Doctoral Program Guide

Computer Science and

Engineering Department

The University of Texas at Arlington

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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 PhD students must check their CSE email account frequently as PhD 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.

Graduate Advisor

A CSE Graduate Advisor will serve as the point of contact to answer questions and help resolve academic issues regarding the CSE graduate program degree requirements, policies, and procedures.

Student Responsibility

http://catalog.uta.edu/academicregulations/studentresponsibility/

The student is responsible for seeking academic advice, for enrolling in appropriate courses to ensure 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.

Doctoral Program

Typically Accepted Students

CSE gives priority admission to students who have:

1. A master's degree in computer science or a related field, *preferably with a thesis*, as evidence of research aptitude.
2. A 3.2 GPA (on a 4.0 scale) in all previous coursework and preferably with advanced coursework
3. The GRE test is strongly recommended but not required. We look for a sum of verbal and quantitative scores of 310 or more, and a quantitative score of at least 160.
4. At least three strong recommendations, preferably from university faculty in technical areas.
5. A solid statement of goals indicating an area of doctoral-level research, which can be supported by the UTA CSE department. The statement must have specific research area(s) that the student seeks to pursue, not a board general statement of interest encompassing all areas of CSE. This will be used by the Graduate Studies Committee to ascertain whether available faculty expertise and interest can properly support the student's dissertation research.
6. Students whose primary language is not English must satisfy the UTA English Proficiency Requirement (TOEFL/IELTS test) to qualify for an assistantship.
7. An international student whose native language is not English is required to take the TOEFL. See www.toefl.org for more information. If the student scores less than 90 (IBT max = 120), the applicant may be required to take additional English courses after admittance to UTA.

Entrance Requirements and Procedures

See the Entrance Requirements section of the Graduate Program Guide for application procedures and evaluation criteria. When all materials have been collected in the Office of Graduate Admissions, the complete file is forwarded to the Computer Science and Engineering Graduate Advisor for evaluation.

Applicants currently in the master's program at UTA should file a Request to Continue beyond the Master's Degree, along with a new statement of purpose and three letters of recommendation from faculty members. UTA students seeking continuation into the PhD program will be subjected to the same criteria as applied in evaluating new applicants. Please note that among other things, the admission committee places significant emphasis on the thesis work pursued in the Master's program.

Degree Requirements

This section contains the specific requirements for earning the Doctor of Philosophy degree in Computer Science or Computer Science and Engineering from CSE at UTA. It is the intent of CSE to incorporate all Office of Graduate Studies requirements into this document. However, students are still responsible for meeting all current Office of Graduate Studies requirements as stated in the catalog.

Introduction

Students receiving a PhD in Computer Science (CS) or Computer Engineering (CpE) are expected to achieve and demonstrate a mastery of the discipline, and significantly advance the state of knowledge through an original research effort. Coursework for an MS CS degree tends to be the primary focus while the thesis is secondary. The emphasis is reversed in PhD studies.

The graduation requirements fall into three categories: completion of a specified number of graduate credits in appropriate subjects with an acceptable grade-point average, demonstration of understanding of the discipline of computer science as evidenced by examination, and completion of a substantial research effort documented in a doctoral dissertation.

The PhD Timeline gives a detailed roadmap of the various milestones that are expected to be met within specified time limits. The PhD checklist shows major milestones for completing the degree requirements for students with and without master's degrees in computer science. The Graduate Studies Committee prefers applicants with master's degrees but does not require one for admission. The milestones that a student passes during the course of a doctoral program are: diagnostic evaluation, basic and advanced course work, comprehensive examination, research proposal, dissertation research and documentation, and dissertation defense. At least two consecutive semesters of residence are required, and the final GPA must not be less than 3.0 on a 4.0 scale. There is no foreign language requirement.

Credit Requirements for MS to PhD Candidates

There is no transfer credit option for PhD students. Instead, courses required for the degree can be waived off the student's degree requirements. It should be noted, however, that the student must still meet the minimum hours required for the earning of the degree.

MS to PhD students must complete a minimum of 18 semester hours of coursework as noted below. Research oriented coursework (such as 5393, 6397 or 6697) do not count toward these 18 hours.

