DEPARTMENT OF COMPUTER SCIENCE

Computer Science, M.S.

The M.S. in Computer Science has been designed to provide a flexible graduate curriculum for students who matriculate through its associated degree program. The main objectives in offering this degree are as follows:

1. Prepare students for successful and productive careers as specialized CS professionals in industry and society.
2. Prepare students for positions in research and development (R&D) and for leadership roles in industry,
3. Prepare students to continue into advanced graduate studies (PhD) in computer science.
4. Prepare students with the necessary skills and ethics to function in a dynamic multidisciplinary technological environment and serve their community.

Students who matriculate from the Department of Computer Science Master's program will be able to:

1. formulate and solve advanced software applications;
2. apply knowledge in a specialized area of the discipline;
3. compile, analyze and document research literature;
4. design and conduct research projects;
5. communicate ideas effectively by completing a graduate project or thesis involving an investigative computer science project, together with oral and written examinations;
6. undertake doctoral studies in the field of Computer Science
7. understand the role, ethics and responsibility of computer scientists in society;

- Computer Science Plan A. (Thesis Option), Master of Science (https://catalog.tsu.edu/graduate/schools-colleges/science-engineering-technology/computer-science/computer-science-thesis-option-ms/)
- Computer Science Plan B. (Non-Thesis option), Master of Science (https://catalog.tsu.edu/graduate/schools-colleges/science-engineering-technology/computer-science/computer-science-non-thesis-option-ms/)

CS 511 Alg Anal & Data Str (3 Credits)
Algorithmic Analysis and Data Structures (3) Design, implementation, and analysis of abstract data types; data structures and their algorithms. Also included are data and procedural abstraction, linked lists , stacks, queues, binary trees, priority queues, heaps, searching, and sorting. Specific algorithmic design techniques to be addressed are divide and conquer, the greedy method, backtracking, branch-and-bound, and dynamic programming. Three (3) hours of lecture per week.
College/School: Col of Science, Engr & Tech
Department: Department of Computer Sci

CS 531 Comp Arch (3 Credits)
Advanced Computer Architectures (3) Architecture of computer hardware, including memory hierarchies, I/O mechanisms, instruction set and data level parallelism, symbolic computation, multiprocessor networks and consistency, and performance modeling. Operational units and their interconnections, which result from architectural specifications are discussed. Also included are memory hierarchies, pipelining, RISC vs. CISC architectures, super scalar processors, and microprogramming. (Contemporary illustrations included). Three (3) hours of lecture per week.
College/School: Col of Science, Engr & Tech
Department: Department of Computer Sci

CS 541 Operating Systems (3 Credits)
Advanced Operating Systems (3) Discussion of design principles and construction techniques for operating systems. Also included are kernel, process management, memory management, multi-threading, auxiliary storage management, and resource allocation. Comparative structures of different kinds of operating systems included. Three (3) hours of lecture per week.
College/School: Col of Science, Engr & Tech
Department: Department of Computer Sci

CS 545 Computer Networks (3 Credits)
Computer Networks (3) Presentation of functions required to operate computer communications networks and methodology procedures for implementing these functions. Broad area of wireless data networks addressed. Other topics included ad hoc radio nets, wireless LAN's, 2.5 G and 3 G cellular network architectures, and Internet protocols. Main focus on the TCP and network layer. Prerequisite: consent of the instructor or undergraduate course in networking. Three (3) hours of lecture per week.
College/School: Col of Science, Engr & Tech
Department: Department of Computer Sci

CS 547 Crytography & Comp Sec (3 Credits)
Cryptography and Computer Security (3) Fundamentals of security principles; security policies; access control systems and methodology; identification, authentication, and accountability; computational number theory and cryptography; strategies of cryptography; and methods of cryptanalysis. Implications and relationships of security in different areas discussed along with applications. Prerequisite: Consent of the instructor. Three (3) hours of lecture per week.
College/School: Col of Science, Engr & Tech
Department: Department of Computer Sci

CS 551 Theory of Computation (3 Credits)
Theory of Computation (3) Topics include finite automata; regular sets, expressions and their properties; push-down automata; standard, universal, and linear-bounded Turing machines; relationships between formal languages and automata; Church-Turing thesis; computational view of P and NP problems, undecidability and its consequences. Three (3) hours of lecture per week.
College/School: Col of Science, Engr & Tech
Department: Department of Computer Sci

CS 553 Automata & Formal Lngs (3 Credits)
Formal Languages and Automata (3) In depth presentation of the foundations, design and implementation of programming languages. The major emphasis will be placed on formal specification of syntax and semantics and a variety of programming language paradigms including statementoriented and procedural, logic, functional, object-oriented and parallel programming languages. (Prerequisite: Consent of the instructor. Three [3] hours of lecture per week.)
College/School: Col of Science, Engr & Tech
Department: Department of Computer Sci

