# Computer Science

## M.S. Graduate Handbook

## 2015 - 2016

Ira A. Fulton Schools of Engineering

ARIZONA STATE UNIVERSITY

# MANUAL OF THE M.S. DEGREE IN COMPUTER SCIENCE AND CONCENTRATIONS

## ARIZONA STATE UNIVERSITY

## 2015 - 2016

CSE graduate degrees please contact:

Office of Graduate Programs
of Computer Science
Ira A. Fulton Schools of Engineering
Arizona State University
PO Box 878809
Tempe, AZ 85287-8809
PHONE: (480) 965-3199

CSE on the web: http://cidse.engineering.asu.edu/forstudent/graduate/computer-science/
E-mail address: cidse.advising@asu.edu

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## Table of Contents


I. Introduction to the computer science program ..... 1

II. Objective of the handbook ..... 1

III. Student responsibility ..... 1

IV. Faculty responsibility ..... 1

V. Admission and eligibility to the MS degree programs ..... 1

- Eligibility. ..... 2
- Application. ..... 2
- Application deadlines ..... 2
- GRE scores ..... 2
- TOEFL/English Proficiency. ..... 2
- Personal statement. ..... 2
- Letters of recommendation. ..... 2
- GPA requirement. ..... 3
- Application evaluation. ..... 3
- Deficiencies ..... 3
- Notice of Admission. ..... 3
- Pre-admission Credits and Transfer Credit ..... 4
- Transfer between Programs ..... 4

VI. MS Degree Requirements ..... 4

- a. Formulation of the Plan of Study ..... 4
- b. Selection of Faculty Advisor ..... 8
- c. Thesis Supervisory Committee ..... 8
- d. Thesis ..... 9

VII. General Information, Policies, and Procedures ..... 10

- a. Research Standards for Publication of Thesis ..... 10
- b. Financial Assistance and/or Fellowships ..... 10
- c. Continuous Enrollment ..... 10
- d. Leave of Absence Policies ..... 11
- e. Maximum Time Limit ..... 11
- f. Registration Requirements for Research Assistants (RA) and Teaching Assistants (TA) ..... 11
- g. Policy for Maintaining Academic Satisfactory Progress ..... 12
- h. Filing for Graduation ..... 14

i. Academic Integrity ..... 14
j. CSE 584 Internship ..... 14
k. CSE 590 Independent Study ..... 16
l. Engineering Student Organizations ..... 16
m. Instructional Concerns and Course-Related Complaints ..... 17
List of Approved 500-level Area Courses ..... 20
Approved 400-Level courses to count toward CSE graduate program ..... 22
Course Descriptions ..... 23
Appendix I - Absent Committee Member Procedure ..... 29

## I. Introduction to the Computer Science Program

The Master of Science in Computer Science is a research-oriented degree, ideal for students with undergraduate education in computer science or related studies. This degree features advanced coursework and a strong emphasis on student research. The M.S. program provides numerous opportunities for interdisciplinary study. Within this degree, students can concentrate their studies in the following areas: Arts, Media and Engineering (AME), Big Data Systems (BDS), Biomedical Informatics (BMI), and Information Assurance (IA).

## II. Objective of the handbook

The purpose of this handbook is to provide guidance and information related to admission, degree requirements, and general policies and procedures. Please note that in some cases you will find differences between the Graduate Education policies and procedures and the computer science program requirements. In these cases, CSE has established higher standards. Students must satisfy both sets of requirements. Please note that policies and procedures are occasionally amended to improve the program. Changes will be communicated to students through e-mail, and posting on the paper and online bulletin boards.

## III. Student responsibility

All students are expected to become familiar with university and program policies and procedures and abide by the terms set forth. Information is available both online and by hardcopy upon request. Most importantly you should visit the following websites:

- The Office of Graduate Education – http://graduate.asu.edu
- Graduate Education policies and procedures https://graduate.asu.edu/policies-procedures
- The Computer Science program – http://cidse.engineering.asu.edu/forstudent/graduate/computer-science/
- The International Students and Scholars Center – https://international.asu.edu/, if applicable.
- The Ira A. Fulton Schools of Engineering – http://engineering.asu.edu

## IV. Faculty responsibility

The members of the faculty of computer science have diverse backgrounds and knowledge. They are available to assist you in your plan of study and your educational and career goals. We encourage you to take the opportunity to make individual appointments with faculty members with whom you have common interests. Please refer to the list of the faculty names, areas of expertise, and research interests at the end of this handbook.

## V. Admission and eligibility to the MS degree programs

The Computer Science MS degree requires a background in engineering, math, sciences, or closely related fields. However, in some cases students with non-traditional educational backgrounds will be considered for admission. These students may be required to take foundational courses to better prepare for the graduate coursework. A student is encouraged to contact a graduate advisor in the School of Computing, Informatics, and Decision Systems Engineering Advising Center to obtain advice on their educational pursuits.

**Eligibility** - Prior to applying to the CS MS program, students are required to have completed three semesters or 12 credit hours of calculus, including multivariate calculus.

**Application** - All students are required to submit an application with the Office of Graduate Education and pay the required fee in order to have their application properly processed.

**Application deadlines** – December 1 for Fall and August 1 for Spring:
To receive full consideration, we ask that you have all the required documents submitted by the deadline.

**GRE scores** - All students, except ASU undergraduate CSE, are required to submit official general Graduate Record Examination (GRE) scores directly to the Office of Graduate Admissions. The average GRE scores for students admitted into the M.S. program have been 153 or 63 percentile verbal, 163 or 88 percentile quantitative, and 4.0 analytical. However, admission decisions are made on the basis of the entire application packet. We do not require specific subject GRE scores. The ASU institution code is 4007. If department code is required use 000 for GRE.

**TOEFL/English Proficiency** - The University requires all international applicants from a country whose native language is not English to provide the Test of English as a Foreign Language (TOEFL) or the International English Language Testing System (IETLS) scores. CSE uses 575 (paper-based) or 90 (internet-based) TOEFL or 7 for IETLS as minimum expectations for admission. Please note that your application will not be processed until the university receives official TOEFL scores, which are valid two years from the start date of the degree program. There are some exceptions for students who have been living in the United States and would like to have the TOEFL waived. They should consult the Office of Graduate Admissions. Please address all TOEFL questions to the Office of Graduate Admissions. The ASU institution code is 4007. If department code is required, use 99 for TOEFL.

**Personal statement -** The application must include a personal statement. The statement should: 1) explain professional goals and reasons for desiring to enroll in the M.S. program; 2) describe any research experience; 3) indicate personal research interests; and 4) identify two or three ASU CSE faculty with matching research interests.

**Letters of recommendation** - CSE requires three (3) letters of recommendation, at least one of which must come from faculty. There is no standard form for letters of recommendation. Our current application process allows students to submit the letter of recommendations electronically by indicating the names and the e-mails of the recommender. In turn, the Office of Graduate Education sends an e-mail to the recommender alerting him or her to go online and submit a recommendation. We encourage letters from people who know you well, such as teachers, professional associates, and supervisors. Ask people who can comment on your academic, emotional, intellectual, and professional development.

