

Graduate Program Guide (MS)



Computer Science and Engineering

2009-2010

**DEPARTMENT OF
COMPUTER SCIENCE AND ENGINEERING**

The University of Texas at Arlington

416 Yates Street
Nedderman Hall, Room 300
P. O. Box 19015
Arlington, Texas 76019-0015

Phone (metro) -- (817) 272-3619 (advising)
FAX (metro) -- (817) 272-3784
Web Page -- <http://www.cse.uta.edu/>

Revised: July 2009

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.

TABLE OF CONTENTS

PURPOSE OF THIS GUIDE	5
THE UNIVERSITY, COLLEGE, AND DEPARTMENT	5
MASTERS PROGRAM GENERAL REQUIREMENTS	6
Entrance Requirements	6
Typical accepted student.	7
Transfers from other UTA departments.	7
International Students	7
Degrees and Degree Requirements	7
M.S.C.S. and M.S.Cp.E. thesis degree programs	8
M.S.C.S. and M.S.Cp.E. Structured (Non-thesis) degree programs	8
M.S.C.S. and M.S.Cp.E. Distance Learning degree program in Database and Information Technology	8
M.Sw.E. Degree program	8
General Requirements	9
Deficiency (Foundation) Courses	9
Orientation Seminar	10
Core Courses	10
Breadth Courses	10
Elective Courses	10
Major Requirements	10
Program of Work and Guidelines	12
General provisions for the program of work:.....	12
Processing of the Graduate Program Of Work (GPOW).....	13
Transfer Credit	13
MASTERS CANDIDATE CHECKLIST (Templates)	14
Masters Program in Software Engineering	15
Purpose and Philosophy	15
Industry Endorsement	15
Degree Requirements	16
Curriculum Requirements	16
Sample Programs of Study	17
Full-Time Students:	17
Part-Time Students	17
Comparing the UTA Curriculum to the SEI Curriculum	17
Software Engineering at UTA	18
Software Engineering Faculty	18
Computer Science and Engineering Graduate Courses	18
RESEARCH FACILITIES	20
RESEARCH AREAS	20
GRADUATE ADVISOR	20

PURPOSE OF THIS GUIDE

This document has been prepared to answer common questions about graduate programs offered by the UTA Computer Science and Engineering Department. It supplements the UTA [Graduate Catalog](#) with specific information for the program. Nothing herein is intended to conflict with information in the Catalog. Italicized items have their own definition elsewhere in this document.

All students are expected to be familiar with appropriate sections of this *Graduate Program Guide* and the information herein before seeking advice from the [Graduate Advisor](#). Each student should watch for memos or notices posted on the CSE Department bulletin board that pertain to graduate students (outside 341 Nedderman Hall).

THE UNIVERSITY, COLLEGE, AND DEPARTMENT

The University of Texas at Arlington is a 100-year-old, comprehensive research, teaching and public service institution located in the heart of the dynamic Dallas-Fort Worth Metroplex. It is the second largest component of the world-renowned University of Texas System and the sixth largest university in Texas.

The University of Texas at Arlington is located in the heart of the Dallas/Fort Worth Metroplex, one of the fastest growing areas in the nation. UTA has emerged as a comprehensive teaching, research and public service university. As of 2004, UTA offered 84 baccalaureate, 69 masters and 30 doctoral degrees within nine academic units and a graduate school. A modern 390-acre campus a few blocks from downtown Arlington offers easy access to museums, concerts, ballet, theater, family recreation, professional sports and other interests.

With an enrollment of approximately 25,000 students, UTA is the second largest of the 15 institutions in The University of Texas System. The student body has become increasingly diversified with students representing 47 states and 150 countries.

The University's academic units include the School of Architecture, College of Business Administration, College of Engineering, College of Liberal Arts, School of Nursing, College of Science, School of Social Work, School of Urban and Public Affairs, and the Center for Professional Teacher Education. Additionally, the Graduate School oversees the administration of academic programs beyond the baccalaureate level.

