Master's Degree Program Guide

Computer Science and Engineering Department

The University of Texas at Arlington

500 UTA Boulevard
Engineering Research Building, Room 640
P. O. Box 19015
Arlington, Texas 76019-0015

817- 272-3785
www.cse.uta.edu

Preface

This brochure is not an official publication and the contents herein are not official policy of The University of Texas at Arlington or of The University of Texas System. In all matters, the Rules and Regulations of the Regents of The University of Texas System, The Handbook of Operating Procedures of The University of Texas at Arlington, and the Graduate Catalog of The University of Texas at Arlington shall supersede this brochure.

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PURPOSE OF THIS GUIDE

This guide will answer some of the common questions asked about the PhD programs offered by the University of Texas at Arlington Computer Science and Engineering Department. It supplements the UTA Graduate Catalog with specific information about the program. Nothing herein is intended to conflict with the information in the UTA Catalog.

All students are expected to be familiar with the information presented in this guide before seeking advice from the Graduate Advisor. Also, all students should check their UTA email account frequently as degree related information will be sent to that address.

For the rest of this guide, The University of Texas at Arlington shall be stated as UTA and the Computer Science and Engineering shall be stated as CSE.

THE UNIVERSITY, COLLEGE, AND DEPARTMENT

Since it's founding over 110 years ago, UTA has become a comprehensive research, teaching, and public service institution offering 84 bachelor's degrees, 69 master's degrees, and 30 doctoral degrees. These degree programs are managed by nine academic units and an Office of Graduate Students.
Enrollment at UTA has exceeded 40,000 students, making UTA it the second largest entity of the world-renowned University of Texas System and is the sixth largest university in Texas. Students at UTA come from all 50 of states and over 150 other countries.

UTA has kept in step with societal needs by attracting leading professors in their fields of research and high achieving students with widely diverse backgrounds. These attributes and the immense growth of the D/FW metroplex have positioned UTA as top university both in the state of Texas and around the world.

The computer science program at UTA started in the early 1970s as a master's level program within the Industrial Engineering Department. The bachelor's degree was first offered in 1978 with the PhD program beginning a few years later. A separate Computer Science and Engineering Department was established in 1980. The undergraduate program was the first in the state of Texas to be accredited by the Accreditation Board for Engineering and Technology (ABET). The CSE department is also recognized by the Computing Science Accreditation Board (CASB). The goals of the CSE department are to provide a high quality engineering education and to be a resource for research and education to technology-based enterprises in north Texas through the TAGER network, by sponsoring seminars and teleconferences on campus with local experts, and by utilizing faculty contacts both domestic and international to advance research and individuals in their fields.

UTA is a major national research institution. An important strategy for such institutions is the channeling of resources both internal and external into carefully chosen areas of study in which initial capability already exists. These areas all relate to regional interests and show promise for significant contributions to national concerns.
Graduates from UTA CSE programs are regularly recruited by well-known industrial giants in the local area, nationally, and worldwide.

GRADUATE ADVISOR

A CSE Graduate Advisor will serve as the point of contact to resolve questions or issues regarding the Graduate Program. The advisor is also available to assist students with degree plan alternatives and selection of courses appropriate for a specific degree plan. However, it is the student's responsibility to select and enroll in courses that satisfy degree requirements.

MASTERS PROGRAM GENERAL REQUIREMENTS

Entrance Requirements

To begin a graduate degree program, an applicant must submit a completed application and fee must be submitted to the Graduate Admissions Office. In addition, the applicant must arrange for Graduate Record Examination (http://www.gre.org) (GRE) scores and official transcripts of all work beyond high school to be sent directly to the Graduate Admissions Office. When these application materials have all been collected, the information is forwarded to the CSE department graduate advisor for evaluation.

If there is a delay in receiving materials, the application may be deferred until all required materials are available. The applicant is notified of the deferral by the Graduate Admissions Office via email.

Admission to master's programs is based on the applicant's ability to do graduate work in computer science. Students without sufficient background in computer science but who meet the other admission criteria, may be admitted to our master's programs on a probationary basis pending completion of specified deficiency courses.