An MS to PhD Computer Science student must enroll for a minimum of 18 semester hours of coursework as follows:

-Completion of 4 core courses with a minimum GPA of 3.0:

- CSE 5311 - Design and Analysis of Algorithms
        and three of the following:
- CSE 5301 - Data Analysis and Modeling Techniques

- CSE 5306 - Distributed Systems
- CSE 5317 - Design and Construction of Compilers
- CSE 5350 - Computer Systems Architecture or CSE 5351 - Parallel Processing
    -or proof that the student completed a course at a different institution at a master's level or above

-Completion of at least three 6000 level courses (9 hours) as PhD student at UTA.

A student must also enroll for a minimum of 18 semester hours of dissertation research (CSE 6399, 6699, 6999, or 7399) with 6999 or 7399 required in the semester in which the dissertation is defended.

An MS to PhD Computer Engineering student must enroll for a minimum of 18 semester hours of coursework as follows:

-Completion of 4 core courses with a minimum GPA of 3.0 chosen from the following:

- 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 Systems Architecture or CSE 5351 - Parallel Processing - or proof that the student completed a course at a different institution at a master's level or above
- CSE 5354 - Real-time Operating Systems (or CSE 6351 when co-listed)

-Completion of at least three 6000 level courses (9 hours) as PhD student at UTA.

A student must also enroll for a minimum of 18 semester hours of dissertation research (CSE 6399, 6699, 6999, or 7399) with 6999 or 7399 required in the semester in which the dissertation is defended.

Milestone	Expected Semester
Form Committee - 4 members minimum	1st or 2nd long semester
Diagnostic Evaluation	2nd or 3rd long semester
Comprehensive Exam	2 long semesters after Diagnostic Evaluation[1,2]
Proposal	1 long semester after Comprehensive Exam
Defense	See 99 hour/ 14 semester regulations[3]

1- To pass the diagnostic evaluation, the student must achieve a GPA of 3.0 or higher in the core courses. If a student schedules the diagnostic evaluation while completing core coursework a conditional pass will be given until the completion of the courses and achievement of a 3.0 or better GPA

2-The PhD committee may increase the number of the required courses subject to the candidate's background during the diagnostic evaluation

3-99 hour/14 Long Semester rule: The new policy stated that all PhD students cannot exceed 99 semester hours and 14 Long semesters. This is to ensure sufficient progress. Failure to meet this will be resulted in loss of funding, tuition support privileges or termination.

Credit Requirements for BS to PhD Candidates

There is no transfer credit option for PhD students. Instead, courses required for the degree can be waived off the student's degree requirements. However, the student must still meet the minimum hours required for earning the degree.

BS to PhD students must complete a minimum of 30 hours of coursework at UTA. Research oriented coursework (such as 5393, 6397 or 6697) do not count toward these 30 hours.

A BS to PhD student must enroll for a minimum of 30 semester hours of coursework as follows:

For a BS to PhD in Computer Science:

-Completion of 4 core courses with a minimum GPA of 3.0:

- CSE 5311 - Design and Analysis of Algorithms
  and three of the following:
- CSE 5301 - Data Analysis and Modeling Techniques
- CSE 5306 - Distributed Systems
- CSE 5317 - Design and Construction of Compilers
- CSE 5350 - Computer Systems Architecture or CSE 5351 - Parallel Processing - or proof that the student completed a course at a different institution at a master's level or above

-Completion of at least three 6000 level courses (9 hours) as PhD student at UTA

-Completion of a minimum of 18 semester hours of dissertation research (CSE 6399, 6699, 6999, or 7399) with 6999 or 7399 required in the semester in which the dissertation is defended.

Milestone	Expected Semester
Form Committee - 4 members minimum	3rd or 4th long semester
Diagnostic Evaluation	4th or 5th long semester
Comprehensive Exam	2 long semesters after Diagnostic Evaluation[1,2]
Proposal	1 long semester after Comprehensive Exam
Defense	See 99 hour/ 14 semester regulations[3]

1- To pass the diagnostic evaluation, the student must achieve a GPA of 3.0 or higher in the core courses. If a student schedules the diagnostics while completing core coursework a conditional pass will be given until the completion of the courses and achievement of a 3.0 or better GPA

2-The PhD committee may increase the number of the required courses subject to the candidate's background during the diagnostic

3-The 99 hour/14 Long Semester rule: The new policy stated that all PhD students cannot exceed 99 semester hours and 14 Long semesters. This is to ensure sufficient progress. Failure to meet this will result in loss of funding, tuition support privileges or termination.