In response to societal needs, UTA has evolved into a university of renown within the state and of emerging position nationally and internationally. The University's history of achievement can be attributed to a faculty of increasing competence and accomplishments; a student body of higher qualifications and greater diversity; a record of growing success by graduates in their respective disciplines; and the maturation of the Dallas/Fort Worth area as a nationally and internationally significant metropolis.

University was elevated to senior college status in 1959 and was transferred from the Texas A&M System to The University of Texas System in 1965. Its final name change came in 1967, when it became The University of Texas at Arlington. The College of Engineering with 4000 students is the third largest in Texas. The college presently has approximately 100 faculty and is aggressively recruiting in several key areas. The goals of the College are to provide quality engineering education at both graduate and undergraduate levels and to provide a research and educational resource to technology-based enterprises in North Texas. The research community accesses computing resources locally and elsewhere as appropriate. The College seeks to disseminate engineering expertise in the North Texas area to students at the graduate level in local industry and other academic institutions through the TAGER Network, by sponsoring seminars on campus (e.g., IEEE Teleconferences), and by individual contacts on a formal or informal basis.

UTA is emerging as a major national research institution. An important strategy in this emergence is the channeling of resources, intramural and external, into carefully chosen problem areas in which initial capability already exists, which relate to regional interests, and which show promise for significant contribution to national concerns. For example, the first in a series of premier research programs in The University of Texas System is UTA's Automation and Robotics Research Institute (ARRI) aimed at enhancing high technology in Texas and the U.S.

Historically, the computer science program at UTA started in the early 1970's as a master's level program within Industrial Engineering. A Ph.D. program was started a few years later. The bachelor's degree was first offered in

1978. A separate Computer Science and Engineering Department was established in 1980. Since the program's inception, there has been a steady growth in enrollment and quality. The undergraduate program was the first in the state to be accredited by the Accreditation Board for Engineering and Technology (ABET) and also carries Computing Sciences Accreditation Board (CSAB) accreditation. Current undergraduate enrollment exceeds three hundred fifty (700). The graduate programs currently enroll four hundred seventy (470) at the master's level and forty-two (42) at the doctoral level. Graduates are readily recruited by industry and can be found in exciting computer-related positions throughout the area and the nation.

MASTERS PROGRAM GENERAL REQUIREMENTS

Entrance Requirements

To begin a graduate degree program in Computer Science or Computer Engineering, an applicant must submit a completed application and application fee to the [Graduate Admissions Office](#) (Graduate School). The Texas Common Application online application process can also be used. In addition, the applicant must arrange for Graduate Record Examination (<http://www.gre.org>) 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 complete package is forwarded to the Computer Science and Engineering *Graduate Advisor* for evaluation by an admissions committee. Three recommendations should be submitted to the Graduate Advisor if you have not sent them to the Graduate School along with your application package.

If there is delay in receiving some materials, the application may be deferred. The applicant is notified by the Graduate School so that the materials may be supplied in a timely fashion.

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, can be admitted to master's programs on a probationary basis to take *deficiency* courses.

Present departmental requirements for the master's programs include:

1. An undergraduate degree, preferably in a technical area.
2. A 3.2 grade point average (on a 4.0 scale) on the last two years of undergraduate course-work. In particular, performance on CS/CpE related courses are emphasized.
3. Relevance of the student's degree (background) to the CSE curriculum.
4. Rigor of the student's Bachelors 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.
5. Reputation of the University/College that the student has received his/her previous degrees from.
6. A sum of verbal and quantitative scores of 1150 or more on the GRE. Additionally:
 - a. GRE quantitative score ≥ 700
 - b. GRE verbal score ≥ 400
 - 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.
7. (International Applicants) A Test of English as a Foreign Language (TOEFL) score of ≥ 230 on the CBT, or 90 on the iBT

Note: Applications with significant mathematics deficiencies will be deferred/denied.

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. Those 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.

Typical accepted student.

1. GPA of at least 3.4
2. GRE V+Q of at least 1200 with Q of at least 730

Transfers from other UTA departments.

Students applying for admission to CSE while a student in another UTA graduate program 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.

