# PhD in Computer Science

## 1. About the Program

A PhD in Computer Science is an advanced research-oriented program designed to develop expertise in the field of computer science. The program emphasizes cultivating innovative problem-solving skills, conducting original research, and contributing to the advancement of knowledge. It combines advanced coursework, independent research under faculty supervision, and the completion of a doctoral dissertation. Graduates of the program are well-prepared for careers in academia, research, and leadership roles in industry, where they contribute to technological advancements and address complex challenges in computing and society.

To earn a PhD degree in Computer Science, the student must complete a minimum of **48 credit hours**, which are distributed as follows:

- **15 credit hours** of core courses.
- **At least 15 credit hours** of elective courses.
- **18 credit hours** dedicated to the dissertation.

## 2. Program Structure

### 2.1 Core courses

| Course Code | Course Name | Course credits |
|---|---|---|
| CSC 712 | Advanced Algorithms and Complexity | 3 |
| CSC 710 | Probability and Statistical Computing | 3 |
| CSC 713 | Theory of Computation | 3 |
| CSC 720 | Operating Systems | 3 |
| CEN 726 | Computer Organization | 3 |

### 2.2 Dissertation (18 credit hours)

| Course Code | Course Title | Requirement | Credits |
|---|---|---|---|
| CSC 799 | Dissertation | Eligible after passing the Comprehensive Exam | 18 |

### 2.3 Comprehensive Exam

| Course Code | Title | Requirement to Attempt | Credits |
|---|---|---|---|
| CSC 759 | Comprehensive Exam | Passing all core courses prior to attempt | 0 |

**2.4 Elective Courses (minimum 15 credit hours)**

| **Elective Courses List (Area 1): Intelligent Systems and Data Management** | | |
|---|---|---|
| Course Code | Course Title | Credit Hours |
| CSC 603 | Machine Learning | 3 |
| CSC 617 | Data Mining | 3 |
| CSC 606 | Computer Vision | 3 |
| CSC 604 | Neural Networks and Deep Learning | 3 |
| CSC 605 | Advanced AI Programming and Frameworks | 3 |
| CSC 609 | Robotics and Embedded Systems | 3 |
| CSC 610 | Advanced Robotics | 3 |
| CIS 610 | Information Retrieval | 3 |
| CIS 611 | Big Data Analytics | 3 |
| CSC 612 | Natural Language Processing | 3 |
| CSC 615 | Bioinformatics | 3 |
| CSC 616 | Advanced Topics in Intelligent Systems and Data Management | 3 |

| **Elective Courses List (Area 2): Cybersecurity and privacy** | | |
|---|---|---|
| Course Code | Course Title | Credit Hours |
| CIT 601 | Applied Cryptography | 4 |
| CIT 606 | Security Policies and Risk Management | 3 |
| CIT 602 | Network Security | 4 |

| | | |
|---|---|---|
| CIT 605 | Operating System Security | 4 |
| CIT 604 | Secure Software Systems | 4 |
| CIT 607 | Biometrics and Access Control | 4 |
| CIT 609 | Penetration Testing and Ethical Hacking | 4 |
| CIT 617 | Advanced Topics in Cybersecurity and Privacy | 4 |

| **Elective Courses List (Area 3): Theoretical and Applied Research in Computer Science** | | |
|---|---|---|
| Course Code | Course Title | Credit Hours |
| CSC 725 | Independent Research Study | 3 |
| CSC 729 | Advanced Topics in Computer Science | 3 |
| CSC 718 | Research Methods and Experimental Design in Computer Science | 3 |
| CSC 618 | Parallel Computing | 3 |

## 3. Curriculum Outline by Level

| Level | Course Code | Course Title | Required or Elective | Pre-Requisite Courses | Credit Hours | Type of requirements (Institution, College, or Program) |
|---|---|---|---|---|---|---|
| Level 1 | CSC 712 | Advanced Algorithms and Complexity | Required | - | 3 | Program |
| | CSC 710 | Probability and Statistical Computing | Required | - | 3 | Program |
| | - | Elective course (1) | Elective | - | Depends on course | Program |
| Level 2 | CSC 713 | Theory of Computation | Required | - | 3 | Program |
| | CSC 720 | Operating Systems | Required | - | 3 | Program |
| | CEN 726 | Computer Organization | Required | | 3 | Program |

| Level | Course Code | Course Title | Required or Elective | Pre-Requisite Courses | Credit Hours | Type of requirements (Institution, College, or Program) |
|---|---|---|---|---|---|---|
| Level 3 | CSC 759 | Comprehensive Exam | Required | Pass all core courses. | 0 | Program |
| | - | Elective course (2) | Elective | - | Depends on course | Program |
| | - | Elective course (3) | Elective | - | Depends on course | Program |
| Level 4 | - | Elective course (4) | Elective | - | Depends on course | Program |
| | CSC 799 | Dissertation | Required | Pass Comprehensive Exam | 18 | Program |
| Level 5 | - | Elective course (5) | Elective | - | Depends on course | Program |