

**Data Science, Analytics and  
Engineering  
Ph.D. Graduate Handbook  
2020 - 2021**

**MANUAL OF THE PH.D. DEGREE IN  
DATA SCIENCE, ANALYTICS, AND ENGINEERING**

**ARIZONA STATE UNIVERSITY**

**2020 - 2021**

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

DSE on the web: <http://cidse.engineering.asu.edu/graduate-data-science-analytics-and-engineering/>

E-mail address: [cidse.advising@asu.edu](mailto:cidse.advising@asu.edu)

*Revised updated January 25, 2021*

## Table of Contents

I.	Introduction to the Data Science, Analytics, and Engineering Program .....	1
II.	Objective of the handbook.....	1
III.	Student responsibility.....	1
IV.	Faculty responsibility.....	1
V.	Admission and eligibility to the doctoral degree program.....	1
	Eligibility .....	<b>Error! Bookmark not defined.</b>
	Application .....	2
	Application deadlines .....	2
	GRE scores .....	2
	TOEFL .....	2
VI.	Doctoral degree requirements.....	3
	a. Core courses.....	4
	b. Qualifying Examination.....	4
	c. Formulation of the Plan of Study:.....	4
	d. Dissertation Supervisory Committee:.....	6
	e. Comprehensive Examination & Dissertation Prospectus: .....	6
	f. Dissertation Defense and 10-Day Rule: .....	6 - 7
VI.	General Information.....	7
	a. Master's in Passing .....	7
	b. Research standards for publication of dissertation .....	9
	c. Financial assistance and/or fellowships .....	8
	d. Continuous Enrollment and Leave of Absence Policies.....	8
	e. Maximum Time Limit.....	11
	f. Research Assistants (RA) and Teaching Assistants (TA).....	9
	g. Satisfactory Progress, Academic Probation, Progress probation, and Withdrawal from the DSE Program .....	9
	h. Academic Integrity.....	13
	j. DSE 584 Internship.....	13
	k. DSE 790 Independent Study.....	15
	l. Student chapters of professional societies .....	15
	Concentration Areas of DSE Graduate Courses .....	18
	Course Descriptions .....	18
	Data Science, Analytics, and Engineering Faculty .....	22

## **I. Introduction to the Data Science, Analytics, and Engineering Program**

The Data Science, Analytics, and Engineering (DSE) program is a collaboration of the School of Computing, Informatics, and Decision Systems Engineering (CIDSE) which serves as the administrative home and the School of Mathematical and Statistical Sciences (SoMSS). The program is multidisciplinary in nature drawing faculty members from CIDSE, SoMSS and the School of Electrical, Computer and Energy Engineering (ECEE) at Arizona State University (ASU). The combined faculty offers an advanced academic program leading to the Doctor of Philosophy (Ph.D.) degree. The program is designed to instill the capability of building and deploying state-of-the-art data analysis and engineering tools to meet the societal need for data-driven discovery of new knowledge and decision making that enhances business and government performance and scientific investigation. The program requires core and elective coursework, Qualifying and Comprehensive Exams, a written dissertation, and an oral defense of the dissertation. The Ph.D. degree is offered to exceptional students who have completed, with distinction, a 'Bachelor's or 'Master's degree in engineering, or a closely related field.

## **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 College and the Data Science, Analytics, and Engineering program requirements. In most of the cases, the differences are because the DSE Program has established higher standards than those set forth by the Graduate College. Thus, 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 will be posted on the CIDSE website.

## **III. Student responsibility and resources**

All students are expected to become familiar with university and program policies and procedures and abide by the terms set forth. Information will be e-mailed and will be available online. Most importantly, you should visit the following websites:

- The Graduate College – <http://graduate.asu.edu> .
- Graduate College Policies and Procedures – <https://graduate.asu.edu/policies-procedures>
- The Data Science, Analytics, and Engineering Program – <http://cidse.engineering.asu.edu/graduate-data-science-analytics-and-engineering/>
  - The International Student and Scholars Center– <https://issc.asu.edu/>, if applicable.
- The Ira A. Fulton School of Engineering – <http://engineering.asu.edu>
- [Graduate Wellness Resources](#) – a one-page guide to Financial, Social, Emotional, and Physical Health and Wellness Resources for ASU Graduate Students was developed by the GPSA .
- [10 Best Practices in Graduate Student Wellbeing](#) – proven ways to help graduate students better care for themselves under the increasing demands of graduate school

## **IV. Faculty responsibility**

The members of the faculty of Data Science, Analytics, and Engineering 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 a list of the faculty names, areas of expertise, and research interest at the end of this handbook.

**V. Admission and eligibility to the doctoral degree program**

The Data Science, Analytics, and Engineering doctoral degree requires a background in quantitative modeling and computational skills that will provide advanced knowledge in data analysis and engineering. However, in some cases, students with non-traditional educational backgrounds will be considered for admission. These students may be required to take fundamental courses to prepare them for the program coursework better. A student is encouraged to contact the School of Computing, Informatics, and Decision Systems Engineering (CIDSE) Advising Center to obtain advice on their educational pursuits.

**Application** - All students are required to submit a complete application with the Office of Graduate Admission <https://students.asu.edu/graduate> and pay the required fee to have their application properly processed.

**Application deadlines – July 1 for fall and December 1 for spring:**

To receive full consideration, we ask that you have all the required documents submitted by the deadline.