First-semester transfers 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 the Graduate School 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 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 take the Test of English as a Foreign Language (TOEFL, <http://www.toefl.org>). If the score is less than < 230 for Computer-based-test (600 paper test, or 90 on the Internet-based-test), the applicant may be required to take the GESP (Graduate English Skills Program) qualifying exam to determine the need for additional English courses after admittance to the Graduate School.

While not required for admission, all 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 an internship program that allows International Students in good standing with an unconditional admission status to gain directly related work experience in conjunction with their studies. Doctoral and Master's thesis students wishing to pursue CPT must have the consent of their supervising professor. All MS students must have a GPA of at least 3.5, must have completed CSE 5194 Orientation in a semester prior to the first semester of CPT, and must have completed at least 18-hours of graduate course work in order to be eligible for the CPT. A student may not undertake a CPT in their graduating semester. 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 Courses* specified herein may select a program leading to one of the following three degrees:

- a) Master of Science in Computer Science (M.S.C.S.)
- b) Master of Science in Computer Engineering (M.S.Cp.E.)
- c) Master of Software Engineering (M.Sw.E.)

M.S.C.S. and M.S.Cp.E. thesis degree programs

Students in either the M.S.C.S. or M.S.Cp.E. *thesis* degree programs must complete 31 semester-hours of graduate work including 24 hours of course work, one hour of Orientation Seminar, and six hours of thesis. Students are also required to complete an additional 3 semester-hours of preparatory thesis research (Thesis I). To qualify for the M.S.Cp.E. degree, the student must hold an undergraduate degree in a computer or electrical engineering field that includes the following minimum computer engineering content:

1. digital design (with lab)
2. microprocessors
3. a significant team software systems design experience, and
4. exposure to a variety of programming languages and systems.

For either degree, the student must submit a thesis to the Graduate School during the semester that graduation is anticipated. 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 are expected 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 M.S.C.S. or M.S.Cp.E. thesis degrees.

M.S.C.S. and M.S.Cp.E. non-thesis degree programs

Students in the M.S.C.S. or M.S.Cp.E. program under the *Structured Option* must complete 36 semester-hours of graduate work and one-hour of Orientation Seminar. To qualify for the M.S.Cp.E. degree, the student must hold an undergraduate degree in a related engineering field that meets the minimum requirements stated in the section above.

This option is intended to serve the needs of students who, through their work, 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. Completion of requirements toward the degree also involves answering a mandatory survey and an oral Exit Interview with the Graduate Advisor in the semester that you plan to graduate.

M.S.C.S. and M.S.Cp.E. Distance Learning (non-thesis) degree program in Database and Information Technology

Students in the M.S.C.S. or M.S.Cp.E. program under the *Distance Learning Option* must complete 36 semester hours of graduate work offered online via streaming video or VCR tapes. To qualify for the M.S.Cp.E. degree, the student must hold an undergraduate engineering degree as specified above.

This option is intended to serve the needs of students who cannot be available on campus for regular classroom sessions. Students pursuing this degree program will be required to complete a program of work consisting of a fixed set of courses. The course offerings in this degree program are inherently inflexible due to the nature of distance education offerings. Variations from this program will be on a rare exception basis. Specific requirements regarding the coursework are shown in template found later in this document. Completion of requirements towards the degree also involves answering a mandatory survey and an oral exit Interview with the Graduate advisor in the semester that you plan to graduate.

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

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 Guide.

General Requirements

- 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 graduate work attempted at UTA; in addition, the GPA computed for courses listed on the Final Program of Work must be at least 3.0.
- c) Up to nine 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 Graduate Program of Work. 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 for non-thesis students.
- e) The student must pass the Orientation Seminar CSE 5194.

Deficiency (Foundation) Courses

The student entering CSE's Master of Science program is required to have an undergraduate preparation equivalent to a baccalaureate degree in Computer Science and/or Engineering, including calculus, statistics, probability and statistics, and linear algebra courses. Students without a proper background will be required to take a number of deficiency courses (in addition to the normal graduate degree hours), as evaluated by the graduate advisor. Graduate credit is not given for the deficiency courses.