**GPA requirement** - To be considered for the MS program, we require a minimum cumulative GPA of 3.25 in the last 60 credit hours of the undergraduate degree.

**Application evaluation** - Several factors are taken into consideration when evaluating a student's application: the student's cumulative GPA, major, institution, personal statement, letters of recommendation, standardized test scores, and performance in individual courses.

**Deficiencies** - Depending on prior academic preparation and accomplishments of an applicant, deficiency courses may be specified to ensure adequate background preparation.

Below is a list of prerequisites, along with the associated ASU course numbers:

- CSE 230 - Computer Organization and Assembly Language Programming
- CSE 310 - Data Structures and Algorithms
- CSE 330 - Operating Systems
- CSE 340 - Principles of Programming Languages
- CSE 355 - Introduction to Theoretical Computer Science
- CSE 360 - Introduction to Software Engineering

**Waiver Process**: Students wishing to have their course syllabi examined as evidence that deficiencies have been satisfied must submit a petition. Submit an e-mail to cidse.advising@asu.edu with the Petition for Reevaluation of Deficiency Course form and supporting documents (such as syllabus, catalog description, or university transcripts) to prove that you have met the requirements. Be advised that the documents you uploaded during the admission application have been evaluated. Submit only **new** information when requesting a reevaluation of assigned deficiencies. Once the petition has been reviewed, it is final. There will be no future petition or consideration request. If after evaluation the petition is not approved, the student may choose to take the deficiency test-out examination.

**Deficiency test-out exam** - On the day before Welcome Day in fall and spring semesters, a classroom will be set aside to allow students entering with deficiencies (listed in the admission letter) to take a test to establish whether they possess basic knowledge of the course sufficient to have an assigned deficiency waived. Students may take up to three test-out exams. This scheduled testing period is the only opportunity for deficiency test-outs. No other arrangements will be made for students to test out of assigned deficiencies.

Deficiency coursework completed with a grade of "C" or better at the undergraduate level will satisfy the requirements. A grade of "B" or better is required for all assigned deficiency coursework at the post-baccalaureate level.

**Notice of Admission -** CSE submits its recommendation of admission to the Office of Graduate Education and the final admission decision is sent to the applicant in writing by the Office of Graduate Education. You may check your application status on My ASU (my.asu.edu).

**Pre-admission Credits and Transfer Credit**
A student can transfer a maximum of six (6) credit hours of graduate coursework from another accredited institution, as specified in the ASU Graduate Catalog. A student must prove the graduate-level credit hours with grades of "B" or better were not used toward a previous degree, per Graduate Education policy. Pre-admission credits must have been taken within three years of admission to the ASU degree program to be accepted. A course with a grade of "Pass", "Credit", or "Satisfactory" is not acceptable for transfer. A student who wishes to transfer credits from another institution should contact a graduate advisor in the CIDSE Advising Center to initiate the transfer credit process.

**Transfer between Programs**
A student who would like to switch from a Ph.D. to a Master's or switch Master's degree programs in Computer Science should follow the Computer Science Degree Change process. With approval, nine credit hours are eligible to transfer into the Master's program. Transfer (pre-admission) courses must have been taken within the last three years with an earned grade of "B" or better and were not used toward a previous degree.

Students who want to change from a Master's to a Ph.D. in Computer Science must submit a new application with ASU Graduate Education. Admission to the Ph.D. program can be denied. If admitted, the student is allowed to transfer only 12 credits from the original uncompleted program to the new program.

**VI. MS Degree Requirements**
Degree requirements for the MS include a minimum of 30 semester hours beyond deficiency courses.

The MS is comprised of three major milestones, which all students are required to complete successfully prior to graduation:

a) Completion of coursework
b) Filing an approved plan of study
c) Successful oral defense of an approved written thesis.

Assigned deficiency courses must be completed by the end of the first academic year. A "B" or better average is required for deficiency courses, and a "B" must be achieved in each course. A grade of "B" or better in a course that follows a prerequisite class does not waive this requirement.

**An accelerated computer science degree** (4+1) BS-BSE/MS program for ASU undergraduate computer science and computer systems engineering students is available. There are also concentrations in Information Assurance, Big Data Systems, Biomedical Informatics, and Arts, Media, and Engineering.

**a. Formulation of the Plan of Study**
The iPOS must contain a minimum of 30 semester hours of approved graduate-level work. At least 24 of these hours must be CSE-5XX credits at ASU. A maximum of 6 credit hours of 400-level coursework may be allowed on the iPOS per Graduate Education guidelines.

Besides meeting the requirements specified above, a student must also pass a thesis defense.

All students are required to earn and pass a grade of "B" or better in the core areas as specified within their concentration.

*Note: Effective Fall 2014 new incoming students were not allowed to count any 598 toward the core focus areas per Graduate Education to comply with policy. Students prior to Fall 2014 admission were grandfathered and will be allowed to complete their degree with the old requirements.

A student needs to submit a plan of study (iPOS) online through My ASU before the end of their second semester of attendance. The final iPOS is subject to approval by the supervisory committee and by the Graduate Program Director. After approval at the School level, the final iPOS is forwarded to the Graduate Education Office for approval.

**MS in Computer Science**

Program requires the following: 30 credit hours and a thesis.

*Required Core Courses: 9 credit hours*
Foundations (3)
Systems (3)
Applications (3)

*Elective or Research Courses: 15 credit hours*
Of these 15 hours, nine must be in their research area approved by their faculty advisor of which up to 6 hours can be CSE 590 Reading and Conference– as Independent study. Coursework selected as part of the area core may not be used as elective coursework on the same plan of study.

*Culminating Experience: 6 credit hours*
CSE 599 Thesis

**Note:** At least 24 of these hours must be CSE-5XX credits at ASU. A maximum of 6 credit hours of 400-level coursework may be allowed on the iPOS per Graduate Education guidelines. Students must successfully pass a thesis defense to graduate.

**MS in Computer Science (Information Assurance)**

Program requires the following: 30 credit hours and a thesis.

*Required Core Course: 9 credit hours*
Foundations (3)
Systems (3)*
Applications (3)*

**Required Concentration Courses:* In addition to the 9 hours of Concentration Courses below, students in this concentration must also take CSE 539 Applied Cryptography as either their Systems or Applications course. Courses that are used to satisfy the concentration requirement in the plan of study cannot be used to satisfy the core area requirement.

*9 credit hours from the Concentration Courses*

- CSE 543: Information Assurance and Security (3)
- CSE 545: Software Security (3)
- CSE 548: Advanced Computer Network Security (3)

*Other Elective or Research Courses: 6 credit hours*
This could include up to 6 hours of CSE 590 – Independent study. Coursework selected as part of the core, concentration or concentration elective may not be used as other elective coursework on the same plan of study. CSE 580, 584, 592, 593 and 595 do not count as electives.

*Culminating Experience: 6 credit hours*
CSE 599 Thesis

**Note:** At least 24 of these hours must be CSE-5XX credits at ASU. A maximum of 6 credit hours of 400-level coursework may be allowed on the iPOS per Graduate Education guidelines. Students must successfully pass a thesis defense to graduate.

