Master's Degree Program Guide

Computer Science and Engineering Department

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Preface
This guide 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 the content of this guide.

TABLE OF CONTENTS

PURPOSE OF THIS GUIDE

This guide will answer most of the common questions asked about the master's degree programs offered by the Computer Science and Engineering Department at the University of Texas at Arlington. It supplements the UTA Graduate Catalog with specific information about the program. Nothing herein is intended to conflict with 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 Computer Science and Engineering shall be stated as CSE.

THE UNIVERSITY, COLLEGE, AND DEPARTMENT

Since its founding over 110 years ago, UTA has become a comprehensive research, teaching, and public service institution offering over 150 bachelors, master, and doctoral degree options. These degree programs are managed by nine academic units and an Office of Graduate Studies.

Enrollment at UTA has exceeded 40,000 students, making it the second largest entity of the world-renowned University of Texas System and the sixth largest university in Texas. Students at UTA come from all 50 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 a 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 (CSAB). 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.

An important strategy for research institutions like UTA 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 answer questions and help resolve issues regarding the CSE graduate program degree requirements. 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. As noted in the UTA catalog, the student is responsible for seeking academic advice, for enrolling in appropriate courses to insure progress toward a degree, for timely completion of his or

her academic program, for familiarity with the appropriate catalog, and for maintaining University standards. Assistance from an academic advisor is not a substitute for the personal responsibility of the student.

MASTER'S PROGRAM GENERAL REQUIREMENTS

Entrance Requirements

To begin a graduate degree program, an applicant must submit a completed application and fee to the UTA Graduate Admissions Office. In addition, the applicant must request that Graduate Record Examination (GRE) scores and official transcripts of all work beyond high school be sent directly to the Graduate Admissions Office. When all application materials have all been collected by Graduate Admissions, the information is forwarded to the CSE department for evaluation. The CSE department's decision is then communicated to Graduate Admissions with the final decision being sent via email from Graduate Admissions to the applicant.

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 CSE master's programs is based on the applicant's perceived ability to do graduate work in computer science as shown by the applicant's test scores and transcripts. Students who do not have a sufficient background in computer science, but otherwise meet the other admission criteria, may be admitted to the master's programs on a probationary basis pending completion of specified deficiency courses.

Present departmental requirements for the master's programs include:

1. An undergraduate degree, preferably in an area related to computer science, computer engineering, or software engineering.
2. A 3.2 grade point average (on a 4.0 scale) on the last two years of undergraduate coursework. In particular, performance on Computer Science/Computer Engineering/Software Engineering related courses is emphasized.
3. Relevance of the student's previous degree(s) to the CSE curriculum.
4. Rigor of the student's bachelor's degree. A three-year degree is not considered sufficiently rigorous. International applicants with a "3+2" Master's degree will be evaluated as equivalent to a 4-year Bachelor's degree.
5. Reputation of the University/College from which the student has received his/her previous degrees.
6. A sum of verbal plus quantitative scores of at least 305 on the GRE. Including:
    a. GRE quantitative score of at least 160
    b. GRE verbal score of at least 145
7. Students may be accepted with a GRE score of 300, but may be required to do additional coursework for their MS degree. In this case:
    a. GRE quantitative score of at least 155
    b. GRE verbal score of at least 145
8. Students may also be accepted with up to three deficiency courses, but may be required to complete other additional coursework for their MS degree.
9. International applicants and applicants whose native language is not English 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) exam and score at least 6.5 in all areas.

Note: Applications with significant mathematics deficiencies may be deferred/denied pending completion of required courses as determined by the CSE department.

Note: For master's applications, only the following are required: application, fee, transcripts from all higher education institutions attended, and test scores. Test scores include GRE scores, and for those whose native language is not English, TOEFL or IELTS scores. The CSE department neither requires nor reviews letters of recommendation, statements of purpose, or any other supplemental materials from MS applicants.

Note: An applicant who does not achieve the stated English proficiency 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. Students whose native language is not English cannot be appointed to teaching assistantship (GTA) duties or have any teaching responsibility without a qualifying score on an accepted English proficiency test.