Deficiency courses are:

1. C Programming (CSE 1320).
2. Assembler Language (CSE 2312).
3. Discrete Structures (CSE 2315) 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.

Screening exams may be offered for the above courses to allow the student to demonstrate proficiency in the indicated topics. These examinations are available only to first-semester masters students. Details are supplied with the admission letter.

4. Algorithms & Data Structures (CSE 2320)
5. Theoretical Computer Science (CSE 3315)
6. Operating Systems (CSE 3320)
7. Computer Architecture I (CSE 3322)

The following courses constitute the Mathematics requirements:

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

Applications missing any of the four mathematics courses may be deferred until their completion. Most applicants with an Engineering or Science background tend to satisfy the Mathematics requirements (8-11 above).

Orientation Seminar

All master's students, with the exception of students in the Distance Learning degree program are required to complete the CSE Orientation Seminar, CSE 5194. The purpose of the course is to familiarize the student with the CSE Graduate Program and with faculty research interests. The primary feature of the Orientation Seminar is an all-day program early in the fall and spring semesters. Orientation Seminar must be completed during the student's first semester in the CSE graduate program. CSE 5194 is not available during the summer session.

Core Courses

All master's students are required to take:

CSE 5311: Advanced Algorithms

And one of the following courses:

CSE 5301: Data Analysis and Modeling Techniques

CSE 5306: Operating Systems II

CSE 5317: Design and Construction of Compilers

Students with all of these core course(s) in their undergraduate program may substitute CSE elective course(s).

Breadth Courses

Breadth courses are defined as any CSE course that is not in the student's major field(s) of study. Each breadth course should be in a different field of study, if possible. These courses are intended to broaden the student's program of work into areas beyond the specific focus of the major track(s).

Thesis option students will choose TWO breadth courses, while the Structured Option students will choose THREE breadth courses.

Elective Courses

Elective courses can be any graduate-level course, in any area that is directly related to your degree program.

Note: Student's may use a maximum of ONE non-CSE course, approved in advance by a CSE Graduate Advisor, in their Graduate Program of Work.

Major Requirements

A "major, or specialty, track" is defined as a sequence of three courses, with at least one 6000-level course in a 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 and 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 Artificial Intelligence 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. Students wishing to major in a subject area not listed below (e.g., majoring in a closely related field) may define a major track in consultation with (and by the advance written approval of) their thesis supervisor or the graduate advisor.

The current major areas and associated courses are listed below. (Note: This is not a complete list of courses in a given major. 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.)

Artificial Intelligence:

- CSE 5360 – Artificial Intelligence I
- CSE 5361 – Artificial Intelligence II
- CSE 5364 – Robotics
- CSE 5368 – Neural Networks
- CSE 5369 – Special Topics in Intelligent Systems
- CSE 5334 – Data Mining
- CSE 6362 – Advanced Topics in Artificial Intelligence
- CSE 6363 – Machine Learning
- CSE 6366 – Digital Image Processing
- CSE 6367 – Computer Vision
- CSE 6369 – Special Topics in Advanced Intelligent Systems

Database:

- CSE 5330 – Database Systems
- CSE 5331 – DBMS Models and Implementation Techniques
- CSE 5333 – Distributed and Parallel Databases
- CSE 5334 – Data Mining
- CSE 5339 – Special Topics in Database Systems
- CSE 6331 – Advanced Topics in Database System
- CSE 6332 – Techniques for Multimedia Databases
- CSE 6339 – Special Topics in Advanced Database Systems

Multimedia/Graphics/Image Processing:

- 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

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 I
- CSE 5325 - Software Engineering II
- CSE 5326 - Real-Time Systems Design
- CSE 5327 - Telecommunications Software Development
- CSE 5328 - Software Team Project I
- CSE 5329 - Software Team Project II
- CSE 6323 - Formal Methods in Software Engineering
- CSE 6324 - Advanced Topics in Software Engineering
- CSE 6329 – Special Topics in Advanced Software Engineering