Present departmental requirements for the master's programs include:
An undergraduate degree, preferably in an area related to computer science, computer engineering, or software engineering.

1. A 3.2 grade point average (on a 4.0 scale) on the last two years of undergraduate course-work. In particular, performance on Computer Science/Computer Engineering/Software Engineering related courses are emphasized.
2. Relevance of the student's degree (background) to the CSE curriculum.
3. Rigor of the student's Bachelor's degree. A three-year degree is not considered rigorous enough. Note: International applicants with a "3+2" Master's degree will be evaluated as equivalent to a 4-year Bachelor's degree.
4. Reputation of the University/College that the student has received his/her previous degrees from.
5. A sum of verbal plus quantitative scores of at least 305 on the GRE. Additionally:
    a. GRE quantitative score of at least 160
    b. GRE verbal score of at least 145
    c. The department does not require the advanced computer science test. A passing score on the Engineering-in-Training (EIT) exam is also given consideration for admission decisions.
6. Students may be accepted with a GRE score of 300, but may be required to do additional coursework for their MS degree (see degree requirements found later in this document). In this case:
    a. GRE quantitative score of at least 155
    b. GRE verbal score of at least 145
7. Students may also be accepted with up to three deficiency courses, but may be required to do additional coursework for their MS degree (see degree requirements found later in this document).
8. International Applicants will need to take the Test of English as a Foreign Language (TOEFL) and score at least 83 with no area score of less than 20, or take the International English Language Testing System (IELTS) and score at least 6.5 in all areas.

Note: Applications with significant mathematics deficiencies may be deferred/denied pending completion of the required courses.

Note: We do not require nor review letters of recommendation or a statements of purpose from MS applicants.

Note: Students with (or completing in the near future) a BS awarded by the CSE department at UTA or a comparable degree from another accredited U.S. university who have a GPA of at least 3.2 should contact the graduate advisor regarding a GRE waiver. UTA CSE students with a GPA of at least 3.5 should contact the graduate advisor regarding nomination for Advanced Admission (i.e. admission without application and fee). Baseline criteria for GRE waiver and Advanced Admission are established by the Graduate Dean and can be found in the current version of the UTA Graduate Catalog.

Transfers from other UTA departments

Students submitting a Change of Program from one UTA department to CSE must:

1. Satisfy CSE entrance requirements.
2. Be in good academic standing.

Acceptance of previous graduate work towards a CSE program of work is not guaranteed. First-semester graduate students seeking a transfer to CSE are expected to submit a copy of their admission letter and transcripts in advance of seeing a CSE graduate advisor.

Interdepartmental transfers are typically not accepted in a student's first semester, and are contingent on program capacity constraints and consent of the admitting program. Additional regulations apply for International students.

International Students

International students must have earned an appropriate degree to indicate that they are academically prepared and qualified to undertake graduate studies. Applicants to CSE must have earned a degree equivalent to a bachelor's degree from a regionally accredited university in the U.S. (Three-year degrees are not acceptable. See the note above concerning "3+2" degrees.) In addition to meeting the standard admission requirements, an international student whose native language is not English is required to complete the Test of English as a Foreign Language (TOEFL, http://www.toefl.org) or the International English Language Testing System (IELTS). The CSE standard for the TOEFL is a score of at least 83 on the with a score of at least 20 in each individual TOEFL evaluation area. For those who take the IELTS test, a score of at least 6.5 in all areas is required. An applicant who does not achieve these standards may be required to take the Graduate English Skills Program (GESP) qualifying exam upon arrival at UTA to determine the need for additional English language courses after admission.

Applicants whose native language is not English should take the Test of Spoken English prior to enrollment. Students cannot be appointed to assistantship duties having any teaching responsibility without a qualifying score on an accepted spoken English test. To repeat, students whose primary language is not English must satisfy the UTA English proficiency requirement to qualify for an assistantship.

