COMPUTER SCIENCE

csc.as.miami.edu

Dept. Code: CSC

Introduction
The Department of Computer Science offers undergraduate and graduate education in Computer Science, and performs research in various areas of Computer Science. The Department has faculty with strong accomplishments in the fields of algorithm engineering, automated reasoning, bioinformatics, computational complexity, computational geometry & computer graphics, cryptography & network security, data mining, data science, molecular computation, multimedia systems, music information retrieval, robotics, scientific computing, scientific visualization, semantic web, and wireless & mobile computing.

Degree Programs
The Department of Computer Science offers

- a Master of Science (MS) in Computer Science
- a Doctor of Philosophy (PhD) in Computer Science

Note
All Computer Science graduate TAs and RAs must complete RCR training during their first semester in the department. All other Computer Science graduate students must complete Responsible Conduct of Research (RCR) training before starting research work. Information about RCR training can be found from UM ethics programs: http://www.miami.edu/index.php/ethics/projects/rcr/ (https://ethics.miami.edu/disciplines/research-ethics/responsible-conduct-of-research/).

Masters Programs in Computer Science

- M.S. in Computer Science (http://bulletin.miami.edu/graduate-academic-programs/arts-sciences/computer-science/computer-science-ms/)
- Five-Year B.S. and M.S. in Computer Science (http://bulletin.miami.edu/graduate-academic-programs/arts-sciences/computer-science/five-year-bs-ms-computer-science/)

Doctoral Program in Computer Science

- Ph.D. in Computer Science (http://bulletin.miami.edu/graduate-academic-programs/arts-sciences/computer-science/computer-science-phd/)

CSC 607. Logic. 3 Credit Hours.
Components: LEC.
Grading: GRD.
Typically Offered: Offered by Announcement Only.

CSC 609. Data Security and Cryptography. 3 Credit Hours.
Prerequisite: CSC 317 or CSC 427.
Components: LEC.
Grading: GRD.
Typically Offered: Offered by Announcement Only.

CSC 618. Interpreters and Compiler Theory. 3 Credit Hours.
Prerequisite: CSC 419.
Components: LEC.
Grading: GRD.
Typically Offered: Offered by Announcement Only.
CSC 623. Theory of Relational Databases. 3 Credit Hours.
Representation theory. Query systems. Acyclic database schemes.
Prerequisite: CSC 423.
Components: LEC.
Grading: GRD.
Typically Offered: Offered by Announcement Only.

CSC 629. Introduction to Computer Graphics. 3 Credit Hours.
Graphic systems. Graphic communication. Geometric modeling (2D and 3D representations). Rendering. Advanced techniques. Display and input
device packages. Software packages.
Components: LEC.
Grading: GRD.
Typically Offered: Offered by Announcement Only.

CSC 632. Introduction to Parallel Computing. 3 Credit Hours.
Parallel computing systems shared-memory parallel programming, with open MP, distributed-memory parallel programming, software with open MPI
software package. Applications: vector and matrix operations, sorting, image processing.
Prerequisite: CSC 317.
Components: LEC.
Grading: GRD.
Typically Offered: Offered by Announcement Only.

CSC 640. Algorithm Design and Analysis. 3 Credit Hours.
Design techniques include divide-and-conquer, greedy method, dynamic programming, backtracking. Time and space complexity. Sorting, searching,
combinatorial and graph algorithms.
Prerequisite: CSC 317.
Components: LEC.
Grading: GRD.
Typically Offered: Offered by Announcement Only.

CSC 645. Introduction to Artificial Intelligence. 3 Credit Hours.
Game theory. AI programming.
Prerequisite: CSC 545.
Components: LEC.
Grading: GRD.
Typically Offered: Offered by Announcement Only.

CSC 647. Computational Geometry. 3 Credit Hours.
Algorithms for solving geometric problems arising from application domains including graphics, robotics, and GIS.
Prerequisite: CSC 317.
Components: LEC.
Grading: GRD.
Typically Offered: Offered by Announcement Only.