Systems/Architecture:

- CSE 5306 – Operating Systems II
- CSE 5317 – Design and Construction of Compilers
- 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
- CSE 5359 – Special Topics in Systems and Architecture

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

Networks:

CSE 5344 – Computer Networks I
 CSE 5346 – Computer Networks II
 CSE 5347 – Telecommunication Networks Design
 CSE 5349 – Special Topics in Networking
 CSE 5355 – Computer System Performance Evaluation
 CSE 6343 – Fault Tolerant Networks
 CSE 6344 – Advanced Topics in Communication Networks
 CSE 6345 – Mobile Computing
 CSE 6347 – Wireless Networking and Mobile Computing
 CSE 6348 – Sensor Networks
 CSE 6349 – Special Topics in Advanced Networking

Theory and Algorithms:

CSE 5301 – Data Analysis and Modeling Techniques
 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 5318 – Applied Graph Theory and Combinatorics
 CSE 5319 – Special Topics in Theory and Algorithms
 CSE 6312 – Advanced Topics in Formal Methods
 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

Bioinformatics:

CSE 5370 – Bioinformatics
 CSE 5379 – Special Topics in Bioinformatics
 CSE 6379 – Advanced Special Topics in Bioinformatics

Information Security:

CSE 5380 – Information Security I
 CSE 5381 – Information Security II
 CSE 5388 – Special Topics in Information Security
 CSE 6388 – Advanced Special Topics in Information Security

Program of Work and Guidelines

Students should prepare a coherent Graduate Program of Work in conjunction with a graduate advisor or their major professor to support their area of interest and to prepare themselves for thesis research, or properly choosing courses for the *Structured Option*. Templates to guide course selection for the Graduate Program of Work can be found below or obtained from a graduate advisor.

General provisions for the program of work:

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 well-

prepared students (proper documentation is necessary). The waived course(s) will be replaced by major or elective course(s).

4. ONE non-CSE course may be chosen with the approval of the advisor. Selection of non-CSE courses for a degree plan should be justified for a specific emphasis and must be approved in advance by the graduate advisor.
5. Clearance to register for a course is not a commitment to accepting that course on the degree plan.
6. Election of thesis option by a student in their GPOW is not a commitment that the student will be able to complete a thesis. Thesis option students must obtain the commitment of a qualified thesis supervisor before beginning thesis research.
7. These provisions are guidelines for devising an acceptable graduate program of work. Programs that follow the spirit of these provisions, but have other merits, will be considered.

Processing of the Graduate Program of Work (GPOW)

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

Transfer Credit

Students who plan to transfer courses from other universities or from a previous degree in another department at UTA for use in their CSE GPOW must file a formal request for course transfer with the graduate school, via the CSE graduate advisor. Per above, the maximum amount of credit that may be considered for transfer is nine credit hours, but generally only six will be allowed. 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 from an accredited U.S. university. The CSE graduate advisor will verify the course transfer(s) and determine which course they will replace in your GPOW. Additional documentation may be required. A Request for Course Transfer Credit form will be completed and forwarded to the Graduate Dean for final approval, via the CSE Graduate Advisor and the chairman of the CSE Graduate Studies Committee. Transfer courses are not credited toward your degree requirements until final approval by the Graduate School. 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:**

CSE 5194

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

Breadth courses: _____, _____

Elective: _____

3 courses in major area: (_____)

6000-level course _____

2nd major course: _____1st major course: _____

Thesis I (CSE 5398- no course credit) and Thesis II (CSE 5698)

Degree granted (circle one): M.S.C.S. or M.S.Cp.E.**NON-Thesis Option Template:**

CSE 5194

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

Breadth courses: _____, _____, _____

Elective: _____

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: _____**Degree granted** (circle one): M.S.C.S. or M.S.Cp.E.