**GRE scores** - All students are required to submit an official **general** Graduate Record Examination (GRE) scores directly to the Office of Graduate Admission. Students with an exceptional background who have graduated with a 'bachelor's degree from ASU may petition to request a GRE waiver by contacting the CIDSE Advising Office Admission decisions are made based on the entire application packet. For 2021 admissions, students with a GPA of at least 3.5 on a 4.0 scale on their most recent degree may request a GRE waiver. We do not require specific subject GRE scores. The ASU Institution code is 4007. If department code is required, use 000 for GRE.

**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 Languages (TOEFL) or the International English Language Testing System (IELTS) scores, or Pearson (PTE). Data Science, Analytics, and Engineering Program uses 575 (paper-based) or 90 (internet-based) as minimum expectations for admission for TOEFL, 7.0 for IELTS and 65 for PTE. **Please note that your application will not be processed until the university receives official scores, which are valid two years from the start date of the degree program.** Exemption from the English Proficiency requirement can be met by visiting the Graduate Admission site under English Proficiency. Please address all English Proficiency questions to the Office of Graduate Admission <https://admission.asu.edu/international/graduate/english-proficiency>. The ASU institution code is 4007 if a 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 doctorate program; 2) describe any research experiences; 3) indicate personal research interests; and 4) identify two or three ASU DSE faculty with matching research interests.

**Letters of recommendation** - DSE requires two (2) letters of recommendation, at least one of which must come from former 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 Admission 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** - Students applying directly from an undergraduate program must have a minimum cumulative GPA of 3.0 in the last 60 credit hours of the undergraduate degree and have been involved in some form of research at the undergraduate level. Students who are applying following a Master's degree must have a minimum GPA of 3.25 for the last degree awarded.

**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. Students wishing to have their course syllabi examined as evidence that deficiencies have been satisfied must submit a petition form together with the support documents to [here](#). If, after evaluation, the petition is not approved, the student may choose to take the deficiency test-out examination. Please note that deficiencies are not intended solely as pre-requisites for graduate coursework; they also satisfy the breadth requirement for all graduates of DSE.

**Deficiency test-out exam** - In fall and spring semesters, an online course proficiency examination (CPE) is provided 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. The cost for each subject examination is \$59 payable at the time of registration. Students have one attempt for each subject. Note: There is no CPE exam for MAT 242 and MAT 267. You will need to reach out to the Math Department for the test out exam. **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.**

Below is a list of pre-requisites along with the associated ASU course numbers:

- CSE 205 – Object-oriented Programming and Data Structure

- MAT 242 – Elementary Linear Algebra or MAT 342 Linear Algebra or MAT 343 Applied Linear Algebra
- MAT 267 – Calculus for Engineering III
- IEE 380 – Probability and Statistics for Engineering Problem Solving

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

**Notice of Admission** - DSE submits its recommendation of admission to the Office of Graduate Admission, and the Office of Graduate Admission notifies the final notice of admission decision in writing. You may check your application status on MyASU (my.asu.edu).

**Pre-admission credits and Transfer credit** – Please refer to the Graduate College policies and procedures.

## VI. Doctoral degree requirements

Degree requirements for the Ph.D. include a minimum of 84 semester hours beyond the bachelor's degree and deficiency courses. A maximum of 30 credit hours taken during the Master's degree can be applied to a Ph.D. degree if coursework is approved as applicable to the doctoral degree.

The Ph.D. is comprised of five milestones, which all students are required to pass successfully before graduation:

- Completion of the core coursework,
- Passing the Qualifying Examination on the core coursework within one year of matriculation into the program,
- Filing an approved Plan of Study,
- Passing of the Written and Oral Comprehensive Examination and approval of the written dissertation prospectus to advance to candidacy,
- Successful oral defense of an approved written dissertation.

Assigned deficiency courses must be completed by the end of the 12<sup>th</sup> semester hour. A grade of "B" or better must be achieved in each deficiency course. A grade of "B" or better in a course that follows a pre-requisite deficiency course does not waive this requirement.

**a. Core courses:** All incoming students are required to complete the four core courses, of which at least three have to be completed in their first year for full-time students or within two years for part-time students.

The core courses are:

- CSE 510 Database Management System Implementation (3)
- CSE 543 Information Assurance and Security (3)
- CSE 572 Data Mining (3) or IEE 520 Statistical Learning for Data Mining (3)

- IEE 670 Mathematical Statistics (3) or STP 502 Theory of Statistics II: Inference (3)

**b. Qualifying Examination:** The Qualifying Exam is a three-hour written exam covering the core courses and offered following the end of the Spring Semester. Students should take the Qualifying Exam within one year of matriculation into the program if they enter without deficiencies and within two years if they enter with deficiencies. The exam is intended to determine if the student has the ability to succeed in the PhD program as indicated by mastery of the core material and demonstrating the likelihood of being able to perform independent research. As such, some questions may require integration of knowledge from multiple courses and require original thought. Students who fail are allowed only one re-examination, which should be taken at the next scheduled examination date. A student must have a cumulative and graduate GPA of 3.0 or higher, have obtained C or better for every core course, and have completed all assigned deficiency courses to sit for the qualifying exam. Specific details on the form and content of the exam will be provided to students upon registration for the exam with the CIDSE Advising Office.