CSC 649. Bioinformatics Algorithms. 3 Credit Hours.
The complexity of bioinformatics computations. Introduction to perl and bioperl. Pattern matching and sequence homology. Genome assembly.
synthesis.
Components: LEC.
Grading: GRD.
Typically Offered: Fall.

CSC 650. Computational Neuroscience. 3 Credit Hours.
Connections to machine learning. Tutorials in Matlab.
Prerequisite: MTH 162 and MTH 224.
Components: LEC.
Grading: GRD.
Typically Offered: Offered by Announcement Only.
CSC 656. Multimedia Systems. 3 Credit Hours.
Prerequisite: CSC 317.
Components: LEC.
Grading: GRD.
Typically Offered: Offered by Announcement Only.

CSC 670. Directed Reading. 2-4 Credit Hours.
Directed reading in Computer Science - content varies by semester.
Components: THI.
Grading: GRD.
Typically Offered: Fall & Spring.

CSC 685. Topics in Computer Science. 1-3 Credit Hours.
Topics in Computer Science - content varies by semester.
Components: LEC.
Grading: GRD.
Typically Offered: Offered by Announcement Only.

CSC 686. Topics in Computer Science. 1-3 Credit Hours.
Topics in Computer Science - content varies by semester.
Components: LEC.
Grading: GRD.
Typically Offered: Offered by Announcement Only.

CSC 687. Topics in Computer Science. 1-3 Credit Hours.
Topics in Computer Science - content varies by semester.
Components: LEC.
Grading: GRD.
Typically Offered: Offered by Announcement Only.

CSC 688. Topics in Computer Science. 1-3 Credit Hours.
Topics in Computer Science - content varies by semester.
Components: LEC.
Grading: GRD.
Typically Offered: Offered by Announcement Only.

CSC 689. Topics in Computer Science. 1-3 Credit Hours.
Topics in Computer Science - content varies by semester.
Components: LEC.
Grading: GRD.
Typically Offered: Offered by Announcement Only.

CSC 690. Seminar for Graduate Students I. 1-3 Credit Hours.
Flexible topics of interest to graduate students.
Components: THI.
Grading: GRD.
Typically Offered: Offered by Announcement Only.

CSC 692. Seminar for Graduate Students II. 1-3 Credit Hours.
Flexible topics of interest to graduate students.
Components: LEC.
Grading: GRD.
Typically Offered: Offered by Announcement Only.

CSC 707. Logic Programming. 3 Credit Hours.
Prerequisite: MTH 506 and CSC 317.
Components: LEC.
Grading: GRD.
Typically Offered: Offered by Announcement Only.
CSC 711. Theory of Computation. 3 Credit Hours.
Recursive functions, Markov algorithms, Turing machines. Unsolvability.
Prerequisite: CSC 317 or CSC 517.
Components: LEC.
Grading: GRD.
Typically Offered: Offered by Announcement Only.

CSC 712. Complexity Theory. 3 Credit Hours.
Models of computations, Blum's axioms, intractability, NP-completeness.
Prerequisite: CSC 427.
Components: LEC.
Grading: GRD.
Typically Offered: Offered by Announcement Only.

CSC 724. Mobile Wireless Systems. 3 Credit Hours.
Cellular Systems, multiple access techniques, wireless networking, mobile IP, power management, user location information management, TDMA, CDMA, and GSM systems, data broadcasting.
Prerequisite: CSC 424.
Components: LEC.
Grading: GRD.
Typically Offered: Offered by Announcement Only.

CSC 732. Parallel Algorithms. 3 Credit Hours.
Parallel computation models; sorting networks; parallel algorithms for sorting, searching, graph problems, prefix computation, pattern matching, and fast Fourier transforms; theory of P-completeness, the class NC.
Prerequisite: CSC 317.
Components: LEC.
Grading: GRD.
Typically Offered: Fall.

CSC 746. Neural Networks and Deep Learning. 3 Credit Hours.
Prerequisite: CSC 317.
Components: LEC.
Grading: GRD.
Typically Offered: Offered by Announcement Only.

CSC 749. Automated Reasoning. 3 Credit Hours.
Prerequisite: CSC 317 or CSC 645.
Components: LEC.
Grading: GRD.
Typically Offered: Offered by Announcement Only.