Distance Learning Program - Database and Information Technology:

CSE 5311 – Advanced Algorithms
 CSE 5306 – Operating Systems II
 CSE 5317 – Design and Construction of Compilers
 CSE 5344 – Computer Networks I
 CSE 5350 – Computer Architecture II
 CSE 5321 – Software Testing
 CSE 5324 – Software Engineering I
 CSE 5325 – Software Engineering II
 CSE 5330 – Database Systems
 CSE 5331 – DBMS Models and Implementation Techniques
 CSE 6331 – Advanced Topics in Database System
 CSE 6332 – Techniques for Multimedia Databases

Note: Courses will be scheduled to be available via Web/VCR at least once per year. Actual courses offered in support of this degree may vary occasionally.

Degree granted (circle one): M.S.C.S. or M.S.Cp.E.

MASTERS PROGRAM IN SOFTWARE ENGINEERING

Purpose and Philosophy

The Master of Software Engineering program (M.Sw.E) provides professional development in software engineering principles and practices. It was created in response to the needs of industry in the North Texas area for graduate level degree programs and is designed to accommodate working software professionals. Solutions to problems encountered in industrial software projects are emphasized. The department has several faculty members specializing in various aspects of software engineering.

Industry Endorsement

“This letter is written in support of the practice-oriented Master of Software Engineering Program. The objectives of the program are consistent with needs at the Lockheed Fort Worth Company and the defense industry in general. There are currently over 200 employees working in software engineering in my department. Many of these employees have bachelor degrees in engineering and computer science and would benefit from this degree program.”

Engineering Manager
 Avionics Software Engineering
 Lockheed Fort Worth Company

“As a UTA alumnus and software engineering manager, I have been hoping that UTA would add a Master of Software Engineering Program. I am confident that your department could provide a quality Master of Software Engineering program that would meet the needs of working software engineers such as those here at Motorola Ft. Worth.”

Fort Worth Research & Dev. Center
 Cellular Infrastructure Group
 Motorola, Inc.

“American Airlines fully recognizes the need for the institution of a Master’s degree in Software Engineering. We are pleased to see that The University of Texas at Arlington will be providing this level of education.”

Managing Director
 Methods & Standards
 SABRE Development Services

“We are pleased to know that your department is planning to offer a Master’s Degree in Software Engineering at The University of Texas at Arlington. The new degree program at UTA would partially fill the gap between conventional Computer Science education, and the ever-growing industry demand for software engineering professionals. We hope that UTA will implement and continue improving the new program using CMS/SEE curriculum as a model.”

Vice President
Research & Development
Alcatel Network Systems, Inc.

“The demand for this degree program is high. In a limited informal survey, thirty-three of our software professionals expressed interest in earning a masters degree in software engineering if it was available in the local area. As EDS and other companies continue improving the maturity of their software processes, this demand will continue to grow.”

Director
EDS Systems and Methods

Degree Requirements

Thirty-seven (37) semester hours of 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.

Delivery

All required courses will be scheduled at least once per year on the UTA campus, over TAGER, or by video tape. Elective courses will be offered with sufficient frequency to allow a part-time student to complete the program within three years.

Curriculum Requirements

Specific course requirements for the MSwE degree are given below. Catalog descriptions are provided in the UTA Graduate Catalog or at the department homepage. (<http://www-cse.uta.edu>)

Foundation Course

CSE 5311 - Design and Analysis of Algorithms

Core SE Courses (All courses are required.)

CSE 5324 - Software Engineering I
CSE 5325 - Software Engineering II
CSE 5328 - Software Development Studio I
CSE 5329 - Software Development Studio II

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

CSE 5326 - Real Time Systems Design
CSE 5392 - Topics in Computer Science
CSE 6324 - Advanced Topics in Software Engineering
CSE 6392 - Special Topics in Advanced Computer Science

Domain Electives (Select a minimum of three CSE courses, at least one from CSE. Total number of SE and Domain electives must be at least six.)