Curricular Practical Training (CPT) – This is a voluntary internship program that allows International Students in good standing to gain directly related work experience in conjunction with their studies. Doctoral and Master's thesis students wishing to pursue CPT must have the written consent of their supervising professor. MS students must have an overall GPA of at least 3.0. In order to be eligible for CPT, Master's students on the 30 hour plan must have completed at least 15 hours of graduate coursework and Master's students on the 36 hour plan must have completed at least 18 hours of graduate coursework. Furthermore, CPT employers and the specific job training opportunity must be approved by the department as part of the student's CPT application process.

Degrees and Degree Requirements

Students with an undergraduate degree in Computer Science, Computer Engineering, Software Engineering, or a directly related field, or who have completed the Foundation Cours*es* specified herein may select a program leading to one of the following three degrees:

a) Master of Science in Computer Science (MS CS)
b) Master of Science in Computer Engineering (MS CpE)
c) Master of Software Engineering (M.Sw.E.)

MS CS and MS CpE thesis degree plans

Students in either the MS CS or MS CpE thesis degree programs must complete 30 semester-hours of graduate work including 24 hours of course work and 6 hours of thesis.

For either degree, MS CS or MS CpE, the student must submit their thesis to the UTA Central Library during the semester the thesis is defended. The thesis must be defended orally before the student's supervising committee and other members of the university community. To facilitate the dissemination of thesis results, students may be required to coordinate with the research supervisor towards a concise publication such as a conference submission, technical note/letter to a journal or transactions, or a technical report. The publication (paper) must be submitted to the committee. Recipients of departmental assistantships are expected to pursue either the MS CS or MS CpE thesis degrees.

MS CS and MS CpE non-thesis degree plans

Students in the MS CS or MS CpE program under the Non-Thesis Option must complete 30 semester-hours of graduate course work.

The non-thesis option is intended to serve the needs of students who have experience doing projects but who do not wish to do a thesis. Specific requirements regarding the coursework are shown in the template found later in this document.

M.Sw.E. Degree (non-thesis) plan

The Masters of Software Engineering degree program was developed in cooperation with the CSE Industry Advisory Board to satisfy the need in local/national industry for highly skilled software professionals. The details of this program are found in a later section of this document. Students must complete at least 30 semester hours of graduate course work.

General Degree Requirements for all MS degrees

a) General requirements for a master's degree that are independent of the chosen degree program must include no course for which the final grade was D or F.

b) A final grade point average of 3.0 (out of 4.0) must be achieved on all course work attempted at UTA; in addition, the GPA computed for courses listed on the degree plan must be at least 3.0.

c) Up to six semester-hours of directly-related coursework may be transferred from another accredited institution. Transfer credits are allowed only for courses graded 'B' or better, and must directly fill a course requirement in the student's degree plan. In most cases a maximum of six semester-hours of transfer credit will be allowed. (Transfer credits must be approved in advance by the graduate advisor, the chair of the CSE Graduate Studies Committee, and the Graduate Dean.)

d) At least one *advanced course* (6000-level) must be completed with a grade of C or better for thesis students, and at least two *advanced courses* (6000-level) for non-thesis students.

Deficiency (Foundation) Courses

A student entering a CSE MS program is required to have an undergraduate preparation equivalent to a baccalaureate degree in Computer Science, Computer Engineering or Software Engineering, including at least four semesters of specified math courses. Students without a proper academic background, as determined by the graduate advisor at the time of the admission review will be required to complete all assigned deficiency courses with passing grades (in addition to the normal graduate degree courses). Graduate credit is not given for these deficiency courses.

Required Foundation courses (each course name is followed by the UTA course number) are:

1. C Programming (CSE 1320)[1]
2. Computer Organization (CSE 2312).
3. Discrete Structures (CSE 2315)[1]. Please note that even though you may have taken "advanced" mathematics for an engineering degree, it is our experience that non-CS students have minimal exposure to the topics in this course. This is especially apparent when students attempt CSE 3315 without this background.