**c. Formulation of the Plan of Study:** After completing the core courses and passing the Qualifying Examination, students will be required to develop and submit a Plan of Study (iPOS) through MyASU. A minimum of 84 credit hours is required in the Plan of Study. In addition to the Required Core, students must complete the Area Requirements for Data Engineering or Data Analytics. The Plan of Study must have the following required minimum components:

**Required Core (12 credit hours)**

- CSE 510 Database Management System Implementation (3)
- CSE 543 Information Assurance and Security (3)
- CSE 572 Data Mining (3) or IEE 520 Statistical Learning for Data Mining (3)
- IEE 670 Mathematical Statistics (3) or STP 502 Theory of Statistics II: Inference (3)

**Area Requirements (9 credit hours)**

***Data Engineering requirements:***

- CSE 512 Distributed Database Systems (3),
- CSE 515 Multimedia and Web Databases (3), and
- CSE 546 Cloud Computing (3)

or

***Data Analytics requirements:***

- CSE 575 Statistical Machine Learning (3) or ECE 598 Topic: Statistical Machine Learning (3),
- CSE 578 Data Visualization (3), and
- IEE 578 Regression Analysis (3), IEE 620 Optimization I (3), APM 523 Optimization (3) or EEE 598 Topic: Convex Optimization (3).

**Electives (39 credit hours)**

**Research (12 credit hours)****DSE 792 Research (12)****Culminating Experience (12 credit hours)****DSE 799 Dissertation (12)**

**A maximum of six credit hours of 400 level coursework may be used on an approved iPOS (400 level courses taken for a grade of Pass/Fail cannot be included on an iPOS). Students must get approval from the Program Chair before enrolling and completing a 400 level coursework, except for the course that is a deficiency requirement. Courses with grades of "D" (1.00) and "E" (0.00) cannot be included on an IPOS.**

**d. Dissertation Supervisory Committee:** The role of the supervisory Committee is to provide guidance and direction for the student's educational and research plan. As such, the Committee must have the necessary expertise to guide and evaluate research in the proposed dissertation area. A minimum of four committee members is required, including the committee chair or two co-chairs. The Chair and Co-chairs must be selected from the approved program list of graduate DSE faculty by the Graduate College. On case-by-case, a onetime approval can be given for an individual to serve as the co-chair for a student's dissertation. The Committee must be made up of at least three members who are in the DSE graduate faculty. The supervisory Committee must be approved by the Chair of the DSE Graduate Program Committee and by the Dean of the Graduate College before taking the Comprehensive Examination.

The first step in forming a Supervisory Committee is securing a Chair of the Committee. It is the responsibility of the student that an IPOS with Committee Chair is filed no later than the semester after completing the 24th credit or first semester after taking the Qualifying Examination. It is also the joint responsibility of the student and his/her Committee Chair to file an iPOS identifying the overall committee composition no later than the semester after completing the 40th credit of the preliminary iPOS.

**e. Comprehensive Examination:** The Comprehensive Exam is intended to ensure the student is prepared to do research in their major area and has integrated the knowledge covered in their Plan of Study. The exam consists of two parts, a Written Comprehensive Exam followed by an Oral Comprehensive Exam. The written portion will be a take home exam. All committee members will submit questions to the student's dissertation advisor/committee chair who will compile the questions and distribute the exam to the student. The student will have fourteen calendar days to complete the exam. Pass or Fail will be determined by the committee on the basis of all the questions. Upon passing the written portion of the exam, the Oral Comprehensive Exam will be scheduled to clarify the written exam responses as necessary and may cover additional questions from the intended research area and Plan of Study. The Comprehensive Examination may not be scheduled until successfully passing the Qualifying Exam. The Comprehensive Exam must be taken no later than the semester following the semester in which the 60<sup>th</sup> credit of iPOS coursework is completed. The committee chair will advise the student of the expectations of the exam.

The student first makes arrangements with the advisory committee chair to schedule the examination. Care must be taken to ensure that the entire examination will fall into one of the two regular semesters. The exam consists of two parts: a) a written exam; and b) oral defenses of both the Comprehensive Exam and the Dissertation Prospectus. While separate, the two oral portions of the exam may be held at the same time. **The student is required to bring a Report of Doctoral Comprehensive Examination and Approval of the Ph.D. Dissertation Prospectus forms available on the CIDSE [website](#) to the oral examination, and after completion of the examination, the Chairperson should submit the form to the Graduate Academic Advisor.**

Steps of the Comprehensive Exam:

1. The student will submit a research proposal to the advisory committee. Guidelines for proposals are presented in the Dissertation Prospectus below. The student should inform the Advising Office that the exam is to begin.
2. The members of the committee will submit written questions to the Dissertation Chair of the committee one week after submission of the research proposal. These questions should relate to the research area suggested by the student or to the coursework taken by the student.
3. The student will have 14 consecutive calendar days to develop written responses to the questions. The candidate should submit one complete set of answers to all questions to each committee member.
4. The general knowledge oral portion of the examination will be held within two weeks of submission of the written responses. This examination will be related to fundamental concepts of the research area and the student's written responses. A separate oral exam will cover the dissertation prospectus. The dissertation prospectus exam may be held immediately following the general knowledge oral exam.
5. The final Pass/Fail is determined based on the combined responses to written and oral examination questions. A majority vote by the committee and a passing vote by the committee chair are required to pass.
6. Passing the prospectus examination makes the student a candidate for the Ph.D. degree. The Graduate College will inform the student and DSE Office when candidacy is granted.

### **Retaking the Exam**

Failure of the comprehensive examinations and the dissertation prospectus is considered final unless the supervisory committee the Graduate Committee Chair, and the Dean of the Graduate College approves a re-examination. At any junction in the examination portion a student fails, he/she is not allowed to proceed to the next examination portion until a re-examination of the failed portion has been passed. The will have to petition and obtaining approval by the Graduate Committee Chair and the Dean of the Graduate College. A re-examination may be administered no earlier than three months and no later than one year from the date of the original examination. Only one re-examination is permitted.