**MS in Computer Science (Arts, Media, and Engineering)**
Program requires the following: 30 credit hours and a thesis.

*Required Core Courses: 9 credit hours*
Foundations (3)
Systems (3)
Applications (3)

*Required Concentration Courses:* 9 credit hours of coursework in Arts, Media and Engineering. Courses that are used to satisfy the concentration requirement on the plan of study cannot be used to satisfy the core area requirement.

*Elective or Research Courses: 6 credit hours*
This could include up to 6 hours of CSE 590 Reading and Conference – as Independent study. Coursework selected as part of the core or concentration may not be used as other elective coursework on the same plan of study. CSE 580, 584, 592, 593 and 595 do not count as electives.

*Culminating Experience: 6 credit hours*
CSE 599 Thesis (4)
AME 599 Thesis (2)

**Note:** At least 24 of these hours must be CSE-5XX credits at ASU. A maximum of 6 credit hours of 400-level coursework may be allowed on the iPOS per Graduate Education guidelines. Students must successfully pass a thesis defense to graduate.

**MS in Computer Science (Biomedical Informatics)**

Program requires the following: 30 credit hours and a thesis.

*Required Core Courses: 9 credit hours*
Foundations (3)
Systems (3)
Applications (3)

*Required Concentration Courses:* 9 credit hours of coursework in Biomedical Informatics:

- BMI 501 Introduction to Biomedical Informatics (3)
- BMI 540 Problem Solving in Biomedical Informatics (3)
- BMI 5XX Approved Course in Biomedical Informatics (3)

*Elective or Research Courses: 6 credit hours*
This could include up to 6 hours of CSE 590 Reading and Conference – as Independent study. Coursework selected as part of the core or concentration may not be used as elective coursework on the same plan of study. CSE 580, 584, 592, 593 and 595 do not count as electives.

Students will focus their research in one of the following areas:

- bioinformatics
- biomedical informatics
- clinical informatics
- imaging informatics
- public health informatics

*Culminating Experience: 6 credit hours*
CSE 599 Thesis

**Note:** At least 24 of these hours must be CSE-5XX credits at ASU. A maximum of 6 credit hours of 400-level coursework may be allowed on the iPOS per Graduate Education guidelines. Students must successfully pass a thesis defense to graduate.

**MS in Computer Science (Big Data Systems Concentration)**

Program requires the following: 30 credit hours and a thesis.

*Required Core Course: 9 credit hours*
Foundations (3)
Systems (3)
Applications (3)

*Required Concentration Courses: 9 credit hours*
CSE 510 Database Management System Implementation (3)
CSE 512 Distributed Database Systems (3)
CSE 572 Data Mining (3) or IEE 520 Statistical Learning for Data Mining (3)

*Restricted Electives: Additional 6 credit hours is required from the following courses:*
CSE 515 Multimedia and Web Databases (3)
CSE 546 Cloud Computing (3)
CSE 573 Semantic Web Mining (3)
CSE 575 Statistical Machine Learning (3)
CSE 591 Topic: Data Visualization

Courses that are used to satisfy the concentration requirement on the plan of study cannot be used to satisfy the core area requirement.

*Culminating Experience: 6 credit hours*
CSE 599 Thesis (6)

Total required credit hours: 30

**Note:** At least 24 of these hours must be CSE-5XX credits at ASU. A maximum of 6 credit hours of 400-level coursework may be allowed on the iPOS per Graduate Education guidelines. Students must successfully pass a thesis defense to graduate.

**b. Selection of Faculty Advisor**
When a student has decided on a primary area of research, the student must select a faculty advisor in that area of study. The faculty advisor must have the right to chair on computer science committees. The faculty advisor will serve as the chair of the supervisory committee that supervises the student's thesis. The list of faculty with the right to chair can be found on Graduate Education's faculty website: https://graduate.asu.edu/graduate-faculty/degree/G2.

**c. Thesis Supervisory Committee**
In consultation, the faculty advisor and student form a supervisory committee. The supervisory committee must include the faculty advisor and two committee members. For students in the IA, BDS, BMI, and AME concentrations, at least one member of the student's committee must be from that program.

The composition of the committee must be in accordance with the guidelines of Graduate Education. Once the committee is established, changes to the committee are highly discouraged. Any changes to the committee must be submitted by completing a Graduate Committee Change form that is signed by the student and all members of the student's committee.

The supervisory committee, in its role as thesis committee, approves the subject and title of the thesis and advises the student during the formulation of the research topic and during the completion of the research and thesis.

**d. Thesis**

A student must be enrolled in at least one graduate-level credit at the time of the defense. If you are holding the defense during the interim period between semesters, you must be registered in the following semester. If you defend during the period between the spring and summer semester, you must be registered for the summer session. If you defend during the period between the summer session and fall semester, then you must be registered in the fall semester. Please see the Graduate Education policies.

Graduate Education publishes information regarding the details of thesis preparation, formal requirements, deadlines, and oral examinations. The student must comply with all guidelines that Graduate Education publishes regarding the submission of a thesis and the scheduling of a final oral examination.

Once the thesis is completed, the student will submit it to the committee members. There will be an open oral defense following the completion of the thesis. A student can schedule the defense after the student's committee chair has approved the student's thesis format. The student must schedule their defense on My ASU at least 10 working days prior to the defense date.

The supervisory committee evaluates the thesis and the student's performance on the defense. The committee accepts the thesis, accepts it with changes, or rejects it.

Please see Appendix I for Absent Committee Member Procedures

**Steps to Preparing for Your Defense**

Prior to defense:

1. Obtain a consensus of approval from the committee chair and the members to proceed with the oral defense.
2. Schedule a date and time with your committee for the oral defense.
3. Important: Ensure that a minimum of 50% of the official committee be physically present at the defense. If at least 50% of the committee cannot be physically present, the defense must be rescheduled.
4. Visit the Office of Graduate Education website to become familiar with the dates and deadlines on format approval and oral defense.

10 days prior to the defense:

These steps are required to be completed at least 10 working days prior to the date of oral defense.

1. Reserve a room with the CIDSE front desk (Brickyard 5th floor).
2. Submit an electronic version of your abstract with title, full names of your committee members, defense date/time/place, and your name as you want it to appear on the defense announcement to the CIDSE front desk.
3. Schedule your defense on My ASU with the Office of Graduate Education.
4.

On the day of the defense:

1. Set up all your equipment at least one half-hour prior to your presentation to make sure they work.

After the defense:

1. Your committee will discuss the results of the exam with you and may have additional comments for you. At the end, the committee will make a recommendation: Pass, Pass with minor revisions, Pass with major revisions, or Fail.
2. Revisions are normal and are expected to be completed within a one-year period. This includes remaining registered until the finished document has been uploaded to ProQuest.
3. Hand-deliver a signed copy of the Report for Doctoral Defense Form to the CIDSE Advising Center BYENG 225.
4. Follow the steps on My ASU for uploading your final thesis through the Office of Graduate Education and ProQuest.