CS 571 Artificial Intelligence (3 Credits)
Artificial Intelligence (3) Indepth study of artificial intelligence (AI) systems. Specific topics include intelligent agent, problem solving, knowledge representation and reasoning, uncertain knowledge and non-monotonic reasoning, uncertain reasoning and statistical methods, planning, machine learning, natural language processing, image processing, and robotics. (Prerequisite: Consent of the instructor. Three [3] hours of lecture per week.)
College/School: Col of Science, Engr & Tech
Department: Department of Computer Sci

CS 583 Data Mining (3 Credits)
Data Mining (3) Presentation of concepts of data mining, including applications, data preparation, model building and evaluation, scoring, data warehousing, architecture data capture, ETL, schema modeling, query design, and optimization. (Prerequisite: Consent of the instructor. Three [3] hours of lecture per week.)
College/School: Col of Science, Engr & Tech
Department: Department of Computer Sci

CS 591 Web Services (3 Credits)
Web Services (3) Provides understanding and experience in modeling essential aspects of Web-based business application systems, including basic processes to the analyze information requirements and to design appropriate solutions leading to web-based applications in an e-business environment. Emphasis on object-oriented analysis and design, client/server system development methods, and human-computer interaction techniques. (Prerequisite: Consent of the instructor. Three [3] hours of lecture per week.)
College/School: Col of Science, Engr & Tech
Department: Department of Computer Sci

CS 599 Graduate Seminar Computer Sci (1 Credits)
Graduate Seminar in CS (1 semester credit hour) A series of seminars held every semester in which students are exposed to various research topics in computer sciences. Students are required to attend theses seminars and provide a written review to each topic presented. Prerequisite: Consent of the instructor. One hour of seminar per week
College/School: Col of Science, Engr & Tech
Department: Department of Computer Sci

CS 645 Multimedia Networking (3 Credits)
This course explores recent advances in multimedia networking technologies. Topics covered include muleimedia compression and standards, multimedia streaming over IP networks, quality of service (QoS) support mechanisms and protocols, IP multicasting, Voice over IP, IPTV, and internet multimedia applications. Three credit hours per week.
College/School: Col of Science, Engr & Tech
Department: Department of Computer Sci

CS 661 Adv Tps in Sfw Eng (3 Credits)
Advanced Topics in Software Engineering (3) Software measurement and analysis theory, applications, and techniques. Also included are process and product metrics, risk and hazard assessment, quality assurance certification techniques, COCOMO model for cost estimation, re-use, reengineering, and software safety. (Prerequisite: Consent of the instructor. Three [3] hours of lecture per week.)
College/School: Col of Science, Engr & Tech
Department: Department of Computer Sci

CS 681 Adv DB Mgmt Sys (3 Credits)
Advanced Database Management Systems (3) Advanced issues related to database design, data modeling and normalization, query optimization, functional dependencies, data integrity, and data security. (Prerequisite: Consent of the instructor. Three [3] hours of lecture per week.)
College/School: Col of Science, Engr & Tech
Department: Department of Computer Sci

CS 696 Special Topics in CS (3 Credits)
Special Topics in Computer Science (3) Consideration of contemporary topics and issues in computer science and associated technology. (Prerequisite: Consent of the instructor. Three [3] hours of lecture per week. This course can be repeated for different topics.)
College/School: Col of Science, Engr & Tech
Department: Department of Computer Sci

CS 697 Independent Master's Prjt (3 Credits)
Independent Master's Project (3) Opportunity for students to do an independent in-depth study on a contemporary topic under the mentorship of a faculty member. Required of students pursuing the Plan B (nonthesis) option. (Prerequisites: Completion of eighteen [18] semester credit hours including core courses and satisfactory completion of the departmental Qualifying Examination.)
College/School: Col of Science, Engr & Tech
Department: Department of Computer Sci

CS 698 Mst Thes/Rsch I (1-3 Credits)
Master's Thesis Research I (1-3) Required independent research project under the mentorship of a faculty member that leads toward the completion of a written thesis for students pursuing the Plan A (thesis) option. (Prerequisites: Completion of eighteen [18] semester credit hours including core courses and satisfactory completion of the departmental Qualifying Examination.)
College/School: Col of Science, Engr & Tech
Department: Department of Computer Sci

CS 699 Mst Thes/Rsch II (1-3 Credits)
Master's Thesis Research II (1-3) Continuation of CS 698. (Prerequisites: CS698.)
College/School: Col of Science, Engr & Tech
Department: Department of Computer Sci