4. Theoretical Computer Science (CSE 3315)[1]
5. Algorithms & Data Structures (CSE 2320)
6. Operating Systems (CSE 3320)

The following courses constitute the Mathematics requirements[2]:

7. Calculus I (MATH 1426)
8. Calculus II (MATH 2325)
9. Linear Algebra (MATH 3330)
10. Probability and Statistics (MATH 3313), or Engineering Probability (IE 3301)

[1] Screening exams may be offered for these courses to allow the student to demonstrate proficiency in the indicated topics. These examinations are available only to first-semester master's students.

[2] Applications missing a full-semester course equivalent to any of the four specified mathematics courses may be deferred until those courses are completed. Most applicants with an engineering or science background tend to satisfy the mathematics requirements (7-10 above).

Additional Coursework

If a student's cumulative GRE score and prior coursework does not satisfy unconditional admission requirements (GRE total $\geq$ 305, GRE quantitative $\geq$ 160, GRE verbal $\geq$ 145) or a student's admission decision is probationary (conditional), then the student is required to take 2 CSE courses in addition to the 30 hours of other required course work for a total of 36 hours of coursework for the degree. These two additional courses can be any CSE 5000 or CSE 6000 level regularly scheduled courses.

Core Courses

All master's students are required to take:

CSE 5311: Design and Analysis of Algorithms

And one of the following three courses:

CSE 5301: Data Analysis and Modeling Techniques
CSE 5306: Distributed Systems
CSE 5317: Design and Construction of Compilers

Breadth Courses

Breadth courses are defined as any CSE course that is not in the student's major field(s) of study. These courses are intended to broaden the student's degree plan into areas beyond the specific focus of the major track(s). Both Thesis option students and Structured Option students will choose TWO breadth courses.

Elective Courses for Thesis option students only

Elective courses can be any graduate-level course, in any area that is directly related to the degree program or thesis research. Note: Not applicable for Non-Thesis Option students.

Major/Specialty Requirements

A "major", or "specialty," track is defined as a sequence of three courses, with at least one 6000-level course in a specific subject area. The major/specialty requirements are as follows:

- Thesis students must choose one major field of study and complete the corresponding major track.
- Non-thesis students must choose TWO major fields of study and complete the corresponding major tracks.
- Students in the Computer Engineering (CpE) degree plan must select Systems/Architecture as one of their major tracks (i.e., Computer Engineering thesis students must select this field as their major.)

NOTE: As specified above, courses in the major track cannot be used to satisfy the breadth requirements. For example, a student majoring in Intelligent Systems/Robotics is required to satisfy the breadth requirements from courses that are in any of the other fields (see major area courses below).

Major subject areas are determined according to the course offerings and the faculty supporting subject areas. Thus, the major subject areas may vary from time to time as reflected in updates to this guideline.

The current major areas and associated courses are listed below. (**Note:** This is not a complete list of courses in each specified field. Courses offered vary significantly from semester to semester, so students are advised to consult course listings each semester to determine courses available in their chosen major field. If in doubt about the field of a specific course, please contact a CSE Graduate Advisor.)

Big Data Management/Databases/Cloud Computing:

- CSE 5330 - Database Systems
- CSE 5331 - DBMS Models and Implementation Techniques
- CSE 5333 - Cloud Computing
- CSE 5334 - Data Mining
- CSE 5335 - Web Data Management
- CSE 5336 - Stream Data Management
- CSE 5339 - Special Topics in Database Systems
- CSE 5362 - Social Networks and Search Engines
- CSE 6331 - Advanced Topics in Database System
- CSE 6339 - Special Topics in Advanced Database Systems
- CSE 6363 - Machine Learning

Imaging/Health Informatics/Bioinformatics:

- CSE 5370 - Bioinformatics
- CSE 5379 - Special Topics in Bioinformatics
- CSE 6379 - Advanced Special Topics in Bioinformatics
- CSE 5348 - Multimedia Systems
- CSE 5365 - Computer Graphics
- CSE 5366 - Digital Signal Processing
- CSE 5389 - Special Topics in Multimedia, Graphics and Image Processing
- CSE 6366 - Digital Image Processing
- CSE 6367 - Computer Vision
- CSE 6389 - Special Topics in Advanced Multimedia, Graphics and Image Processing