Sample Programs of Study

Full-Time Students:

Year 1 Fall (10 hours)	Year 1 Spring (9 hours)
CSE 5311	CSE 5325
CSE 5324	Elective
Elective	Elective
CSE 5194	
Year 2 Fall (9 hours)	Year 2 Spring (9 hours)
CSE 5328	CSE 5329
Elective	Elective
Elective	Elective

Part-Time Students

Year 1 Fall (7 hours)	Year 1 Spring (6 hours)
CSE 5324	CSE 5325
Elective	Elective
CSE 5194	
Year 2 Fall (6 hours)	Year 2 Spring (6 hours)
CSE 5311	Elective
Elective	Elective
Year 3 Fall (6 hours)	Year 3 Spring (6 hours)
CSE 5328	CSE 5329
Elective	Elective

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.

<u>UTA Course</u>	<u>SEI Course</u>
CSE 5324 Software Engineering, Eng. I	Software Systems Engineering, Software Analysis, System Design Principles
CSE 5325 Software Eng. II	Software Project Management part of Software Creation and Maintenance

CSE 5326 Real Time Systems Design	Advanced System Design Principles, Software Analysis
CSE 5328 & 5329 Studios	Software Development Studio
CSE 6324 Advanced Software Engineering	Software Analysis, Verification & Validation, Software Engineering Seminar

Software Engineering at UTA

Software engineering was added as a new 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.

In 1988, the Software Engineering Center for Telecommunications (SECT) was established. Software engineering research in this center has been sponsored by industry, both local and national, and by the Texas Advanced Technology Program.

Software Engineering Faculty

[David C. Kung](#), Professor. Ph.D., Norwegian Institute of Technology, 1984. Software engineering, formal specification and verification, object-oriented real time systems modeling and verification, objected-oriented testing.

[David Levine](#), Visiting Assistant Professor. M.S.C.S., Texas at Arlington, 1975. Software engineering, mobile computing and networks, systems, distributed-networked objects

[Arthur A. Reyes](#), Assistant Professor; Ph.D., California at Irvine, 1999. Software engineering, software specification and testing, avionics software.

COMPUTER SCIENCE AND ENGINEERING GRADUATE COURSES

On the following page is a list of current CSE course offerings as of the Fall 2008 Catalog. Students should check the UTA Graduate Catalog and the UTA course offering Website for a current list of courses offered by the CSE department.

CSE GRADUATE COURSES (as of Fall 2008 Catalog)