GRE Waiver

Applicants who graduated with a bachelor's degree within the last 12 months or will soon earn a bachelor's degree from the CSE department at UTA and who have a GPA of at least 3.2 GPA on a 4.0 scale should contact a graduate advisor regarding a GRE waiver. Alternatively, an applicant who graduated with a Computer Science degree from an accredited U.S. institution within the last three years with a GPA of 3.5 or better on a 4.0 scale, and who is currently working in the computer software field in the DFW area should contact a graduate advisor about the possibility of a GRE waiver. Baseline criteria for the GRE waiver are established by the Graduate Dean and can be found in the current version of the UTA Graduate Catalog.

Facilitated Admission

UTA undergraduate CSE students interested in continuing into the CSE master's program who have a GPA of at least 3.5 should contact a graduate advisor regarding Facilitated Admission (i.e. admission without application or fee). Baseline criteria for Facilitated 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 another UTA department to CSE must:

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

Acceptance of previous UTA graduate coursework towards a CSE degree is not guaranteed. First-semester graduate UTA students seeking a transfer to CSE are expected to submit a Change of Program after their grades have been posted but before Census Day of the subsequent term.

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 begin graduate studies. Applicants to CSE must have earned a degree equivalent to a bachelor's degree from an accredited U.S. university. Three-year degrees are not acceptable. See the note concerning "3+2" degrees in item 4 under the heading of Entrance Requirements.

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) or the International English Language Testing System (IELTS) exam. The CSE standard for the TOEFL is a score of at least 83 overall, 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.

Students whose native language is not English cannot be appointed to teaching assistantship duties (GTA) or have any

teaching responsibility without a qualifying score on an accepted spoken English test. Applicants must have a US bachelor's degree, or a TOEFL speaking score of at least 23, or an IELTS speaking score of at least 7 to be eligible for a teaching position.

Course Numbering

UTA courses are numbered with a four digit course number followed by a three digit section number. Courses with numbers in the 1000s, 2000s, 3000s, and 4000s are undergraduate courses. Graduate level classes are those numbered in the 5000s and 6000s. There is one 7000 level class but it is exclusively for PhD students.

The first digit of the course number designates the level of the course. The second digit of the course is the number of credit hours the course provides. So, CSE 5311 is a 5000 level graduate course that counts for 3 hours of coursework. The section number of the course is what designates that course's particular time slot or professor, etc. If there are multiple sections of a course, and you want to take the course at a particular time or with a particular professor, you would need to know the section number of the course to register properly (i.e. CSE 5311-003).

Courses with the section number 020 or a number in the 200s are specialized courses for a particular student cohort population. General population students cannot register for courses with these section numbers. Students in these cohorts are registered by an advisor directly.

Degrees and Degree Requirements

Students with an undergraduate degree in Computer Science, Computer Engineering, Software Engineering, or a degree from a directly related field, or who have completed the Foundation Courses specified in the Deficiency Courses section below 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.SwE)

MS CS and MS CpE non-thesis degree plans

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

M.SwE 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.

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 coursework made up of 24 hours of coursework and 6 hours of thesis. The thesis must be defended orally before the student's supervising committee and other members of the university community. The finalized thesis document must be submitted to the UTA Central Library for archiving.

To facilitate the dissemination of thesis results, students may be required to coordinate with their research supervisor on a concise publication such as a conference submission, technical note/letter to a journal or transactions, or a technical report. The publication must be submitted to the committee. Master's degree level recipients of departmental assistantships are expected to pursue either a MS CS or MS CpE thesis degree.

The 36 Hour Non-thesis Degree Plan

All CSE master's students are admitted under the 36 hour non-thesis degree plan by default. If a student's cumulative GRE score and prior coursework do not satisfy unconditional admission requirements, or a student's admission decision is probationary, then the student will be required to take two 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.

The 30 Hour Non-thesis Degree Plan

All CSE master's students are admitted under the non-thesis 36 hour plan. In order to qualify for the non-thesis 30 hour plan, students must meet three requirements upon admission or before the first day of class of their first semester as a CSE student at UTA. There are no exceptions to these requirements.