Intelligent Systems/Robotics:

- CSE 5360 - Artificial Intelligence I
- CSE 5361 - Artificial Intelligence II
- CSE 5362 - Social Networks and Search Engines
- CSE 5364 - Robotics
- CSE 5367 - Pattern Recognition
- CSE 5368 - Neural Networks
- CSE 5369 - Special Topics in Intelligent Systems
- CSE 5334 - Data Mining
- CSE 5383 - Introduction to Unmanned Vehicle Systems
- CSE 5384 - Unmanned Vehicle System Development
- CSE 6363 - Machine Learning

CSE 6366 - Digital Image Processing
CSE 6367 - Computer Vision
CSE 6369 - Special Topics in Advanced Intelligent Systems

Networks/IoT:

CSE 5344 - Computer Networks
CSE 5345 - Fundamentals of Wireless Networks
CSE 5346 - Networks II
CSE 5347 - Telecommunication Networks Design
CSE 5349 - Special Topics in Networking
CSE 5355 - Computer System Performance Evaluation
CSE 6344 - Advanced Topics in Communication Networks
CSE 6345 - Pervasive Computing & Communications
CSE 6347 - Advanced Wireless Networks & Mobile Computing
CSE 6348 - Advances in Sensor Networks
CSE 6349 - Special Topics in Advanced Networking

Security/Privacy:

CSE 5380 - Information Security I
CSE 5381 - Information Security II
CSE 5382 - Secure Programming
CSE 5388 - Special Topics in Information Security
CSE 6388 - Advanced Special Topics in Information Security

Software Engineering:

CSE 5320 - Special Topics in Software Engineering
CSE 5321 - Software Testing
CSE 5322 - Software Design Patterns
CSE 5323 - Software Engineering Processes
CSE 5324 - Software Engineering: Analysis, Design, and Testing
CSE 5325 - Software Engineering: Management, Maintenance, and Quality Assurance
CSE 5326 - Real-Time Systems Design
CSE 5327 - Telecommunications Software Development
CSE 5328 - Software Engineering Team Project I
CSE 5329 - Software Engineering Team Project II
CSE 5382 - Secure Programming
CSE 6323 - Automated Software Engineering
CSE 6324 - Advanced Topics in Software Engineering
CSE 6329 - Special Topics in Advanced Software Engineering

Systems/Architecture/Languages:

CSE 5306 - Distributed Systems
CSE 5317 - Design and Construction of Compilers
CSE 5333 - Cloud Computing
CSE 5343 - Real-time Data Acquisition and Control Systems
CSE 5348 - Multimedia Systems
CSE 5350 - Computer Architecture II
CSE 5351 - Parallel Processing
CSE 5355 - Computer System Performance Evaluation
CSE 5442 - Embedded Computer Systems (Also CSE 5342)
CSE 5359 - Special Topics in Systems and Architecture

CSE 5383 - Introduction to Unmanned Vehicle Systems
CSE 5384 - Unmanned Vehicle System Development
CSE 6306 - Advanced Topics in Operating Systems
CSE 6350 - Advanced Topics in Computer Architecture
CSE 6351 - Topics in Parallel and Distributed Computing
CSE 6352 - Fault-Tolerant Computing
CSE 6359 - Special Topics in Advanced Systems and Architecture

Data Analytics/Algorithms/Theory:

CSE 5301 - Data Analysis and Modeling Techniques
CSE 5307 - Programming Language Concepts
CSE 5311 - Design and Analysis of Algorithms
CSE 5314 - Computational Complexity
CSE 5315 - Numerical Methods
CSE 5316 - Modeling, Analysis, and Simulation of Computer Systems
CSE 5317 - Design and Construction of Compilers
CSE 5318 - Applied Graph Theory and Combinatorics
CSE 5319 - Special Topics in Theory and Algorithms
CSE 6311 - Advanced Computational Models and Algorithms
CSE 6314 - Advanced Topics in Theoretical Computer Science
CSE 6317 - Advanced Topics in Languages and Compilers
CSE 6319 - Special Topics in Advanced Theory and Algorithms

Degree Plan and Guidelines

Students should review their degree plan with a graduate advisor and, for thesis students, their supervising professor, and then properly choose courses as appropriate. Templates to guide course selection are shown later in this document and can also be obtained from the CSE website.