## VII. General Information, Policies, and Procedures

### a. Research Standards for Publication of Thesis

Graduate research is the study of an issue that is of sufficient breadth and depth to be publishable in a CSE-related journal. The effort should reflect a minimum of 750 hours of thoughtful work for a thesis. The research should follow the 'scientific method' and thus be both objective and reproducible. The thesis should demonstrate independent, original, and creative inquiry. There should be predefined hypotheses or developmental goals and objectives that are measurable and can be tested. The document should demonstrate proficiency with written English and should conform to the Office of Graduate Education format guidelines.

### b. Financial Assistance and/or Fellowships

There are limited funds for MS and PhD. students. We encourage students to pursue assistantships outside of CSE, not limiting their search to CSE.

### c. Continuous Enrollment

Once admitted to a graduate degree program, students must be registered for a minimum of one credit hour during all phases of their graduate education, including the term in which they graduate. This includes periods when students are engaged in research, working on or defending theses, or in any other way utilizing university resources, facilities, or faculty time.

Registration for every fall semester and spring semester is required. Summer registration is required for students taking examinations, completing culminating experiences, defending theses, or graduating from the degree program.

To maintain continuous enrollment, the credit hour(s) must:

- Appear on the student's Plan of Study, OR
- Be research (592, 792), thesis (599), dissertation (799), or continuing registration (595, 695, 795), OR
- Be a graduate-level course.

Grades of "W" and/or "X" are not considered valid registration for continuous enrollment purposes. "W" grades are received when students officially withdraw from a course after

the add/drop period. “X” grades are received for audit courses. Additionally, students completing work for a course in which they received a grade of “I” must maintain continuous enrollment as defined previously. Graduate students have one year to complete work for an incomplete grade; if the work is not completed and the grade changed within one year, the “I” grade becomes permanent. Additional information regarding incomplete grades can be found at http://asu.edu/aad/manuals/ssm/ssm203-09.html.

**d. Leave of Absence Policies**

Graduate students planning to discontinue registration for a semester or more must submit a Request to Maintain Continuous Enrollment form. This request must be submitted and approved before the anticipated semester of non-registration. Students may request to maintain continuous enrollment without course registration for a maximum of two semesters during their entire program.

Having an approved Request to Maintain Continuous Enrollment by Graduate Education will enable students to re-enter their program without re-applying to the university. Students who do not register for a fall or spring semester without an approved request are considered withdrawn from the university under the assumption that they have decided to discontinue their program. Students removed for this reason may re-apply for admission to resume their degree program; the application will be considered along with all other new applications to the degree program.

A student with a Graduate Education-approved Request to Maintain Continuous Enrollment is not required to pay tuition and/or fees, but in turn is not permitted to place any demands on university faculty or use any university resources. These resources include university libraries, laboratories, recreation facilities, or faculty time.

**e. Maximum Time Limit**

Master’s students must complete all program requirements within a six-year period. The six-year period starts with the semester and year of admission to the Master’s program. Graduate courses taken prior to admission that are included on the plan of study must have been completed within three years of the semester and year of admission to the program.

Any exceptions must be approved by the supervisory committee and the Office of Graduate Education dean. The Office of Graduate Education may withdraw students who are unable to complete all degree requirements and graduate within the allowed maximum time limits.

**f. Registration Requirements for Research Assistants (RA) and Teaching Assistants (TA)**

Students awarded an assistantship within the Ira A. Fulton School of Engineering are required to be registered for 12 credit hours. Audit credit hours do not count toward the 12 credit hours.

Students who obtain an assistantship outside the Ira A. Fulton School of Engineering are required to be enrolled a minimum of 6 credit hours. Audit credit does not count toward the 6 credit hours. Enrollment in continuing registration (IEE 795) does not count toward the 6-hour requirement.

TAs and RAs are treated as residents for tuition purposes. To be eligible for tuition remission, TAs and RAs must be employed a minimum of 10 hours per week (25 percent Full-Time Equivalency {FTE}). TAs/RAs working 10-19 hours per week (25-49 percent FTE) receive a 50 percent remission of tuition for the semester or summer session of their employment. TAs/RAs working 20 hours per week (50 percent FTE) do not pay tuition during the semester or summer session of their employment. In addition, the university pays the individual health insurance premium for those TAs and RAs working 20 hours per week (50 percent FTE). The TA/RA offer does not cover additional fees beyond tuition. In addition to tuition waiver, students receive a stipend depending on their offer.

**g. Policy for Maintaining Academic Satisfactory Progress**

Each semester, the computer science program reviews students' files for satisfactory progress toward completion of the degree. All students who fall in one of the four categories are placed on probation or withdrawn from the program:

1) Satisfactory progress;
2) Academic probation;
3) Progress probation;
4) Withdrawal from the CSE program.

**1. Satisfactory progress** means that a student does not have any academic or progress probationary issues. In addition to the probationary rules, satisfactory progress includes communication each semester with the student's committee chair regarding his/her progress.

**2. Academic Probation**

A student who has been admitted to a graduate degree program in CIDSE with either regular or provisional admission status, must maintain a semester grade point average (GPA) of 3.0:

1. in all work taken for graduate credit (courses numbered 500 or higher),
2. in the coursework on the student's approved plan of study, and
3. in all coursework taken at ASU (overall GPA) post-baccalaureate.

A student will be placed on academic probation if one or more of the student's semester GPAs listed above falls below 3.0. Students will be notified by mail and e-mail when placed on academic probation.

A student will earn academic good standing by obtaining a semester 3.0 or better in the GPAs listed above by the time the next nine graduate hours are completed. A maximum of two semesters are allowed to complete the nine hours of graduate-level coursework to raise the GPA. Coursework such as research and dissertation registration that are for Z or Y grade cannot be included in these nine hours.

Students will also receive an academic probation notice/letter if one of these pertains to their academics:

- Received a "D" or "E" in a required deficiency course or in a course at the 400 level or above.
- Deficiency GPA below 3.0.

**3. Progress probation** pertains to issues dealing with making progress toward a degree. The following are notices/letters you will receive if one of these pertains to your academics:

- Lack of progress toward completing deficiencies as listed on your admission letter.
- Failure to pass the oral thesis defense.

**4. Withdrawal from the CSE program:**

An M.S. student may be removed from program for any of the reasons listed below:

1. Cumulative GPA is less than 3.0 for two consecutive semesters. (The student with such a cumulative GPA will be put on probation after the first semester.)
2. The semester GPA is less than 3.0 in the course of two consecutive semesters. (The student is put on probation with such GPA after the first semester.)
3. Failure to complete deficiencies within the time allowed, as determined by the admissions committee.
4. Failure to meet a requirement specified for the M.S. degree, including not making satisfactory progress toward the completion of the degree.

A student is recommended for withdrawal from the CSE program if s/he fails to meet the probationary standards placed in the semester mentioned in the probationary letter. The student will receive a letter from the computer science program explaining the reasons for the withdrawal. The student will have five calendar days from the date of the letter to appeal the decision. The CSE Graduate Program Committee (GPC) will review the case and will make the necessary recommendation. The graduate program chair, on behalf of the GPC, will provide a written explanation of the outcome. If the outcome is favorable, the student will have to meet all the outlined requirements at the end of the specified period. The student will be required to sign an agreement acknowledging the recommendations and the consequences if the agreements are not met. If the GPC recommends that the appeal is not granted in favor of the student, the graduate program chair, on behalf of the GPC, will recommend to the Dean's Office to withdraw the student from the CSE program. The student will then have the opportunity to appeal to the Ira A. Fulton Schools Standards Committee, which reviews the student's case and makes the final ruling to Associate Dean and the CSE program. If the appeal is not granted in favor of the student, the Dean's Office of Academic and Student Affairs will recommend to

the Office of Graduate Education to withdraw the student from the CSE program. Please refer the Office of Graduate Education on policies and procedures or contact the graduate advisor in the CIDSE Advising Center.