For a BS to PhD in Computer Engineering:

-Completion of 4 core courses with a minimum GPA of 3.0 chosen from the following:

- CSE 5311 - Design and Analysis of Algorithms
- CSE 5301 - Data Analysis and Modeling Techniques
- CSE 5306 - Distributed Systems
- CSE 5317 - Design and Construction of Compilers
- CSE 5342 - Embedded Systems II
- CSE 5350 - Computer Systems Architecture or CSE 5351 - Parallel Processing
  -or proof that the student completed a course at a different institution at a master's level or above
- CSE 5354 - Real-time Operating Systems (or CSE 6351 when co-listed)

-Completion of at least three 6000 level courses (9 hours) as PhD student at UTA

-Completion of a minimum of 18 semester hours of dissertation research (CSE 6399, 6699, 6999, or 7399) with 6999 or 7399 required in the semester in which the dissertation is defended.

Milestone	Expected Semester
Form Committee - 4 members minimum	3rd for 4th long semester
Diagnostic Evaluation	4th or 5th long semester
Comprehensive Exam	2 long semesters after Diagnostic Evaluation[1,2]
Proposal	1 long semester after Comprehensive Exam
Defense	See 99 hour/ 14 semester regulations[3]

1- To pass the diagnostic evaluation, the student must achieve a GPA of 3.0 or higher in the core courses. If a student schedules the diagnostics while completing core coursework a conditional pass will be given until the completion of the courses and achievement of a 3.0 or better GPA

2-The PhD committee may increase the number of the required courses subject to the candidate's background during the diagnostic

3-99 hour/14 Long Semester rule: The new policy stated that all PhD students cannot exceed 99 semester hours and 14 Long semesters. This is to ensure sufficient progress. Failure to meet this will be resulted in loss of funding, tuition support privileges or termination.

Grades

Courses in which a student earns a grade of D or F cannot be used to satisfy degree requirements. All grades do, however, count toward the student's overall GPA. Courses in which a student earns a grade of C can be used toward degree requirements, however, minimum GPA requirements must still be met. Students cannot repeat a course in which they earned a grade of C or better.

If at any point a student's GPA drops below 3.0, the student will be placed on academic probation. The student then has one semester to raise the GPA back up to 3.0 or be dismissed from the program. The PhD program also requires a student to obtain a GPA of 3.0 or higher their core courses and for the passing of the Diagnostic Evaluation.

Residence

The objective of the PhD program is to develop PhD candidates who can do independent research upon graduation. This objective is not compatible with part-time study. Therefore, at least two consecutive semesters of full time residence is required during the dissertation phase. Full time study may be pursued in conjunction with some teaching duties or departmentally supported research but is not compatible with off-campus employment.

The Graduate Studies Committee may level additional residence requirements or set specific progress goals to be attained during residency.

Status Reports

All PhD students are required to submit an annual progress report describing the work they completed during the academic year as well as the specific milestones they have completed and plan to complete. The Status Report form can be found at the end of this document.

PhD Timeline

A PhD student is required to decide on a Supervising Professor by the start of their second long semester in the PhD program. This must be conveyed to the Graduate Advisor in writing accompanied by the Supervisor's approval.

- The student must form a PhD committee at least one month prior to the Diagnostic Evaluation. The form showing the consent of the members to serve on the student's PhD committee must be submitted to the Graduate Advisor.

- The Diagnostic Evaluation itself must be completed no later than three long semesters after the student starts the PhD program. The signed Diagnostic Evaluation Form must be submitted to the Graduate Advisor upon completion of the evaluation by the committee.

• The Comprehensive Exam must be scheduled no later than one year for full-time students and two years for part-time students after the Diagnostic Evaluation. The signed Comprehensive Exam Report must be submitted to the Graduate Advisor upon completion of the exam.

• The student must present his/her research proposal to the PhD Committee no later than two years after the Comprehensive Exam. The Research Proposal Form with the required presentation schedule information must be submitted to the Graduate Advisor prior to the proposal presentation.