General provisions for the degree plan:

1. Thesis students must complete at least one advanced (6000 level) course: and Structured Option students must complete at least two advanced (6000 level) courses per guidelines provided above.
2. Thesis students are allowed to use a maximum of one Directed Study course (CSE 5393) towards their degree requirements. Directed Study may NOT be used for non-thesis programs except in exceptional cases.
3. At the discretion of the graduate advisor or the supervising professor, and with the approval of the chair of the CSE Graduate Studies Committee, one or more of the core or breadth courses may be waived for exceptionally well-prepared students (proper documentation is necessary). The waived course(s) will be replaced by major or elective course(s).
4. Clearance to register for a course is not a commitment to accepting that course on the degree plan.
5. Election of the thesis option by a student is not a commitment that the student will be able to complete a thesis. Thesis option students must obtain the commitment and approval of a qualified thesis supervisor before beginning thesis research.
6. These provisions are guidelines for devising an acceptable graduate degree plan. Programs that follow the spirit of these provisions, but have other merits, will be considered.

Processing of the Graduate Degree Plan

Students will discuss their initial degree plan with a CSE graduate advisor before they enroll in classes in their first semester. The templates that follow are for use by the student. The official degree plan is established and maintained online in the MyMav Student Information System. Students should review their plan online frequently to ensure that they stay on track toward completion of their degree requirements.

Transfer Credit

Students who plan to transfer courses from another institution must file a formal request with their CSE advisor. The advisor will review the request and upon approval, forward the request to the Office of Records for final evaluation. The maximum amount of credit that may be considered for transfer is six credit hours. Students must provide an official copy of the transcript that shows successful completion (grade of 'B' or higher) of the course(s) that are requested for transfer credit. Additional documentation may be required. A Request for Course Transfer Credit form will be completed and forwarded to the Office of Records for final approval. Please check the UTA Graduate Catalog for additional regulations.

NOTE: It is the student's responsibility to initiate the transfer request and obtain other required documentation to support the transfer. Transfers do not occur unless the request is properly completed and approved.

MASTERS CANDIDATE COURSE REQUIREMENTS CHECKLIST (Templates)

Thesis Option Template:

Core courses: 5311, and _____ (one of: CSE 5301, CSE 5306, or CSE 5317)

3 courses in major area: (_____)

6000-level course _____
2nd major course: _____
1st major course: _____

Breadth courses: _____, _____

Elective: _____

Thesis II: CSE 5698

Degree granted: MS CS or MS CpE

Non-Thesis (Structured) Option Template - 30 hour plan:

Core courses: 5311, _____ (one of: CSE 5301, CSE 5306, or CSE 5317)

3 courses in major area 1: (_____)

6000-level course _____
2nd major course: _____
1st major course: _____

3 courses in major area 2: (_____)

6000-level course _____
2nd major course: _____
1st major course: _____

Breadth courses: _____, _____

Degree granted (circle one): MS CS or MS CpE

NOTE: Electronic versions of the CSE degree plan templates shown above are available for download on the CSE graduate website (http://cse.uta.edu/graduate/).

Non-Thesis Option Template - 36 hour plan:

Additional Courses: Six hours of CSE 53xx or CSE 63xx - See section on Additional Coursework

CSE _____, _____

Core courses: 5311, _____ (one of: CSE 5301, CSE 5306, or CSE 5317)

3 courses in major area 1: (_____)

6000-level course _____
2nd major course: _____
1st major course: _____

3 courses in major area 2: (_____)

6000-level course _____
2nd major course: _____
1st major course: _____

Breadth courses: _____, _____

Degree granted : MS CS or MS CpE

Master's Program in Software Engineering

Degree Requirements

Thirty (30) semester hours of graduate course work beyond the B.S. degree. The MSwE curriculum is divided into four categories. Foundation and core courses (18 hours) focus on software engineering and supporting material, including mathematical formalisms and a two-course software engineering project sequence. This project is team-oriented and will culminate with a significant written and oral report of results. Courses in the other two categories consist of electives that provide depth in software engineering and knowledge in potential application domains. In addition, students must satisfy the general degree requirements of the department.