**h. Filing for Graduation**

During the final semester, a student must file an application for graduation with the Graduation Office of the Registrar on My ASU. The student's approved final plan of study (iPOS) must be on file with Graduate Education before the student can apply for graduation.

**i. Academic Integrity**

The highest standards of academic integrity are expected of all graduate students, both in the academic coursework and in their related research activities. The failure of any graduate student to meet these standards may result in serious consequences, including suspension or expulsion from the university and/or other sanctions as specified in the academic integrity policies of individual schools, as well as the university.

Violations of academic integrity include, but are not limited to: cheating, fabrication, tampering, plagiarism, or aiding and/or facilitating such activities. At the graduate level, it is expected that students are familiar with these issues and each student must take personal responsibility in their work. In addition, graduate students are expected to follow university guidelines related to the Student Code of Conduct. University policies related to academic integrity and code of conduct are available in the Office of Student Life, or at http://graduate.asu.edu/beintheknow.

**j. CSE 584 Internship**

Curricular Practical Training (CPT) is an academic experience usually obtained at off-campus work settings, allowing the student to apply knowledge and skills gained in various classes. It is intended as a unique, hands-on learning experience to provide students with a number of valuable skills that they can use upon graduation from their graduate degree programs. Accordingly, it is not available to full-time or part-time workers regularly employed by the company where the internship is proposed.

CPT is available to both domestic and international students. However, international students must work with the International Students and Scholars Center (ISSC) and submit additional documentation to obtain work authorization. Furthermore, international students must include the CPT course CSE 584 (1 credit hour) as an integral part of their program of study, reflected by their approved iPOS.

Addition of the CPT credit(s) should be done at the initial submission of the student's iPOS. Later additions of CPT courses must be requested and approved at least one full semester (fall, spring, or summer) prior to the proposed start date of the internship. For example, a student planning to do an internship during the summer session should have an approved iPOS with the internship course before the beginning of classes in the preceding spring semester. The internship credit cannot be added to an approved iPOS

once all coursework has been completed. Exceptions may be made if the internship is relevant to thesis research.

The CSE program chair will determine the need for a CPT internship in such cases in consultation with the graduate academic advisor. Note that approval of an iPOS with the CSE 584 credit confirms that the internship is an integral part of the degree requirements as planned by the student. Hence, students who are not able to fulfill the internship credit requirements in their iPOS are required to replace the course credit requirements through the following options:

- taking the 1-credit hour CSE 594 seminar course
- taking a 3-credit hour graduate course,
- taking one credit hour of CSE 590 – Reading and Conference (Independent Study).

In order to be eligible for internship, a student must be in **good academic standing (cumulative, graduate, and iPOS GPA of 3.0 or above) and not have an academic integrity violation** in a course for two full semesters (summer semesters not included) from the initial reporting of the incident. For example, a sanctioned academic integrity violation initially reported on April 15, 2012 will make the student ineligible for this approval until the end of spring 2013 semester.

International students need to be aware of immigration policies and regulations, which may jeopardize their academic status. Hence, it is strongly recommended for international students to consult with the International Students and Scholars Center (ISSC).

All students (domestic and international) may take part in an out-of-state internship in the summer session. The eligibility requirements for CPT internships remain the same as mentioned.

During the regular fall and spring semesters, international graduate students in F-1 status must register for a minimum of nine (9) credit hours to maintain full-time status and be enrolled in a minimum six (6) credit hours of in-person, on-campus coursework at the ASU Tempe campus. A maximum of three (3) credit hours of online courses is permitted. The CSE 580 practicum course will not count as satisfying the student's "physical presence" at ASU. Students will not be able to take part in internships outside the Phoenix metropolitan area. In some cases students may be approved to do an internship in Tucson or other nearby locations to Phoenix, as long as the student is able to prove they can physically attend their courses on campus.

Required documents and forms for the internship proposal must be submitted to the CIDSE Advising Office at least four weeks prior to the beginning of the semester in which the internship is planned. Students will not be able to request late-add registration of the CSE 584 Internship credit to their class schedule after the add/drop deadline of each semester.

An approved proposal is required before commencing the internship. The request will include a statement from the employer that indicates they understand that the work is to satisfy a degree requirement. A sample letter and other required forms are available on the CIDSE CPT website. Students must receive approval from their faculty advisor and from the graduate program director before registering for CSE 584. At the M.S. level, internship is intended to enhance the student's research capabilities in the area related to the thesis. Therefore, the internship plan must show the relationship between the work proposed and the intended research program. The faculty advisor may be asked to write a separate letter explaining why the internship is required. In order register for the CSE 584 - Internship, a student must have a **cumulative, graduate, and iPOS GPA of 3.0 or above** and not have an academic integrity violation in a course for two full semesters (summer sessions not included) from the initial reporting of the incident. A final plan of study must be filed with the Office of Graduate Education showing the internship credit before registering for CSE 584. All application materials for an internship must be completed by the last day of regular registration for any semester. The student must take classes appearing on the plan of study the semester following the internship.

**Renege: (verb) to fail to carry out a promise or commitment**
Never accept a job with the intention of turning it down if "something better" comes along. Not only is it inconsiderate and unprofessional, it also reflects badly on Arizona State University and might negatively impact another ASU student's opportunity with that employer. Also, employers communicate with each other and you don't want to get a bad reputation.

After you have given your decision careful consideration and accepted an offer, stop looking. Inform other employers who have extended offers that you have accepted another position. Don't accept further interview invitations or search further. Please refer to NACE's Playing Fair…Your Rights and Responsibilities as a Job Seeker http://www.naceweb.org/playing_fair/ to become familiar with Principles for Professional Practice.

**A five-page final report is required** at the end of the internship before a grade and credit is given. The final report must be submitted to the reporting supervisor for comments and then to the faculty advisor for grade assignment. Refer to the CIDSE CPT website for guidelines to prepare the final report.

**k. CSE 590 Independent Study**
Independent study is available for MS students. The student must get written approval from the supervising faculty outlining the coverage of the content. The independent study form must be approved by the faculty advisor and will be placed in the student's file.

**l. Engineering Student Organizations**
There are dozens of engineering student organizations and teams ranging from honors and professional associations to groups creating underwater robots, concrete canoes and launching rockets. Student organizations are excellent opportunities to learn about career

possibilities as many of the student groups operate in conjunction with industry professional societies … get involved today! Please visit http://studentorgs.engineering.asu.edu/ for a list of engineering student organizations.