The **Dissertation Prospectus** is a research proposal that precedes the dissertation. It is a document that introduces the doctoral student's proposed original contribution to the field of Data Science, Analytics, and Engineering that will be created through the doctoral research and writing of the dissertation. The prospectus should raise an important issue in the field and discuss the issue's contribution to the discipline. The doctoral student should work with their advisor or co-advisors to prepare the prospectus. The committee members review the prospectus for originality and contribution. Following that, oral delivery and a committee review of the Dissertation Prospectus should be scheduled. This oral prospectus defense is considered to be a part of the Comprehensive Exam and may be held in conjunction with the general knowledge defense.

While the format of the proposal is up to the committee chair, the written proposal document typically contains:

1. A title page with the author's name, committee members' names, institution, and date.
2. A table of contents.
3. An introduction explaining the nature of the research.
4. A clear statement of the research problem.
5. A thorough review of all relevant literature.
6. An argument that the problem is of sufficient relevance and importance to study.
7. A description of the proposed methodology and argument for its acceptability.
8. A statement of the expected contributions of the research.
9. A plan/schedule for completion of the research.
10. A complete bibliography following an accepted style.

The final version of the proposal is a binding agreement between the student and the Committee and will be enforced by the DSE Program. Satisfactory completion of the research, as outlined in the proposal, will result in an approved dissertation. Following the approval of the written dissertation, the student must schedule and pass a final oral defense.

**f. Dissertation Defense and 10-Day Rule:** Defense of a dissertation comprises submission of an approved dissertation followed by its successful oral defense. Students are required to submit a paper based on the dissertation research to an DSE-related refereed journal before the final examination. They are strongly encouraged to present a conference paper(s) on their work during the research. These publications are normally jointly written with the advisor and other appropriate faculty. Successful oral defense of the dissertation fulfills the DSE 799 requirement.

### **Steps to Preparing for Your Defense**

#### Before 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 is physically present at the defense. If at least 50% of the committee cannot be physically present, the defense must be rescheduled.
4. Visit the Graduate College website to become familiar with the dates and deadlines on format approval and oral defense.

10 days before the defense:

These steps are required to be completed before 10 working days from the date of the oral defense.

1. Reserve a room for the defense. You may contact the CIDSE front desk (Brickyard 5<sup>th</sup> floor) for a room in the Brickyard, or, contact the room scheduler in your advisor's home program. Due to COVID-19, the defense may be held through Zoom.
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 MyASU with the Graduate College.

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. In the end, the committee will make a recommendation: Pass, Pass with minor revisions, Pass with major revisions, or Fail.
2. Failing the dissertation defense is final.
3. Revisions are normal and are expected to be completed within one year. This includes remaining registered until the finished document has been uploaded through MyASU on ProQuest.
4. Follow the steps on MyASU on uploading your final dissertation through the Graduate College and ProQuest.

## VI. General Information

### a. Research standards for publication of dissertation

Graduate research is the study of an issue that is of sufficient breadth and depth to be publishable in an DSE-related journal. The effort should reflect a minimum of 1,500 hours of thoughtful work for a dissertation (Ph.D.). The research should follow the 'scientific 'method' and thus be both objective and reproducible. The dissertation 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 Graduate College format guidelines. For more information on format guidelines, please visit the Graduate College web site [https://graduate.asu.edu/completing-your-degree#tabs-0-content\\_main-5](https://graduate.asu.edu/completing-your-degree#tabs-0-content_main-5)

### b. Financial assistance and/or fellowships

The Data Science, Analytics, and Engineering 'Program's goal is to provide financial support to incoming Ph.D. students where possible. According to the 'student's academic performance and past academic research, funding offers will be extended to individual students with the highest academic achievements. We encourage students to highlight their past academic achievements in their statement and their resume.

**c. Continuous Enrollment and Leave of Absence Policies**

Once admitted to a graduate degree program or graduate certificate program, students must be registered for a minimum of one credit hour during all phases of their graduate education, including the terms in which they are admitted and graduate. This includes periods when students are engaged in research, conducting a doctoral prospectus, working on or defending theses or dissertations, taking comprehensive examinations, taking Graduate Foreign Language Examinations 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, conducting a doctoral prospectus, defending theses or dissertations or graduating from the degree program.

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

- Appear on the student's Interactive 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 drop/add 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 complete and the grade changed within one year, the "I" grade becomes permanent and will remain on the students' transcripts. Additional information regarding incomplete grades can be found at [asu.edu/aad/manuals/ssm/ssm203-09.html](http://asu.edu/aad/manuals/ssm/ssm203-09.html).

**Leave of Absence**

Students planning to discontinue enrollment for a semester or more must request approval for a leave of absence. A student may petition the Graduate College for a leave of absence for a maximum of two semesters during their entire program. The Graduate College dean must approve a petition for a leave of absence, endorsed by the members of the 'student's supervisory committee and the head of the academic unit. **This request must be filed and approved before the anticipated absence.**

An approved leave of absence will enable students to re-enter their program without re-applying to the university. Students who do not enroll for a fall or spring semester

without an approved leave of absence by the Graduate College are considered withdrawn from the university under the assumption that they have decided to discontinue their program. A student removed for this reason may reapply for admission to resume their degree program; the application will be considered along with all other new applications to the degree program.

A student on leave is not required to pay fees, but in turn, is not permitted to place any demands on university faculty or use any university resources.