Curriculum Requirements

Specific course requirements for the MSwE degree are given below. Catalog descriptions are provided in the UTA Graduate Catalog.

Foundation Course

CSE 5311 - Design and Analysis of Algorithms

Core SE Courses (In the 30-hour plan, CSE 5324 and CSE 5325 must be replaced by CSE 5321 and CSE 5322)

CSE 5324 - Software Engineering: Analysis, Design, and Testing
CSE 5325 - Software Engineering: Management, Maintenance, and Quality Assurance
CSE 5328 - Software Engineering Team Project I
CSE 5329 - Software Engineering Team Project II

SE Elective Courses (Select a minimum of two courses – at least one 6000-level)

CSE 5321 - Software Testing
CSE 5322 - Software Design Patterns
CSE 6324 - Advanced Topics in Software Engineering
CSE 6329 - Special Topics in Advanced Software Engineering

Domain Electives Select a minimum of one CSE course. Total number of SE and Domain electives must be at least fifteen (15) credit hours.

Sample Programs of Study

Full-Time Students:

Year 1 Fall (9 hours)	Year 1 Spring (9 hours)
CSE 5311	CSE 5321
CSE 5322	Elective
Elective	Elective
Year 2 Fall (9 hours)	Year 2 Spring (3 hours)
CSE 5328	CSE 5329
Elective	
Elective	

Part-Time Students:

Year 1 Fall (6 hours) CSE 5322 Elective	Year 1 Spring (6 hours) CSE 5321 Elective
Year 2 Fall (6 hours) CSE 5311 Elective	Year 2 Spring (6 hours) Elective Elective
Year 3 Fall (6 hours) CSE 5328	Year 3 Spring (6 hours) CSE 5329

Comparing the UTA Curriculum to the SEI Curriculum

Software Engineering Institute (SEI) (http://www.sei.cmu.edu) is a DoD-supported organization whose primary mission is to advance the state of the practice of software engineering by accelerating the transition of promising new methods and technologies from concept demonstration to routine use.

The UTA program includes all the necessary courses and content specified in the SEI MSwE degree program, but the material is packaged somewhat differently. A mapping of the UTA curriculum into the SEI curriculum is provided below.

UTA Course	SEI Course
CSE 5324 Software Engineering: Analysis, Design, and Testing	Software Systems Engineering, Software Analysis, System Design Principles
CSE 5325 Software Eng. Management, Maintenance, and Quality Assurance	Software Project Management part of Software Creation and Maintenance
CSE 5326 Real Time Systems Design	Advanced System Design Principles, Software Analysis
CSE 5328 & 5329Team Projects	Software Development Studio
CSE 6324 Advanced Topics in Software Engineering	Software Analysis, Verification & Validation, Software Engineering Seminar

Software Engineering at UTA

Software engineering was added as an area of emphasis by the Computer Science and Engineering Department in 1982 to serve the needs of the local aerospace and defense industry. The first faculty member was hired to provide leadership in the development of this new activity. In later years, additional faculty members with software engineering backgrounds have been added. Currently, the CSE Department has several faculty members whose primary interests are in software engineering. Course offerings in software engineering have expanded to six graduate and two undergraduate courses. These courses have proven to be popular with students and continue to have strong enrollments. Graduate students are able to pursue master's and doctorate programs with an emphasis in software engineering.