**m. Instructional Concerns and Course-Related Complaints**

Being part of a large university creates opportunities to learn from a diverse instructor population with different teaching styles and modalities for delivering course content. Courses are offered by a diverse set of faculty, including those who are research intensive, those whose primary responsibility is teaching, and part-time faculty who are working in the field. Based on enrollment or modality of offering, faculty may also be supported by graduate student teaching assistants and graders. This diverse higher education delivery platform may differ significantly from the high school experience, and while it provides opportunity to expand the student's ability to learn and develop problem solving skills, concerns and conflicts with requirements and instructors may occasionally arise. CIDSE students with instructional concerns should review and adhere to the following guidelines for attempting to resolve their issues. First and foremost, keep in mind that the faculty and advising staff are experienced, dedicated educators that are here to help you achieve your educational goals but at the same time, as an engineering and computer science program, they have a responsibility to ensure standards are maintained and student outcomes are achieved prior to graduation. The university culture recognizes the value of diversity in multiple dimensions as well as the presumption of expertise and academic freedom of the faculty.

**Communicate with your Instructor**

If you have a difference of opinion with your instructor or teaching assistant (TA), or have concerns about technical or administrative aspects of the course, visit the instructor or TA during office hours or contact them via email (if you cannot visit them during the office hours). Express your concerns clearly and respectfully and ask for help. Be sure to provide succinct information about what you are having trouble understanding in the course or your concern. Instructors and TAs are here to help. Please remember that you are responsible for prerequisite knowledge/skills required for a course and regularly studying the material taught in the course. The teaching staff may not be able to help you with your problem if you lack the prerequisite knowledge/skills or have not been keeping up with the course material. As a guideline, you should be spending three hours studying every week for each hour of course credit. Thus you should schedule 8-10 hours of time each week to devote to each 3-credit course. In addition, make sure to resolve the issues as soon as they occur and maintain all documentation. For example, if the assignment instructions are not clear, get the clarification on the day the assignment is assigned and do not wait until the deadline of the assignment.

If, after communicating with your instructor or TA, you are still having problems in the course, connect with your academic advisor to understand your options moving forward.

**Connect with your Graduate Program Chair**

If you are unable to resolve the concern after initial contact with the instructor or the TA, and you have met with your academic advisor, you should then connect with the graduate

program chair for your degree (or the department offering the course). The graduate program chair will confer with the instructor and/or TA to better understand the concern and try to resolve the problem. Please note that before meeting with the graduate program chair you should have made a reasonable effort to meet with the course instructor (not just the TA) and get the issue resolved. When contacting the graduate program chair, provide all the relevant details such as the course syllabus, assignment handout, email exchange with the instructor, etc. so that the graduate program chair can promptly act on your concerns. Please be brief and precise in the description of your concerns. In some cases, the graduate program chair would like to meet you. When coming for the meeting please bring along all the relevant documents.

If the instructional concern is not resolved with the graduate program chair or the department offering the course, contact the Associate Dean of Academic Affairs Office for the college offering the course for assistance.

**Remain Focused**

When faced with instructional concerns, it is important to remain focused on the rest of the course while addressing specific areas that are under review. Be sure to stay connected with your academic advisor if there are any changes in your situation.

NOTE:

- Misrepresentation of facts or disrespectful behavior when confronting your instructor or teaching assistant is considered an academic integrity violation.
- Maintain all documentations.
- Act proactively and promptly.

In Summary, Guidelines for Avoiding Problems

- Be sure you have the necessary prerequisite knowledge before starting a course;
- Attend class and online exercises regularly;
- Devote time each week to studying to avoid falling behind;
- Contact the TA (if assigned) or instructor during office hours at first sign of trouble and come prepared to ask precise questions and to explain your difficulty
- Accept the fact that you grow intellectually and professionally by being challenged and learning to deal with diverse expectations and environments.

Process for Resolving Conflicts in Grading, Course Expectations, etc.

- Contact the TA (if available) or instructor to explain your concern and seek resolution;
- If the TA/instructor has attempted to assist you but you are still having academic difficulty that is causing personal stress or hindering your academic success, see your Academic Advisor;

- If the TA/instructor is not responsive or does not provide a legitimate response/accommodation, then contact your graduate program chair.
- If you still feel there is a legal, ethical, or procedural violation that is victimizing you, contact the Office of the Associate Dean of Engineering for Academic Affairs.
- Circumventing this process will be considered a violation of professional ethics and protocol.

## List of Approved 500-level Area Courses

| Course Prefix | Course Title | Foundations | Systems | Applications |
|---|---|---|---|---|
| CSE 509 | Digital Video Processing | | | X |
| CSE 510 | Database Management System Implementation | | | X |
| CSE 511 | Semi-Structured Data Management | | | X |
| CSE 512 | Distributed Database Systems | | | X |
| CSE 515 | Multimedia and Web Databases | | | X |
| CSE 520 | Computer Architecture II | | X | |
| CSE 522 | Real-Time Embedded Systems | | X | |
| CSE 530 | Embedded Operating Systems Internals | | X | |
| CSE 531 | Distributed and Multiprocessor Operating Systems | | X | |
| CSE 534 | Advanced Computer Networks | | X | |
| CSE 535 | Mobile Computing | | X | |
| CSE 536 | Advanced Operating Systems | | X | |
| CSE 539 | Applied Cryptography | | X | X |
| CSE 543 | Information Assurance and Security | | X | |
| CSE 545 | Software Security | | X | |
| CSE 546/591 | Cloud Computing | | X | |
| CSE 548 | Advanced Computer Network Security | | X | |
| CSE 550 | Combinatorial Algorithms and Intractability | X | | |
| CSE 551/591 | Foundations of Algorithms* | X | | |
| CSE 552 | Randomized and Approximation Algorithms | X | | |
| CSE 555 | Theory of Computation | X | | |
| CSE 556 | Game Theory with Applications to Networks | X | | |
| CSE 561 | Modeling and Simulation Theory and Applications | | X | |
| CSE 563 | Software Requirements and Specification | | X | |
| CSE 564 | Software Design | | X | |
| CSE 565 | Software Verification, Validation and Testing | | X | |
| CSE 566 | Software Project, Process and Quality Management | | X | |
| CSE 569 | Fundamentals of Statistical Learning and Pattern Recognition | X | | |
| CSE 570 | Advanced Computer Graphics I | | | X |
| CSE 571 | Artificial Intelligence | | | X |
| CSE 572 | Data Mining | | | X |
| CSE 573/591 | Semantic Web Mining | | | X |
| CSE 574 | Planning and Learning Methods in AI | | | X |

| | | | | |
|---|---|---|---|---|
| CSE 575 | Statistical Machine Learning | | | X |
| CSE 576 | Topics in Natural Language Processing | | | X |
| CSE 577 | Advanced Geometric Modeling I | | | X |
| CSE 578/591 | Data Visualization | | | X |
| CSE 579 | Knowledge Representation and Reasoning | X | | |

**4XX and 4XX/598 courses do not apply toward the required area courses.**

* CSE 598 Design and Analysis of Algorithms and CSE 591 Foundations of Algorithms cannot both be listed on the iPOS.