**d. Maximum Time Limit**

Doctoral students must complete all program requirements **within a 10 year period**. The ten-year period starts with the semester and year of admission to the doctoral program. Graduate courses taken before 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 (previously awarded 'master's degrees used on the Plan of Study are exempt).

Any exceptions must be approved by the supervisory committee, and the Graduate College dean and ordinarily involves repeating the comprehensive examinations. The Graduate College may withdraw students who are unable to complete all degree requirements and graduate within the allowed maximum time limits.

**e. 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 towards 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. Enrollment in continuing registration (DES 795) does count towards the 6-hour requirement.

Students with TA/RA .50 FTE appointments (i.e., 20 hours per week), who are appointed within the first 8 weeks of a semester during the academic year, receive an award covering tuition for the semester. Students with TA/RA .50 FTE appointments during the summer session(s) receive an award covering tuition.

Students with TA/RA .25–.49 FTE appointments (i.e., 10–19 hours per week), who are appointed within the first 8 weeks of a semester during the academic year, receive an award covering 100% of the nonresident portion of tuition and an award covering 50% of the remaining tuition for the semester. Students with TA/RA .25–.49 FTE appointments during the summer session(s) receive an award covering 100% of the nonresident portion of tuition and an award covering 50% of the remaining tuition.

The university provides an award covering the premium for individual health insurance for teaching and research assistants/associates who meet the minimum eligibility requirements during the duration of their appointment (coverage periods are August 16–January 15 and January 16–August 15). These are:

- appointment at 50% time (20 hours per week)
- hired as a TA or RA no later than the end of the eighth week of classes of the semester

There are four ways an international student can fulfill the English language requirement for TAs. Any of the following will fulfill the language requirement:

1. Take and pass the SPEAK test with a score of 55 or higher. Only SPEAK scores from Global Launch are allowed.
2. Take the iBT (Internet-based TOEFL) test and receive a score of 26 or higher on the oral portion of the test.
3. Take the IELTS test and receive a score of 8 or higher on the speaking portion of the test.
4. Complete the ITA Teacher Training Course with a score of 'certified.'

**f. Satisfactory Progress, Academic Probation, Progress probation, and Withdrawal from the DSE Program**

Each semester, the Data Science, Analytics, and Engineering Program reviews students' files for satisfactory progress towards completion of the degree. All students will be placed in one the four categories:

- 1) Satisfactory progress;
- 2) Academic Probation;
- 3) Progress probation;
- 4) Withdrawal from the DSE Program.

1. **Satisfactory progress** means that a student does not have any academic and progress probationary issues. In addition to the probationary rules, satisfactory progress includes each semester communication with the student's Committee Chair regarding his/her progress.
2. **Academic Probation** pertains to grades that might affect Program and University policies, including graduation. The following are notices/letters you will receive if one of these pertains to your academics:
  - GPA below 3.0 in approved iPOS courses;
  - Cumulative GPA (post-baccalaureate) below 3.0;
  - 500-level and above (graduate) GPA below 3.0;
  - The deficiency course grade is below 3.0.
3. **Progress probation** pertains to issues dealing with making progress towards a degree. The following are notices/letters you will receive if one of these pertains to your academics:
  - Lack of progress toward completing Ph.D. program admission deficiencies, as specified in your admission letter.
  - Lack of progress toward completing core courses within the first year for full-time students or two years for part-time students (see Section VI.a).

- Failure to take and pass the Ph.D. Qualifying Examination in compliance with the timeline and requirements stated in Section VI.b.
  - Failure to file an iPOS with Committee Chair no later than the semester immediately after passing the Qualifying Examination (see Section VI. d).
  - Failure to take and pass the Ph.D. Comprehensive Exam in compliance with the timeline and requirements stated in Section VI.e.
  - Failure to maintain regular contact with the Committee Chair and make satisfactory progress toward completion of the dissertation.
4. A student is recommended for **withdrawal from the DSE Program** if the student fails to meet the probationary standards placed upon in the semester mentioned in the probationary letter. The student will receive a letter from the Data Science, Analytics, and Engineering Program explaining the reasons for the withdrawal. The student will have 5 calendar days from the date of the letter to appeal the decision. The DSE Graduate Program Committee (GPC) will review the case and will make the necessary recommendation. The Graduate Program Chair or GPC 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 GPC Chair, on behalf of the GPC, will recommend to the Dean's Academic Affairs to withdraw the student from the DSE 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 DSE Program. If the appeal is not granted in favor of the student, the Dean's Academic and Student Affairs will recommend to the Graduate College to withdraw the student from the DSE Program. Please refer the Graduate College on policies and procedures or contact the graduate advisor in the CIDSE Advising Center.

**g. 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. Also, 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> .

**h. DSE 584 Internship**

DSE584 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 several 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.

The 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, students are strongly encouraged to include a maximum of three one-credit hours of CPT course DSE 584 (1 credit hour) as an integral part of their Program of Study, reflected by their approved iPOS. These credits are not part of the 84 mandatory credits. Addition of the CPT course(s) should be done at the initial submission of the student's iPOS. The Internship course cannot be added to an approved iPOS once all coursework has been completed. Exceptions may be made if the internship is relevant to dissertation research.

The GPC 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 DSE 584 course confirms that the internship is an integral part of the degree requirements as planned by the student. An additional internship that is not part of the 84 credit hours can be removed from the iPOS. Note: Only internship courses can be removed from the iPOS. Courses that are approved as part of the overall degree program in the iPOS can only be substituted with other approved coursework.