• The student is expected to submit a copy of the PhD dissertation document along with the slides to the PhD committee at least one month prior to the actual defense. Also, copies of papers and associated reviews must be submitted to the committee at that time.

• The Final Dissertation Defense must be scheduled no earlier than 6 months after the Research Proposal. The signed Dissertation Defense Form must be submitted to the Graduate Advisor upon completion of the defense evaluation by the committee.

The specifics of the Diagnostic Evaluation, Comprehensive Exam, Research Proposal, dissertation, and Dissertation Defense follow.

Supervising Professor and Committee

The student must find a Supervising Professor and form an advisory committee, called the Supervising Committee. It is the responsibility of the student to find a faculty member willing to provide a research topic or to supervise a topic of the student's choosing.

The Supervisory Committee consists of the Supervising Professor (serving as the chair of the committee), and at least three others. The Supervising Professor must be a member of the graduate faculty. Of the remaining members, three must be members of the graduate faculty or associate members of the graduate faculty. A majority of the committee (including the supervising professor) must be from the CSE faculty.

The Supervisory Committee is responsible for administering the diagnostic evaluation and the comprehensive exam, over-seeing the dissertation research, and conducting the dissertation defense.

Diagnostic Evaluation

At the beginning of a PhD program, the student should make plans to take the Diagnostic Evaluation. To pass the Diagnostic Evaluation, students are required to take and pass four core courses, including 3 breadth courses. Please note that most students with a CSE background may have already passed a majority of these classes and therefore will not be required to retake them. The courses are listed below.

For PhD in Computer Science students:

- CSE 5311 - Design and Analysis of Algorithms
    and three of the following:
- CSE 5301 - Data Analysis and Modeling Techniques
- CSE 5306 - Distributed Systems
- CSE 5317 - Design and Construction of Compilers
- CSE 5350 - Computer Systems Architecture or CSE 5351 - Parallel Processing

For PhD in Computer Engineering students:

- CSE 5311 - Design and Analysis of Algorithms
- CSE 5301 - Data Analysis and Modeling Techniques
- CSE 5306 - Distributed Systems

- CSE 5317 - Design and Construction of Compilers
- CSE 5342 - Embedded Systems II
- CSE 5350 - Computer Systems Architecture or CSE 5351 - Parallel Processing
- CSE 5354 - Real-time Operating Systems (or CSE 6351 when co-listed)

The purpose of the breadth courses is to give the student a well-rounded CSE education and exposure to topics outside their specialties. Students have a choice of 3 out of a possible 9 breadth areas. The breadth areas reflect the main areas of emphasis of the CSE department and may change to include new areas in the future. Currently, students have a choice from the following breadth areas:

- Big Data Management/Databases/Cloud Computing

- Embedded Systems

- Imaging/Health Informatics/Bioinformatics

- Intelligent Systems/Robotics

- Networks/IoT/Communications

- Security/Privacy

- Software Engineering

- Systems/Architecture/Languages

- Data Analytics/Algorithms/Theory

Comprehensive Exam

The comprehensive exam is intended to test the student's ability to comprehend quality research through critical analysis and being able to present such analysis to an audience, in this case the supervising committee. The exam has two components: A written part and an oral part.

The committee administering the comprehensive exam assigns the student the work related to the comprehensive exam at the request of the Supervising Professor. The student is expected to make a presentation to the members of the committee to give a very brief overview of the area(s) that his/her research would encompass. Each member of committee assigns the following work: Technical papers (at least one but no more than two) for the student to read and answer questions on. The total number of questions from all committee members will be no fewer than five and no more than ten. The student will be given approximately 2 weeks (as specified by the committee) to provide responses to the questions in written form. This constitutes the written part of the exam. The written answers will be filed in the student's records. The committee then meets for an oral presentation by the student, at which time the committee tests the student's understanding of the technical content of the assigned papers. This constitutes the oral part of the exam.

Following the completion of the written and oral exam portions, each committee member will assign a letter grade similar to a course grade based on their assessment of the student's answers to their questions and the oral presentation. The committee then assigns a cumulative grade for the student's performance on the exam. Using the assigned grades, a numerical average is determined with a passing grade being a 3.0 or better. A grade average of less than 3.0 as determined by the committee results in either requiring the student to repeat the exam or failing the student, with failure resulting in termination of the student's PhD studies. A student will be given at most two chances to pass the exam.