For CS:

1. The student must have been admitted unconditionally or provisionally to the CSE department
2. The student must have a GRE with a total score of 305 or greater and a quantitative score of at least 160 and a verbal score of at least 145
3. The student must have taken and passed the equivalents of CSE 5330 Database I, CSE 5324 Software Engineering I, and CSE 5344 Networks I in their undergraduate study

For CpE:

1. The student must have been admitted unconditionally or provisionally to the CSE department
2. The student must have a GRE with a total score of 305 or greater and a quantitative score of at least 160 and a verbal score of at least 145
3. The student must have taken and passed the equivalents of CSE 3323 Electronics, CSE 3442 Embedded Systems, and CSE 5366 Signal Processing in their undergraduate study.

For M.SwE:

1. The student must have been admitted unconditionally or provisionally to the CSE department
2. The student must have a GRE with a total score of 305 or greater and a quantitative score of at least 160 and a verbal score of at least 145
3. The student must have taken and passed the equivalents of CSE 5324 Software Engineering I, CSE 5325 Software Engineering II, and CSE 5330 Database I in their undergraduate study

Note: Upon qualification for the 30 hour plan, the student is not allowed to take the graduate level equivalent of the undergraduate courses which qualified them for the 30 hour plan as listed in each section above (i.e. CS students cannot take CSE 5330, 5324, or 5344; CpE students cannot take CSE 3323, 3442, 5366, or 5344; M.SwE students cannot take CSE 5324, 5325, or 5330). If a student does take one or more of these courses, the course(s) cannot be used to satisfy degree requirements.

Note: If a newly admitted student believes they qualify for the 30 hour plan they must send an email to CSEGradAdvising@uta.edu with their name, ID number, and a request to be placed on the 30 hour plan.

General Degree Requirements for all MS degrees

a) No course in which the final grade was D or F may be used to satisfy a degree requirement.

b) A cumulative grade point average of 3.0 (out of 4.0) must be achieved on all coursework attempted at UTA as well as in the specific courses considered as being in the major.

c) Up to nine semester-hours of directly-related coursework may be transferred from another accredited institution. In most cases a maximum of six semester-hours of transfer credit will be allowed. See the Transfer Credit section later in this document for more information.

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

Deficiency Courses

A student entering a CSE MS program is required to have undergraduate preparation equivalent to a bachelor's degree in Computer Science (CS), Computer Engineering (CpE), or Software Engineering (SE), 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. These deficiency courses are in addition to the normal graduate degree courses. Graduate credit is not given for these deficiency courses and these courses cannot be used to fulfill any graduate degree requirements.

Students requesting to change between Master of Science degrees plans in Computer Science, Computer Engineering, and Software Engineering are required to have completed the Foundation Courses specified below.

Required Foundation courses for Computer Science and Software Engineering (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 3318)
6. Operating Systems (CSE 3320)

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

1. C Programming (CSE 1320)[1]
2. Computer Organization (CSE 2312)
3. Circuits and Systems (CSE 2440)
4. Digital Logic Design (CSE 2441)
5. Embedded Systems I (CSE 3442) or Introduction to Computer Engineering (CSE 5400)

The following courses constitute the Mathematics requirements[2]:

1. Calculus I (MATH 1426)
2. Calculus II (MATH 2425)

3. Linear Algebra (MATH 3330)
4. 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] Applicants 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.

Core Courses

All CS and SE master's students are required to take:

CSE 5311: Design and Analysis of Algorithms

And one of the following courses:

CSE 5301: Data Analysis and Modeling Techniques
CSE 5306: Distributed Systems
CSE 5317: Design and Construction of Compilers
CSE 5350: Computer Architecture II or CSE 5351: Parallel Processing

All CpE master's students are required to take two of the following courses:

CSE 5301: Data Analysis and Modeling Techniques
CSE 5306: Distributed Systems
CSE 5311: Design and Analysis of Algorithms
CSE 5317: Design and Construction of Compilers
CSE 5342: Embedded Systems II
CSE 5350: Computer Architecture II
CSE 5351: Parallel Processing

Breadth Courses

Breadth courses are defined as any graduate level CSE course that is not used in one of the student's specialty fields of study. These courses are intended to broaden the student's degree plan into areas beyond the specific focus of the specialty tracks. Both thesis option students and non-thesis option students must choose two breadth courses. Breadth courses cannot be from the same specialty area as either of the student's two specialty areas, nor can they be from the same specialty area as each other.