**Eligibility:** In order to be eligible for an internship, a student must not be in academic probation (refer to section VI.f.2 in the handbook). 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 semester. 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 course is permitted. The DSE 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 can 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 two weeks before the beginning of the semester in which the internship is planned. Students will not be able to request late-add registration of the DSE 584 Internship credit to their class schedule after the drop/add 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 from the Graduate Advisor. Students must receive approval from their faculty advisor and the GPC Chair before registering for DSE 584. To register for the DSE 584 - Internship, a student must not be in academic probation (refer to section VI.g.2 in the handbook). A final Plan of Study must be filed with the Graduate College showing the Internship course before registering for DSE 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.

**Renegé: (verb) to fail to carry out a promise or commitment**

It is unethical for students to continue to seek or consider other employment opportunities once an offer has been accepted. CIDSE expects students to honor an acceptance and withdraw from all employment seeking activities. Students who accept an offer from an organization and later renege/decline the offer will be prohibited from further requesting future CPT pending a meeting with the Assistant Director.

**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 website](#) for guidelines to prepare the final report.

**i. DSE 790 Independent Study**

Independent study is available for Ph.D. 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 GPC Chair, which will be placed in the student's file.

**j. Student chapters of professional societies**

Our graduate students are involved in many professional societies. Most branches of Data Science, Analytics, and Engineering have associated professional societies. Participation in professional societies is an excellent road to career and interest group connections and students are encouraged to discuss society membership with their research advisor. Professors will be happy to sign a membership form that will entitle a student to reduced rates. Professional societies particularly relevant for Data Science, Analytics, and Engineering include ACM (Association for Computing Machinery), ASA (American Statistical Association), IEEE (Institute of Electrical and Electronics

Engineers), IISE (Institute of Industrial and Systems Engineers) and INFORMS (Institute of Operations Research and the Management Sciences). Several of these societies have student chapters at ASU.

### **J. 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 undergraduate experience, and while it provides an 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 understand the norms and expectations of the profession. They are here to help you achieve your educational goals but at the same time they have a responsibility to ensure standards are maintained and student outcomes are achieved before 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 e-mail (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 have trouble understanding in the course or your concern. Instructors and TAs are here to help. Please remember that you are responsible for pre-requisite 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 pre-requisite 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 12 hours each week to devote to each 3-credit course. Also, 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 Committee 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 Committee Chair. The GPC 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 GPC 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 GPC Chair provides all the relevant details such as the course syllabus, assignment handout, e-mail exchange with the instructor, etc. so that the GPC Chair can promptly act on your concerns. Please be brief and precise in the description of your concerns. In some cases, the GPC or GPC 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 through this process, contact the CIDSE School Director or 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 documentation.
- Act proactively and promptly.

### **In Summary, Guidelines for Avoiding Problems**

- Be sure you have the necessary pre-requisite knowledge before starting a course;
- Attend class and online exercises regularly;
- Devote time each week to studying to avoid getting 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 an 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 GPC 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.

### Approved DSE Graduate Courses

Required Core Courses for the Degree			
Prefix and Number	Course Title	New Course?	Credit Hours
IEE 520 or CSE 572	Statistical Learning for Data Mining Data Mining	No	3
IEE 670 or STP 502	Mathematical Statistics Theory of Statistics II: Inference	No	3
CSE 510	Database Management System Implementation	No	3
CSE 543	Information Assurance and Security	No	3
Electives Courses <i>(as deemed necessary by supervisory committee)</i>			
Prefix and Number	Course Title	New Course?	Credit Hours
CSE 511	Data Processing at Scale	No	3
CSE 512	Distributed Data Systems	No	3
CSE 515	Multimedia and Web Databases	No	3
CSE 546	Cloud Computing	No	3
CSE 548	Advanced Computer Network Security	No	3
CSE 550	Combinatorial Algorithms and Intractability	No	3
CSE 551	Foundations of Algorithms	No	3
CSE 552	Randomized and Approximation Algorithms	No	3
CSE 555	Theory of Computation	No	3
CSE 556	Game Theory with Applications to Networks	No	3
CSE 561	Modeling and Simulation Theory and Application	No	3
CSE 565	Software Verification, Validation and Testing	No	3
CSE 569	Fundamentals of Statistical Learning and Pattern Recognition	No	3
CSE 571	Artificial Intelligence	No	3
CSE 573	Semantic Web Mining	No	3
CSE 574	Planning and Learning Methods in AI	No	3
CSE 575	Statistical Machine Learning	No	3
CSE 576	Topics in Natural Language Processing	No	3
CSE 578	Data Visualization	No	3
CSE 579	Knowledge Representation and Reasoning	No	3
CSE 598	Algorithms in Computational Biology	No	3
IEE 506	Web-Enabled Decision Support Systems	No	3
IEE 511	Analysis of Decision Processes	No	3
IEE 512	Introduction to Financial Engineering	No	3
IEE 521	Urban Operations Research	No	3
IEE 526	Operations Research in Healthcare	No	3
IEE 545	Advanced Simulating Stochastic Systems	No	3
IEE 570	Advanced Quality Control	No	3
IEE 572	Design Engineering Experiments	No	3
IEE 573	Reliability Engineering	No	3
IEE 574	Applied Deterministic Operations Research	No	3
IEE 575	Applied Stochastic Operations Research Models	No	3
IEE 577	Data Science for Systems Informatics	No	3
IEE 578	Regression Analysis	No	3
IEE 579	Time Series Analysis/Forecasting	No	3