Research Proposal

The research proposal serves two purposes: it shows the committee the work that the candidate has already completed on the topic of planned dissertation study and secondly, the work that the candidate plans to pursue towards completion of the dissertation. It is the committee's discretion to require the student to make an oral presentation, however a research proposal document must be submitted to the committee and filed with the CSE department.

Dissertation

The most clearly distinguishing characteristic of a program leading to the Ph.D. degree is the requirement that the candidate write a dissertation embodying the results of significant and original investigation. The dissertation must make a real contribution to the field of engineering or the applied science discipline, and is expected to be a mature and competent piece of writing. The work that it reports may be basic scientific research, engineering research, or creative design.

All dissertations must be in the format prescribed by the student's supervising committee. Each student is also expected to submit papers for publication in a reputable scientific journal appropriate to the field of research. The catalog section on Tuition and Fees lists dissertation related fees.

All dissertations must be submitted electronically to the UTA Central Library for cataloging and archiving. Details of the dissertation submission process are available from the UTA Central Library and at http://library.uta.edu/etd.

Dissertation Defense

The supervising committee must have copies of the dissertation at least four weeks prior to the dissertation defense. Exceptions to this four-week limit can be sought from individual members of the committee.

The dissertation defense will be oral and open to all members (faculty, students, and invited guests) of the university community. The questioning of the candidate will be generally directed by the student's supervising committee, but any person attending the defense may participate in the examination. Although the defense is concerned primarily with the dissertation research and content, the committee may explore the student's knowledge of areas interrelated with the core of the dissertation problem.

Publication Requirements

A PhD student is required to conduct research leading to the submission of distinct, quality publications to at least one premier journal and two premier conferences.

• All papers must be related to the PhD dissertation work

• Copies of all papers and associated reviews are due when the dissertation is submitted to the committee

• Quality of submission will be established either by its acceptance for publication or by the committee based on the paper's content and referee reviews/comments

The dissertation defense report must be filed with the Office of Records no later than three weeks before the date the degree is to be conferred.

Time Limits

Please note that the graduate catalog states that all requirements for the doctoral degree must be completed within four years after passing the comprehensive examination. Time limits other than this as presented in the timeline are amendable by the PhD committee under compelling circumstances, for example for students pursuing a part-time PhD. The total PhD program may not exceed 99 semester hours or seven years.