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.

Specialty Area Requirements

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

- Thesis students must choose one specialty area and complete the corresponding courses
- Non-thesis students must choose two specialty areas and complete the corresponding courses
- Students in the Computer Engineering (CpE) degree plan must select either Embedded Systems or Systems/Architecture as one of their two specialty areas

Specialty areas are determined according to the course offerings and the faculty supporting those subject areas. Thus, the courses under the specialty areas may vary from time to time as reflected in updates to this guide.

Some courses are listed in multiple specialty areas. Students who take such courses must choose which specialty area they want to use the course under. A single course cannot be used to fulfill multiple degree requirements.

The current specialty 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 specialty areas. If a student is in doubt about the specialty area of a specific course, the student should contact a 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

Embedded Systems:

- CSE 5342 - Embedded Systems II
- CSE 5352 - IoT and Networking
- CSE 5354 - Real-time Operating Systems
- CSE 5355 - Electromechanical Systems and Sensors
- CSE 5356 - System On Chip (SoC) Design
- CSE 5357 - Advanced Digital Logic Design
- CSE 5358 - Microprocessor Systems
- CSE 5372 - RISC Processor Design
- CSE 5373 - General Purpose GPU Programming
- CSE 6351 - Advanced Topics in Computer Engineering
- CSE 6353 - Computer Engineering System Design

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 5355 - Electromechanical Systems and Sensors

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/Communications:

CSE 5344 - Computer Networks
CSE 5345 - Fundamentals of Wireless Networks
CSE 5346 - Networks II
CSE 5352 - IoT and Networking
CSE 5347 - Telecommunication Networks Design
CSE 5349 - Special Topics in Networking
CSE 5376 - Data Communications
CSE 5377 - Wireless communications
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 5348 - Multimedia Systems
CSE 5350 - Computer Architecture II
CSE 5351 - Parallel Processing
CSE 5359 - Special Topics in Systems and Architecture
CSE 5358 - Microprocessor Systems
CSE 5372 - RISC Processor Design
CSE 5373 - General Purpose GPU Programming
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 - Advanced Topics in Computer Engineering
CSE 6352 - Fault-Tolerant Computing
CSE 5353 - Computer Engineering System Design
CSE 6359 - Advanced Topics in 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 MAP AND GUIDELINES

Students may review their degree MAP with a graduate advisor if needed for assistance with choosing courses. Templates to guide course selection are shown later in this document and can also be obtained from the CSE website. Thesis students should also consult their supervising professor when choosing coursework.

General provisions for the degree MAP

1. Thesis students must complete at least one advanced (6000 level) course. Non-Thesis students must complete at least two advanced (6000 level) courses per guidelines provided above.
2. Thesis students are allowed to take a maximum of one Directed Study course (CSE 5393) for use towards their degree requirements. Directed Study may NOT be used in non-thesis programs except in exceptional cases and with prior advisor approval.

3. Clearance to register for a course is not a commitment to accept that course in the degree plan.
4. Election of the thesis option by a student is not a binding commitment on the part of a faculty member 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. A thesis supervisor may elect to discontinue supervision of a student if they believe the student is not progressing as needed.
5. 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 MAP

Students may 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.

Transfer Credit

Students who plan to transfer courses from another institution must file a formal request with their graduate advisor. The maximum amount of credit that may be considered for transfer is nine credit hours, however, often only six credit hours are approved. Approval is at the discretion of the graduate advisor. Students must provide an official copy of the transcript showing successful completion of the requested transfer courses with a grade of 'B' or better. Additional documentation may be required. A Transfer of Graduate Credit form must 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.