RESEARCH FACILITIES

Excellent computing facilities are available on campus for research and teaching activities. Academic Computing Services (ACS) operates IBM, Dell, SUN and Silicon Graphics systems, each of which may be accessed from numerous computing and graphics terminals on campus. Supported operating system environments include Windows and numerous UNIX variations. The CSE department operates SUN, VAX and HP workstations and/or servers along with dual and quad-processor Linux/SMP systems. Numerous Windows and Macintosh personal computers are also available, as are development systems from Motorola and Intel and other manufacturers, along with other hardware and software resources needed to support the development of microprocessor-based systems.

The UTA Engineering Research Building

The CSE department is located at the Engineering Research Building, which has approximately 234,000 square feet of space for state-of-the-art, multidisciplinary research and teaching labs and classrooms, faculty and graduate student offices, administrative offices, conference rooms and support areas. The building's design incorporates several energy-saving features, including green and light-reflecting roofs, window designs for improved use of available light, rain and condensate water capture and storage for landscaping, use of recycled materials, and others allows the facility to meet requirements for LEED Silver certification.

RESEARCH AREAS

The Computer Science and Engineering Department currently supports Ph.D. studies in the following areas:

1. Computer Architecture and Systems (Parallel processing, Fault tolerance, Distributed Operating Systems, and others)
2. Database and Information Systems (converting data to knowledge, crowdsourcing and human computation, data modeling and summarization, data exploration, data reduction, data warehousing, database testing, deep web and social media mining, entity query, information integration, information retrieval, knowledge discovery, query processing and optimization, real-time databases, searchable file systems, spatial databases, usability challenges in querying graph data, Web data management, XML)
3. Big Data and Large-Scale Computing (big data analytics and mining, cloud computing, computational journalism, data exploration, data science, distributed computing, environmental and tracking data analysis, parallel algorithms, parallel computing, scalable and distributed graph-processing, scalable memory and storage systems, scientific computing, systems support for big data, warehouse-scale computing)
4. Biocomputing and Health Informatics (assistive technologies, bioinformatics, computational neuroscience, computer aided rehabilitation, health informatics, human computer interaction, medical informatics)

5. Information Security and Privacy (systems for providing Internet privacy, location privacy, security and privacy in ubiquitous computing, and secure P2P systems)
6. Networking and Telecommunications (anonymity and privacy online, content-centric networking, Internet distributed traffic control, Internet router interface programming, network function virtualization, next-generation networks, opportunistic networks, pervasive computing, secure peer-to-peer systems, sensor networks, software-defined networking, wireless networks)
7. Embedded Systems and Mobile Computing (cyber-physical systems, data acquisition and control, hybrid systems, instrumentation, Internet of Things, mobile and pervasive devices and technologies, mobile applications, modeling and simulation, network simulation and test bedding, real-time systems, reliable and fault tolerant computing, verification and validation, virtual reality, wireless localization, wireless sensor networks)
8. Machine Learning and Data Mining (deep web and social media mining, environmental and tracking data analysis, matrix-based machine learning, neural networks, pattern recognition, similarity-based indexing, social network, spatio-temporal data analysis and mining, sparse learning, statistical and combinatorial algorithms, statistical optimization and data analytic, tensors)
9. Intelligent Systems (Knowledge representation, Knowledge acquisition, Machine learning, Neural networks, Parallel AI and others)
10. Software Engineering (agile methods, automated software engineering, automated testing, formal methods, mobile software engineering, object-oriented software engineering, program analysis, program repair, reverse engineering, software cost estimation, software design patterns, software engineering processes, software methodology, software process, software security, testing object-oriented software, verification and validation)
11. Computer Vision and Multimedia (endoscopic vision, gesture recognition, human motion analysis, image processing, neural networks, pattern recognition, robotic vision, sign language recognition, signal processing, video compression, visualization)
12. Sustainable Computing (define standards for power-aware hardware and software, design power efficient architectures, energy-aware computing resource provisioning, energy-aware routing in sensor networks, evaluate power and performance tradeoff, green data center architectures, restructure software and applications, spatial indexing for sensor queries)

General course work to support each of the above areas is available. Other areas are possible if the appropriate faculty is willing to support them. See the section on the faculty and their research.