Change of Committee or Coursework

A student may change coursework, major professor, or supervising committee members at any point, subject to the approval of the Graduate Studies Committee. If the student elects to change course work after the "Final Program of Work" report is filed, a "Change of Program Request" must be approved and filed. If a student changes a major professor or supervising committee member after the original research proposal has been submitted, a new research proposal will be required.
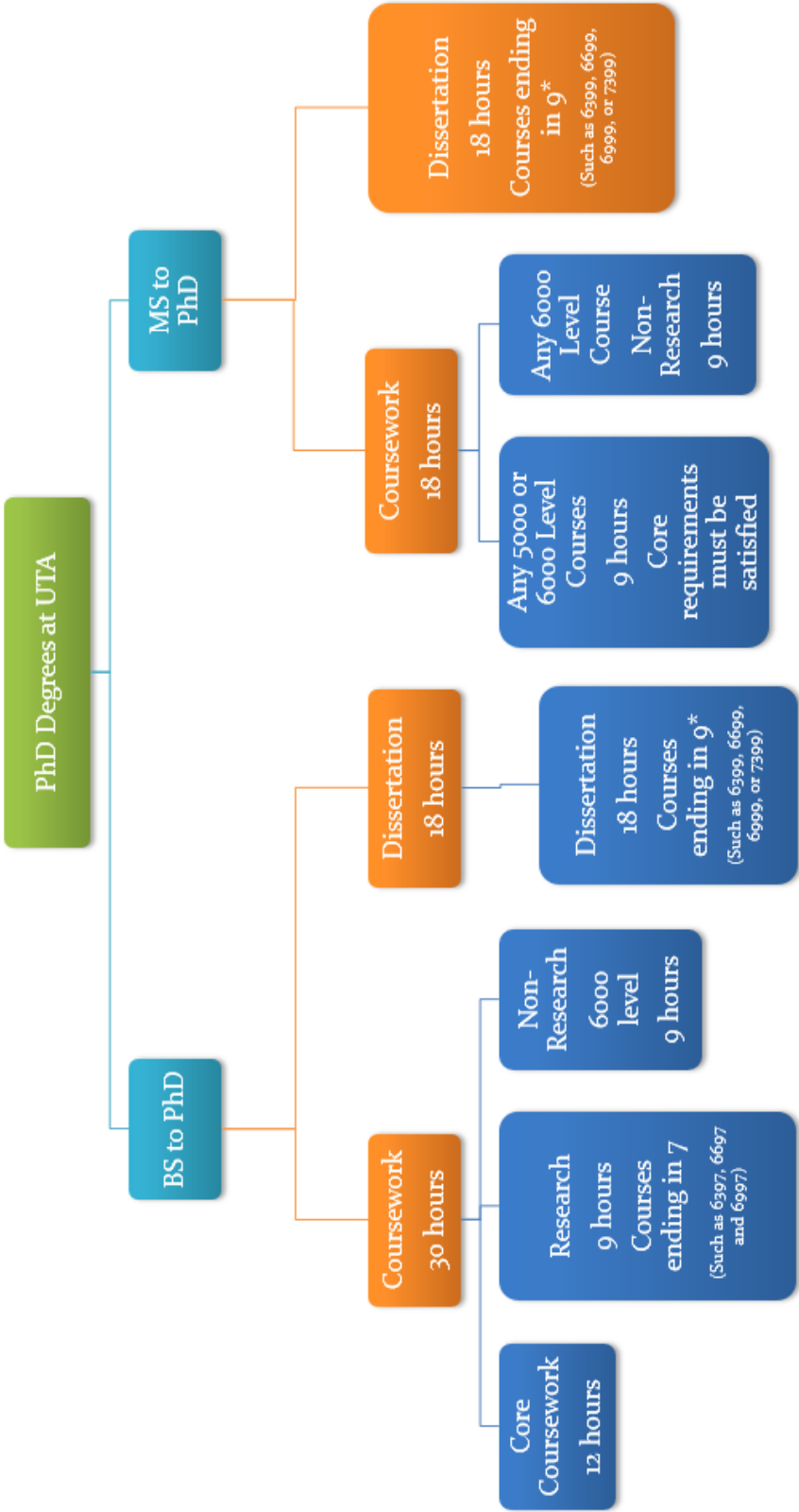
Research Areas

The Computer Science and Engineering Department currently supports PhD studies in the following areas:

1. Computer Architecture and Systems (Parallel processing, Fault tolerance, Distributed Systems, and others)

2. Database Systems (Logical and physical design, Distributed databases, Object-oriented databases and others)

3. Intelligent Systems (Knowledge representation, Knowledge acquisition, Machine learning, Neural networks, Parallel AI and others)

4. Networking, Telecommunications, and Mobile Computing

5. Software Engineering (Environments, Formal verification, Testing, and others)

6. Multimedia Systems (Authoring, Compression, Collaboration and Communication)

7. Theory and Algorithms

8. Bioinformatics

9. Information Security

10. Embedded Systems

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 on the CSE webpage.

BS and MS to PhD Degrees and Hours at UTA

PhD Degrees at UTA

MS to PhD

- **Dissertation**
  18 hours
  Courses ending in 9*
  (Such as 6399, 6699, 6999, or 7399)

- **Coursework**
  18 hours
  - Any 6000 Level Course
    Non-Research
    9 hours
  - Any 5000 or 6000 Level Courses
    9 hours
    Core requirements must be satisfied

BS to PhD

- **Dissertation**
  18 hours
  - Dissertation
    18 hours
    Courses ending in 9*
    (Such as 6399, 6699, 6999, or 7399)

- **Coursework**
  30 hours
  - Non-Research
    6000 level
    9 hours
  - Research
    9 hours
    Courses ending in 7
    (Such as 6397, 6697 and 6997)
  - Core Coursework
    12 hours

*CSE 6399 can only be used for hours and cannot be taken in graduating semester. CSE 7399 can only be taken once and when it is the student's intention to defend and graduate in that term.