IEE 582	Response Surfaces/Process Optimization	No	3
IEE 605	Foundations of Information Systems Engineering	No	3
IEE 620	Optimization I	No	3
IEE 622	Optimization II	No	3
IEE 640	Probability and Stochastic Processes	No	3
IEE 672	Adv Topics-Experimental Design	No	3
STP 505	Bayesian Statistics	No	3
STP 526	Theory of Statistical Linear Models	No	3
STP 530	Applied Regression Analysis	No	3
STP 532	Applied Nonparametric Statistics	No	3
STP 533	Applied Multivariate Analysis	No	3
STP 540	Computational Statistics	No	3
STP 598	Topic: Causal Inference	No	3
STP 598	Topic: Machine Learning / Statistical Learning	No	3
STP 598	Topic: Time Series	No	3
STP 598	Topic: Advanced Design of Experiment	No	3
APM 505	Applied Linear Algebra	No	3
APM 523	Optimization	No	3
APM 525	High-Performance Computing	No	3
APM 598	Topic: Fourier Analysis and Wavelets	No	3
EEE 551	Information Theory	No	3
EEE 558	Wireless Communications	No	3
EEE 581	Filtering of Stochastic Processes	No	3
EEE 585	Security and Privacy in Networked Systems	No	3
EEE 591	Topic: Machine Learning and Data Science: Theory to Practice	No	3
EEE 598	Topic: Statistical Machine Learning from Foundations to Algorithm	No	3
EEE 598	Topic: Convex Optimization	No	3
EEE 598	Topic: Special Topics in Machine Learning	No	3
EEE 598	Topic: Distributed and Large Scale Optimization	No	3
EEE 598	Topic: Remote Sensing and Adaptive Radar	Np	3
EEE 598	Topic: Introduction to Complex Networks and Machine Learning	No	3
EEE 598	Topic: Speech and Audio Processing and Perception	No	3
EEE 598	Topic: Machine Learning for Smart Grid	No	3
EEE 598	Topic: Neuromorphic Hardware Design	No	3

#### Other Requirements

**Students must select coursework from either the Data Engineering Requirement or the Data Analytics Requirement. Students cannot take a Data Engineering or Data Analytics course and have it meet an elective requirement at the same time. Students will need to take a different elective course to reach the total number of credit hours required for the program. Other coursework may be used with approval of the academic unit to fulfill these requirements. All students must take the qualifying exams.**

*E.g. – internships, clinical requirements, field studies, foreign language exam as applicable*

Data Engineering requirements:

- CSE 512 Distributed Database Systems (3),
- CSE 515 Multimedia and Web Databases (3), and
- CSE 546 Cloud Computing (3)

or
Data Analytics requirements: CSE 575 Statistical Machine Learning (3) or ECE 598 Topic: Statistical Machine Learning (3), CSE 578 Data Visualization (3), and one of IEE 578 Regression Analysis (3), IEE 620 Optimization I (3), APM 523 Optimization (3) or EEE 598 Topic: Convex Optimization (3).
and
Passing the Qualifying Exam covering the required core courses within one year of matriculation into the program and completing deficiencies. Deficiencies must be completed within one year of matriculation..

## COURSE DESCRIPTIONS

### **DSE 591 Seminar**

A small class emphasizing discussion, presentations by students, and written research papers.

### **DSE 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. Check with the instructor for pre-requisites and/or co-requisites.

### **DSE 684 Internship**

Structured practical experience following a contract or plan, supervised by faculty and practitioners.

### **DSE 691 Seminar**

A small class emphasizing discussion, presentations by students, and written research papers.

### **DSE 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.

### **DSE 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.

### **DSE 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.

### **DSE 799 Dissertation**

Supervised research focused on preparation of dissertation, including literature review, research, data collection and analysis, and writing. Grading method: Pass/Fail with Z Option

#### **Data Science, Analytics, and Engineering Faculty**

<b>Name</b>	<b>Rank</b>	<b>Highest Degree</b>	<b>Area of Specialization/Expertise</b>
Ahmed Alkhateeb	Asst. Prof.	PhD	Machine Learning for Wireless Communications, Edge Computing, Computer Vision
David Allee	Professor	PhD	Machine Learning Applications
Ronald Askin	Professor	PhD	Applied Optimization and Statistics
Chitta Baral	Professor	PhD	Artificial Intelligence
Rida Bazzi	Assoc. Professor	PhD	Machine Learning, Privacy and Security
Visar Berisha	Assoc. Professor	PhD	Audio processing for health
Dimitri Bertsekas	Professor	PhD	Foundations of Machine Learning
Daniel Bliss	Assoc. Professor	PhD	Battlefield Signal Processing
K. Selcuk Candan	Professor	PhD	Data Management
Chris Bryan	Asst. Prof.	PhD	Visualization and HCI