**Approved 400-Level courses to count toward CSE graduate program**

**IMPORTANT: Students who have taken any of the 4XX courses listed below as 598 cannot take the same class at the 400-level.**

CSE 408 Multimedia Information Systems
CSE 412 Database Management
CSE 414 Advanced Database Concepts
CSE 432 Operating System Internals
CSE 434 Computer Networks
CSE 438 Embedded Systems Programming
CSE 440 Compiler Construction I
CSE 445 Distributed Software Development
CSE 446 Software Integration and Engineering
CSE 457 Theory of Formal Languages
CSE 459 Logic for Computing Scientists
CSE 460 Software Analysis and Design
CSE 463 Introduction to Human Computer Interaction
CSE 464 Software Quality Assurance and Testing
CSE 465 Information Assurance*
CSE 466 Computer Systems Security
CSE 467 Data and Information Security
CSE 468 Computer Network Security
CSE 469 Computer and Network Forensics
CSE 470 Computer Graphics
CSE 471 Introduction to Artificial Intelligence
CSE 472 Social Media Mining
CSE 476 Introduction to Natural Language Processing
CSE 477 Introduction to Computer-Aided Geometric Design

*Credit is allowed for only CSE 465 <u>or</u> CSE 543, but not both.

A maximum of 6 credit hours of 400-level coursework is allowed. A maximum of 12 hours of a combination of 400-level and cross-listed courses (4XX/5XX) is allowed. If a 400-level course is cross-listed with a 500-level course, students will be required to enroll in the 500-level.

## Course Descriptions

**CSE 509 Digital Video Processing**
Concepts of digital video compression, video analysis, video indexing, browsing and retrieval, video transmission over networks, video processors, and relevant industry standards.

**CSE 510 Database Management System Implementation**
Implementation of database systems. Data storage, indexing, querying, and retrieval. Query optimization and execution, concurrency control, and transaction management.

**CSE 511 Semi-Structured Data Management**
Addresses the data management issues for semi-structured data, which are commonly found in Web applications. Covers techniques on modeling, storing, querying and searching data without schemas, with optional confidence, and/or provenance information. Requires knowledge on relational databases and programming skills.

**CSE 512 Distributed Database Systems**
Distributed database design, query processing, and transaction processing. Distributed database architectures and interoperability. Emerging technology.

**CSE 515 Multimedia and Web Databases**
Data models for multimedia and Web data; query processing and optimization for inexact retrieval; advanced indexing, clustering, and search techniques.

**CSE 520 Computer Architecture II**
Computer architecture description languages, computer arithmetic, memory-hierarchy design, parallel, vector, multiprocessors, and input/output.

**CSE 522 Real-Time Embedded Systems**
Development of real-time embedded systems, scheduling algorithms, embedded software structures, real-time operating system.

**CSE 530 Embedded Operating System Internals**
Investigating Linux source including: memory management, kernel synchronization and driver design topics. Designing, coding, testing, and evaluating embedded operating system software in a Linux environment.

**CSE 531 Distributed and Multiprocessor Operating Systems**
Distributed systems architecture, remote file access, message-based systems, object-based systems, client/server paradigms, distributed algorithms, replication and consistency, and multiprocessor operating systems.

**CSE 534 Advanced Computer Networks**
Advanced network protocols and infrastructure, applications of high-performance networks to distributed systems, high-performance computing and multimedia domains, special features of networks.

**CSE 535 Mobile Computing**
Mobile networking, mobile information access, adaptive applications, energy-aware systems, location-aware computing, mobile security and privacy.

**CSE 536 Advanced Operating Systems**
Protection and file systems. Communication, processes, synchronization, naming, fault tolerance, security, data replication, and coherence in distributed systems. Real-time systems.

**CSE 539 Applied Cryptography**
Uses cryptography for secure protocols over networked systems, including signatures, certificates, timestamps, electrons, digital cash, and other multiparty coordination.

**CSE 543 Information Assurance and Security**
Comprehensive understanding of information assurance and security problems with the solutions as well as hands-on experiences about applying these solutions.

**CSE 545 Software Security**
Theories and tools for software security, including secure design, threat analysis and modeling, security testing and coding.

**CSE 546 Cloud Computing**
Virtualization, cloud computing, programmable networking, performance evaluation, information assurance, distributed and parallel computing, and cloud computing-based applications. Students must have a solid background in computer architecture, operating system and computer networking to be successful in this course.

**CSE 548 Advanced Computer Network Security**
Comprehensive understanding of network security and corresponding solutions, including cryptography, access control, secure Web transactions, e-mail security, and viruses.

**CSE 550 Combinatorial Algorithms and Intractability**
Combinatorial algorithms, nondeterministic algorithms, classes P and NP, NP-hard and NP-complete problems, and intractability. Design techniques for fast combinatorial algorithms.

**CSE 551 Foundations of Algorithms**
Advanced topics in formal algorithm design and analysis, including advanced shortest-paths algorithms, amortized analysis, network flows, NP-completeness and selected topics in computational geometry, distributed/parallel, randomized, and approximation algorithms.

**CSE 552 Randomized and Approximation Algorithms**
Introduces two important areas of algorithm design for graduate students. A randomized algorithm is allowed to rely on the outcome of a random experiment in deciding on its next step. In may applications, randomized algorithms are simpler than any deterministic algorithms known, but in several cases, they are in fact more powerful or more efficient than any

deterministic algorithms. Covers basic paradigms for randomized algorithm design and analysis, as well as for derandomization.

**CSE 555 Theory of Computation**
Rigorous treatment of regular languages, context-free languages, Turing machines and decidability, reducibility, and other advanced topics in computability theory.

**CSE 556 Game Theory with Applications to Networks**
Strategic conflict as matrix games, notions of equilibrium, definition and existence of Nash equilibrium, zero-sum games, extensive-form games, Bayes Nash equilibrium, potential games, routing games, algorithmic game theory, computation of Nash equilibrium, incentives and pricing in communication networks, application of game theory in wireless networks. Knowledge of calculus, discrete mathematics, probability theory and algorithms is necessary to be successful in this course.

**CSE 561 Modeling and Simulation Theory and Application**
Modeling theories, simulation protocols, object-oriented modeling, model design, simulation analysis, network-based systems, discrete-event modeling, continuous modeling, hybrid modeling.

**CSE 563 Software Requirements and Specification**
Examines the definitional stage of software development; analysis of specification representations, formal methods, and techniques emphasizing important application issues.

**CSE 564 Software Design**
Examines software design issues and techniques. Includes a survey of design representations and a comparison of design methods.

**CSE 565 Software Verification, Validation, and Testing**
Test planning, requirements-based and code-based testing techniques, tools, reliability models, and statistical testing.

**CSE 566 Software Project, Process, and Quality Management**
Project management, risk management, configuration management, quality management, and simulated project management experiences.

**CSE 569 Fundamentals of Statistical Learning and Pattern Recognition**
Concepts of statistical pattern recognition, Bayesian decision theory, parameter estimation, discriminant analysis, basics of artificial neural networks, basics of data clustering. Knowledge of college-level calculus, linear algebra, basic probability theory and proficiency in computer programming is necessary to be successful in this course.

**CSE 570 Advanced Computer Graphics I**
Hidden surface algorithms, lighting models, and shading techniques. User interface design. Animation techniques. Fractals and stochastic models. Raster algorithms.

