II (Systems and Networks):**
- 91.515 Operating Systems I
- 91.516 Operating Systems II
- 91.561 Computer & Network Security I
- 91.562 Computer & Network Security II
- 91.563 Data Communications I
- 91.564 Data Communications II
- 91.580 Developing Android Apps
- 91.661 Advanced Topics in Network Security

**Group III (Human-Computer Interaction, Visualization, Robotics and AI):**
- 91.523 Computer Vision I
- 91.527 Human-Computer Interaction
- 91.528 Evaluation of Human Computer Interactions
91.530 Natural Language Processing
91.541 Data Visualization
91.543 Artificial Intelligence
91.544 Data Mining
91.545 Machine Learning
91.546 Computer Graphics I
91.547 Computer Graphics II
91.548 Robot Design
91.549 Mobile Robots
91.550 Topics: Advanced Robotics Development
91.550 Topics: Human-Computer Interaction
91.550 Topics: Human-Robot Interaction
91.550 Topics: Multi-Touch Computing
91.550 Advanced Topics in Computer Vision
91.641 Advanced Topics in Visualization

Group IV (Information Management and Analysis):
91.513 Internet and Web Systems I
91.514 Internet and Web Systems II
91.540 Visual Analytics
91.573 Database I
91.574 Database II
91.580 Topics: Big Data Modeling
91.580 Topics: Bioinformatics
91.530 Topics: Multimedia Computing
91.673 Advanced Database Systems

Electives (18 credits, 6 courses in the 91.5xx and 91.6xx series or other courses approved by the department)

Total: 30 credits

Master’s Thesis
An optional master’s thesis can be substituted for at most six credits, and can be used to substitute for 2 courses as electives. Students who wish to do a thesis must file a Proposed Thesis Committee form with the Graduate Coordinator prior to beginning work on the thesis.