CSC 751. Semantic Web. 3 Credit Hours.
An overview of the underlying semantic web technologies. Ontology construction and implementation using tools and APIs (logic, XML, RDF, RDFS). Theoretical and practical aspects of knowledge representation (description logic, RDF, RDFS, SPARQL, SROIQ(D)). Designing and debugging ontologies (ontology engineering, entailment tools, project).
Prerequisite: CSC 317 and MTH 309.
Components: LEC.
Grading: GRD.
Typically Offered: Offered by Announcement Only.

CSC 752. Autonomous Robotic Systems. 3 Credit Hours.
Prerequisite: CSC 317 and MTH 210.
Components: LEC.
Grading: GRD.
Typically Offered: Offered by Announcement Only.
CSC 756. Advanced Multimedia Systems. 3 Credit Hours.
Prerequisite: CSC 656.
Components: LEC.
Grading: GRD.
Typically Offered: Offered by Announcement Only.

CSC 785. Advanced Topics in Computer Science. 1-3 Credit Hours.
Advanced Topics in Computer Science
Components: LEC.
Grading: GRD.
Typically Offered: Offered by Announcement Only.

CSC 786. Advanced Topics in Computer Science. 1-3 Credit Hours.
Advanced Topics in Computer Science
Components: LEC.
Grading: GRD.
Typically Offered: Offered by Announcement Only.

CSC 787. Advanced Topics in Computer Science. 1-3 Credit Hours.
Advanced Topics in Computer Science
Components: LEC.
Grading: GRD.
Typically Offered: Offered by Announcement Only.

CSC 788. Advanced Topics in Computer Science. 1-3 Credit Hours.
Advanced Topics in Computer Science
Components: LEC.
Grading: GRD.
Typically Offered: Offered by Announcement Only.

CSC 789. Advanced Topics in Computer Science. 1-3 Credit Hours.
Advanced Topics in Computer Science
Components: LEC.
Grading: GRD.
Typically Offered: Offered by Announcement Only.

CSC 793. Research Project. 1-6 Credit Hours.
Supervised research project preceding dissertation research for the Ph.D.
Components: LEC.
Grading: GRD.
Typically Offered: Fall & Spring.

CSC 794. Research Project. 1-6 Credit Hours.
Supervised research project preceding dissertation research for the Ph.D.
Components: LEC.
Grading: GRD.
Typically Offered: Fall & Spring.

CSC 810. Master's Thesis. 1-6 Credit Hours.
The student working on his/her master's thesis enrolls for the number of credit s as determined by his/her advisor. Credit is not awarded until the thesis has been accepted.
Components: THI.
Grading: SUS.
Typically Offered: Fall & Spring.

CSC 825. Continuous Registration--Master's Study. 1 Credit Hour.
To establish residence for non-thesis master's students who are preparing for major examinations. Credit not granted. Regarded as full time residence.
Components: THI.
Grading: GRD.
Typically Offered: Fall & Spring.
CSC 830. Pre-Candidacy DOCTORAL DISSERTATION. 1-12 Credit Hours.
Required of all candidates for the Ph.D. The student will enroll for credit as determined by his/her advisor, but for not less than a total of 12 hours. Up to 12 hours may be taken in a regular semester, but not more than six in a summer session.

Components: THI.
Grading: SUS.
Typically Offered: Fall, Spring, & Summer.

CSC 840. Post-Candidacy Doctoral Dissertation. 1-12 Credit Hours.
Required of all candidates for the Ph.D. who have advanced to candidacy. The student will enroll for credit as determined by his/her advisor, but not for less than a total of 12. Not more than 12 hours of CSC 740 may be taken in a regular semester, nor more than six in a summer session.

Components: THI.
Grading: SUS.
Typically Offered: Spring.

CSC 850. Research in Residence. 1 Credit Hour.
Used to establish research in residence for Ph.D. students after the student has enrolled for permissible cumulative total in appropriate doctoral research. Regarded as full-time residence.

Components: THI.
Grading: SUS.
Typically Offered: Fall, Spring, & Summer.