Master's Program in Software Engineering

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.

M.SwE Degree Requirements

Similar to the other CSE graduate degrees, the M.SwE degrees are either 30 or 36 hours in total. The M.SwE curriculum is divided into four categories. The 30 hour plan includes foundation, core, SE electives, and domain electives. The 36 hour plan includes the 30 hour plan requirements plus six hours of additional CSE coursework. The project courses are 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 all other general degree requirements of the department.

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 M.SwE 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 & 5329 Team Projects	Software Development Studio
CSE 6324 Advanced Topics in Software Engineering	Software Analysis, Verification & Validation, Software Engineering Seminar

Degree Plan Worksheet

Please email CSEGradAdvising@uta.edu for the latest Degree Plan Worksheet for your degree.

ASSISTANTSHIPS

The CSE department is required to hire PhD students who need support as Graduate Teaching Assistants (GTA) before hiring master's level students. It is extremely rare for master's students to receive department support by way of a GTA.

The criteria for choosing assistants, subject to the constraint of assigning PhD student funding first, is as follows:

1. Highest priority is given to students who are requested by the professor for a particular course, who have a qualifying GPA, and are in academic good standing. The instructor of the class will need to send an email to Dr. Elmasri requesting that the specific student be their GTA for their class.
2. The student's GPA is then reviewed.
3. Priority is given to MS thesis students if there are still GTA positions open. The student should have taken the class that needs the GTA, and should have gotten an A grade in that class.

Students wanting to be considered for a GTA position should email Dr. Elmasri with the following information in the body of the email and attach their CV.

1. Student name, email, and student ID (the ID number that begins with 100)
2. Current cumulative GPA
3. Whether you are a non-thesis or thesis student (if thesis, list supervising professor)
4. A list of classes/grades that you have completed at UTA

The GTA assignment committee will verify the information. Students chosen for a position will receive an email with further instructions. Students should not send multiple emails.

The CSE department also has Graduate Research Assistant (GRA) positions. These are handled in the same manner as GTA positions as described above.

INTERNSHIPS

US Citizens, Legal Permanent Residents, and H-1/H-4 visa holders do not need to do anything special regarding internships. If such a student receives an internship offer, they may choose to accept it but should keep a balance with school and work so as to succeed in earning their degree.

International students, that is, those on F1/F2 visas, must obtain authorization for an internship. In order to be eligible for an internship, master's students must have grades posted in at least half of the courses required for their degree (deficiency courses are not counted toward internship eligibility), and must have a cumulative GPA of at least 3.0. PhD students must have unconditionally passed their Diagnostic Evaluation and have an overall GPA of at least 3.0.

Upon receipt of an internship offer, the student must send the Curricular Practical Training (CPT) form available from the

Office of International Education and the internship offer letter to a CSE graduate advisor at CSEGradAdvising@uta.edu. The offer letter must describe the general job duties, state the start date and end date for employment, as well as state whether the offer is for part-time or full-time, or state the work hours per week. The start and end dates of the internship must fall between the dates listed on the Office of International Education website CPT page.

The CSE advisor will verify the student's internship eligibility and register the student in the required internship course, CSE 5191 for full-time CPT or 5192 for part-time CPT. Upon completion of the internship, a report must be submitted to the appropriate CSE faculty member for a grade in the CPT course. The professor of record will instruct students what to do at the appropriate time.

International students may complete a maximum of two semesters of full-time internships during their UTA master's degree career. That is, they can only enroll in 5191 twice for full-time work. If a full-time internship offer spans from two terms or is extended after one term, the student must sign up for 5191 in each term. Enrollment in other coursework is not required when a student is on full-time CPT.

There is no limit to the number of part-time CPT internships students may have. Students doing part-time internships must still register for 5192 and must enroll full time for Fall and Spring terms. Summer enrollment is optional.

THE UTA ENGINEERING RESEARCH BUILDING

The CSE department is located at the Engineering Research Building (ERB), 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 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.

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.