CSE 5191	Individual Studies In Computer Science	CSE 5380	Information Security 1
CSE 5194	Orientation Seminar	CSE 5381	Information Security 2
CSE 5301	Data Analysis & Modeling Techniques	CSE 5388	Special Topics In Information Security
CSE 5306	Operating Systems Ii	CSE 5389	Special Topics In Multimedia, Graphics, & Image Processing
CSE 5307	Programming Language Concepts	CSE 5391	Individual Study In Computer Science
CSE 5311	Design And Analysis Of Algorithms	CSE 5392	Topics In Computer Science
CSE 5314	Computational Complexity	CSE 5393	Directed Study In Computer Science
CSE 5315	Numerical Methods	CSE 5394	Master's Project I
CSE 5316	Modeling, Analysis, And Simulation Of Computer Systems	CSE 5395	Master's Project Ii
CSE 5317	Design And Construction Of Compilers	CSE 5398	Master's Thesis I
CSE 5318	Applied Graph Theory And Combinatorics	CSE 5442	Embedded Computer Systems
CSE 5319	Special Topics In Theory & Algorithms	CSE 5698	Master's Thesis Ii
CSE 5320	Special Topics In Software Engineering	CSE 6197	Research In Computer Science
CSE 5321	Software Testing	CSE 6297	Research In Computer Science
CSE 5322	Software Design Patterns	CSE 6306	Advanced Topics In Operating Systems
CSE 5323	Software Engineering Processes	CSE 6314	Advanced Topics In Theoretical Computer Science
CSE 5324	Software Engineering: Analysis, Design, And Testing	CSE 6319	Special Topics In Advanced Theory And Algorithms
CSE 5325	Software Engineering: Management, Maintenance, And Quality Assurance	CSE 6323	Formal Methods In Software Engineering
CSE 5326	Real-Time Software Design	CSE 6324	Advanced Topics In Software Engineering
CSE 5327	Telecommunications Software Development	CSE 6329	Special Topics In Advanced Software Engineering
CSE 5328	Software Engineering Team Project I	CSE 6331	Advanced Topics In Database Systems
CSE 5329	Software Engineering Team Project Ii	CSE 6332	Techniques For Multimedia Databases
CSE 5330	Database Systems	CSE 6339	Special Topics In Advanced Database Systems
CSE 5331	DBMS Models And Implementation Techniques	CSE 6344	Advanced Topics In Communication Networks
CSE 5333	Distributed And Parallel Databases	CSE 6345	Pervasive Computing & Communications
CSE 5334	Data Mining	CSE 6347	Advanced Wireless Networks & Mobile Computing
CSE 5339	Special Topics In Database Systems	CSE 6348	Advances In Sensor Networks
CSE 5343	Real-Time Data Acquisition And Control Systems	CSE 6349	Special Topics In Advanced Networking
CSE 5344	Computer Networks	CSE 6350	Advanced Topics In Computer Architecture
CSE 5345	Fundamentals Of Wireless Networks	CSE 6351	Topics In Parallel And Distributed Computing
CSE 5346	Networks Ii	CSE 6352	Fault-Tolerant Computing
CSE 5347	Telecommunication Networks Design	CSE 6359	Special Topics In Advanced Systems & Architecture
CSE 5348	Multimedia Systems	CSE 6362	Advanced Topics In Artificial Intelligence
CSE 5349	Special Topics In Networking	CSE 6363	Machine Learning
CSE 5350	Computer Architecture Ii	CSE 6366	Digital Image Processing
CSE 5351	Parallel Processing	CSE 6367	Computer Vision
CSE 5353	Distributed Computing	CSE 6369	Special Topics Advanced Intelligent Systems
CSE 5355	Computer System Performance Evaluation	CSE 6379	Special Topics In Advanced Bioinformatics
CSE 5359	Special Topics In Systems & Architecture	CSE 6388	Special Topics In Advanced Information Security
CSE 5360	Artificial Intelligence I	CSE 6389	Special Topics In Advanced Multimedia, Graphics, & Image Processing
CSE 5361	Artificial Intelligence Ii	CSE 6392	Special Topics In Advanced Computer Science
CSE 5364	Robotics	CSE 6397	Research In Computer Science
CSE 5365	Computer Graphics	CSE 6399	Dissertation
CSE 5366	Digital Signal Processing	CSE 6697	Research In Computer Science
CSE 5367	Pattern Recognition	CSE 6699	Dissertation
CSE 5368	Neural Networks	CSE 6997	Research In Computer Science
CSE 5369	Special Topics In Intelligent Systems	CSE 6999	Dissertation
CSE 5370	Bioinformatics		
CSE 5379	Special Topics In Bioinformatics		

RESEARCH FACILITIES

Excellent computing facilities are available on campus for research and teaching activities. Academic Computing Services (ACS) operates IBM, DEC Alpha, SUN and Silicon Graphics systems, each of which may be accessed from numerous video and graphics terminals on campus. Supported operating system environments include 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, 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) E-mail address: TBD
2. Database Systems (Logical and physical design, Distributed databases, Object-oriented databases and others) E-mail address: elmasri@cse.uta.edu
3. Intelligent Systems (Knowledge representation, Knowledge acquisition, Machine learning, Neural networks, Parallel AI and others) E-mail address: TBD
4. Networking, Telecommunications, and Mobile Computing: das@cse.uta.edu
5. Software Engineering (Environments, Formal verification, Testing, and others) E-mail address: reyes@cse.uta.edu
6. Multimedia Systems (Compression, Authoring, Communication, Collaboration and others) E-mail address: iahmad@cse.uta.edu

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.

GRADUATE ADVISOR

The CSE Graduate Advisor will serve as a point of contact to resolve questions/issues regarding the Graduate Program of Work. He/she is also available to advise students on degree plan alternatives, and can help with selection of courses appropriate for a specific degree plan. However, it is the responsibility of the student to select and enroll in courses that will satisfy the degree requirements specified in this document.