**CSE 571 Artificial Intelligence**
Definitions of intelligence, computer problem solving, game playing, pattern recognition, theorem proving, and semantic information processing; evolutionary systems; heuristic programming.

**CSE 572 Data Mining**
Advanced data mining techniques: classification, clustering, association, preprocessing; performance evaluation; information assurance, Web mining, security and privacy issues, and other applications. Students must have a solid background in database management systems, search, learning, and statistics to be successful in this course.

**CSE 573 Semantic Web Mining**
Data mining techniques for structuring and organizing unstructured sources such as text and Web data into meaningful machine-processable information; computational aspects of information extraction and data linkage; discovery and prediction tasks where text serves as data such as detecting events, measuring public opinion and making recommendations. A background in databases, algorithms and theory of computation is necessary to be successful in this course.

**CSE 574 Planning and Learning Methods in AI**
Reasoning about time and action, plan synthesis and execution, improving planning performance, applications to manufacturing intelligent agents.

**CSE 575 Statistical Machine Learning**
Spectral clustering, regression, classification, semi-supervised learning, feature reduction, manifold learning, ranking, kernel learning and multitask learning.

**CSE 576 Topics in Natural Language Processing**
Comparative parsing strategies, scoping and reference problems, nonfirst-order logical semantic representations, and discourse structure.

**CSE 577 Advanced Geometric Modeling I**
Advanced concepts of geometric modeling: rectangular and triangular surfaces, triangle meshes, Voronoi diagrams, discrete and continuous shape measures, volumes and volume visualization. Students must have a solid background in linear algebra, calculus, and basic 3D graphics to be successful in this course

**CSE 579 Knowledge Representation and Reasoning**
Covers knowledge representation and reasoning algorithms in artificial intelligence, shows how they can be used in practice, and provides an overview of current research trends.

**CSE 580 Practicum**
Structured practical experience in a professional program, supervised by a practitioner and/or faculty member with whom the student works closely.

**CSE 584 Internship**
Structured practical experience following a contract or plan, supervised by faculty and practitioners.

**CSE 590 Reading and Conference**
Independent study in which a student meets regularly with a faculty member to discuss assignments. Course may include such assignments as intensive reading in a specialized area, writing a synthesis of literature on a specified topic, or writing a literature review of a topic.

**CSE 591 Seminar**
A small class emphasizing discussion, presentations by students, and written research papers.

**CSE 594 Conference and Workshop**
Topical instruction, usually in compressed format, leading to academic credit. Often offered off campus to groups of professionals.

**CSE 595 Continuing Registration**
Used in situations where registration is necessary but where credit is not needed. Replaces arbitrary enrollment in reading and conference, research, thesis, dissertation, etc. Used by students when taking comprehensive examinations, defending theses or dissertations, or fulfilling the continuous enrollment requirement in doctoral programs. Credit is not awarded, and no grade is assigned.

**CSE 598 Special Topics**
Topical courses not offered in regular course rotation--e.g., new courses not in the catalog, courses by visiting faculty, courses on timely topics, highly specialized courses responding to unique student demand.

**CSE 599 Thesis**
Supervised research focused on preparation of thesis, including literature review, research, data collection and analysis, and writing.

**CSE 691 Seminar**
A small class emphasizing discussion, presentations by students, and written research papers.

**CSE 790 Reading and Conference**
Independent study in which a student meets regularly with a faculty member to discuss assignments. Course may include such assignments as intensive reading in a specialized area, writing a synthesis of literature on a specified topic, or writing a literature review of a topic.

**CSE 792 Research**
Independent study in which a student, under the supervision of a faculty member, conducts research that is expected to lead to a specific project such as a dissertation, report, or publication. Assignments might include data collection, experimental work, data analysis, or preparation of a manuscript.

**CSE 795 Continuing Registration**
Used in situations where registration is necessary but where credit is not needed. Replaces arbitrary enrollment in reading and conference, research, thesis, dissertation, etc. Used by students when taking comprehensive examinations, defending theses or dissertations, or fulfilling the continuous enrollment requirement in doctoral programs. Credit is not awarded, and no grade is assigned.

**CSE 799 Dissertation**
Supervised research focused on preparation of dissertation, including literature review, research, data collection and analysis, and writing.

## Appendix I - Absent Committee Member Procedure

While it is desirable that all members of a student's supervisory committee be available during the oral exam, prospectus and final dissertation defense, there are situations (e.g. faculty travel, faculty emergencies and/or faculty leave) that may necessitate holding the oral exam, prospectus, or final dissertation defense with one or more committee member(s) absent. The Academic Unit has established the following policies and procedures for such cases.

1. A minimum of 4 committee members (including chair/co-chair) from the student's official committee must be available during the student's oral exam, prospectus, and final dissertation defense.
2. A minimum of 50% of the student's official committee must be physically present with the student at the oral exam, prospectus, and final dissertation defense. If at least 50% of the committee cannot be physically present, the exam/defense must be rescheduled.
3. The chair (or one co-chair) must be available for the oral exam, prospectus, and final dissertation defense. If this is not possible, the exam/defense must be rescheduled.
4. The chair or (one co-chair) must be physically present at the oral exam, prospectus, or final dissertation defense. If this is not possible, the exam/defense must be rescheduled. The student cannot submit a committee change after the defense is scheduled to create co-chairs in the case of an absent chair.
5. A committee co-chair or member who cannot be available during the oral exam, prospectus, or final dissertation defense, may participate in one of three ways. These options are listed in the order of preference:
   a. The absent committee member videoconferences into the oral exam defense location.*
   b. The absent committee member teleconferences into the oral exam defense location.*
   c. The absent committee member provides a substitute to be physically present (approved by the committee chair & the head of the academic unit) for the oral exam, prospectus, or final dissertation defense. The substitute must be someone who is approved to serve on graduate supervisory committees for that program. The absent committee member should provide the substitute questions, in writing, to be asked at the exam/defense. The substitute, although respecting the opinions expressed by the regular committee, must be free to use his/her judgment in voting on whether the student passes or fails the defense. The substitute should sign the absent committee member's name, and add his/her initials directly after the signature.

   *The defense location must have the necessary equipment to accommodate video/teleconference materials.
   *Students must provide a copy of their document and any other supporting presentation materials to the committee member at least 5 working days in advance of the defense. The defense location must have the necessary equipment to accommodate video/teleconference materials.

If the videoconference or teleconference option is selected, the absent member needs to e-mail the committee chair or co-chair to state that member voted to pass or fail the student and authorize that the chair sign their name on the form. The committee chair or co-chair should sign

the name of the absent individual on the form and then add his/her initials directly after the signature.

If a committee member will be absent from the oral defense, the student or committee chair/co-chair must notify the Program Chair before or at the time of scheduling the oral exam defense. If the student is notified of an absence after scheduling the oral exam, the student must contact the Program Chair prior to the oral exam defense date, so he/she finds a substitute.

For the final dissertation defense, if a committee member will be absent from the defense, the student or committee chair/co-chair must notify Graduate Education before or at the time of scheduling the defense. If the student is notified of an absence after scheduling the defense, the student must contact Graduate Education prior to the defense date.