Yu (Kevin) Cao	Professor	PhD	Machine Learning Hardware; Neural Inspired Computing
Chaitali Chakrabarti	Professor	PhD	Hardware for Machine Learning
Charles Colbourn	Professor	PhD	Combinatorial Design Theory & Network Algorithms
Gautam Dasarathy	Asst. Prof.	PhD	Iterative ML, High Dimensional Statistics, Data Science on Graphs, Information Theory
Adolfo Escobedo	Asst. Prof.	PhD	Optimization
Malena Espanol	Asst. Prof.	PhD	Numerical Linear Algebra and Image processing
Georgios Fainekos	Assoc. Prof.	PhD	Cyber Physical Systems
Deliang Fan	Asst. Prof.	PhD	ML Hardware; Security of AI Systems
Stephanie Forrest	Professor	PhD	Adaptive Systems; biology and computation
John Fricks	Assoc. Prof.	PhD	Stochastic Modeling, Statistical Inference
Kevin Gary	Assoc. Prof.	PhD	Software Engineering Analytics
Esmá Gel	Assoc. Prof.	PhD	Operations Research
Mojdeh Hedman	Asst. Prof.	PhD	Machine Learning for Power Systems
Sharon Hsiao	Asst. Prof.	PhD	Learning Analytics and Data Visualization
Suren Jayasuriya	Asst. Prof.	PhD	Visual Scene Recognition
Feng Ju	Asst. Prof.	PhD	Applied Optimization and Statistical Modeling
Ming-Hung Kao	Assoc. Prof.	PhD	Optimal Experimental Design; Functional MRI analysis
Oliver Kosut	Assoc. Prof.	PhD	Information Theory
Yin-Cheng Lai	Professor	PhD	Machine Learning, Nonlinear Dynamics; Complex Networks, Data Analysis
Shiwei Lan	Asst. Prof.	PhD	Statistical Computing, Bayesian Modeling
Heewook Lee	Asst. Prof.	PhD	Computational Biology and Algorithms
Baoxin Li	Professor	PhD	Visual computing and Machine Learning

Jing Li	Assoc. Prof.	PhD	Statistical Modeling
Robert LiKamWa	Asst. Prof.	PhD	Machine Learning
Ross Maciejewski	Assoc. Prof.	PhD.	Visualization and Data Science
Robert McCulloch	Professor	PhD	Machine Learning & Statistical Computing
Katina Michael	Professor	PhD	Socioethical implications of Big Data; Implantable technologies
Pitu Mirchandani	Professor	PhD	Optimization
Hans Mittelmann	Professor	PhD	Optimization and Software
Douglas Montgomery	Regents Professor	PhD	Statistical Modeling and DOE
Sebastien Motsch	Assoc. Prof.	PhD	Machine Learning and Applied Math
Angelia Nedich	Professor	PhD	Large Scale Optimization
Umit Ogras	Assoc. Prof.	PhD	Machine Learning for Embedded Systems; Edge Computing
Theodore Pavlic	Asst. Prof.	PhD	Modeling and Nonlinear Optimization
Rong Pan	Assoc. Prof.	PhD	Statistical Modeling
Antonia Papandreou- Suppappola	Professor	PhD	Bayesian Nonparametric Learning Signal Processing for Data Science
Giulia Pedrielli	Asst. Prof.	PhD	Simulation Optimization
Rodrigo Platte	Assoc. Prof.	PhD	Function Approximation and Inverse Problems
Rosemary Renaut	Professor	PhD	Numerical Linear Algebra
Mark Reiser	Assoc. Prof.	PhD	Multivariate analysis, mixed models
Fengbo Ren	Asst. Prof.	PhD	Parallel Computing/Embedded Systems
Andrea Richa	Professor	PhD	Complex Systems, Networks and Biomimicry
Christ Richmond	Assoc. Prof.	PhD	Information Theory; Signal Processing
George Runger	Professor	PhD	Statistical Modeling

Lalitha Sankar	Assoc. Professor	PhD	Machine Learning, Cyber Security and Big Data
Anna Scaglione	Professor	PhD	Internet of Things
Jorge Sefair	Asst. Prof.	PhD	Optimization
Jaesun Seo	Asst. Prof.	PhD	Hardware for Machine Learning
Aviral Shrivastava	Assoc. Prof.	PhD	Embedded and Multicore Systems
Jennie Si	Professor	PhD	Reinforcement Learning, Approx. DP
Siddharth Srivastava	Asst. Prof.	PhD	Sequential Decision Making
Andreas Spanias	Professor	PhD	Information Signal Processing
Siddharth Srivastava	Asst. Prof.	PhD	Sequential Decision making and robotics
Violet Syrotiuk	Assoc. Prof.	PhD	Dynamic Network Optimization
Cihan Tepedelenlioglu	Assoc. Prof.	PhD	Optimization, Signal Processing, Information Theory
Yalin Wang	Assoc. Prof.	PhD	Geometric Modeling and Topology
Bruno Welfert	Assoc. Prof.	PhD	Scientific Computing, HPC
Yang Weng	Asst. Prof.	PhD	Power System Optimization
Teresa Wu	Professor	PhD	Health Info System Design & Analytics
Guoliang Xue	Professor	PhD	Optimization; Big Data enabled networking; Truth discovery, Auto ML
Hao Yan	Asst. Prof.	PhD	Data Analytics
Nong Ye	Professor	PhD	Information Systems
Yezhou Yang	Asst. Prof.	PhD	Cognitive Robotics
Junshan Zhang	Professor	PhD	Edge Computing, Distributed & Reinforcement Learning; Privacy; Info Theory
Yanchao Zhang	Professor	PhD	Social Networks and Data Mining
Yi Zheng	Professor	PhD	Applied Regression Analysis
Ming Zhao	Assoc. Prof.	PhD	Data-driven systems
Jia Zou	Asst. Prof.	PhD	Data Science



### 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 50% of the student's official committee must be physically present with the student at the oral exam, prospectus, and final dissertation defense unless this rule has been temporarily suspended by the university due to a pandemic or similar situation. If at least 50% of the committee cannot be physically present, the exam/defense must be rescheduled.
2. 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.
3. The chair or (one co-chair) must be physically present at the oral exam, prospectus, or final dissertation defense unless the university has suspended this rule due to a temporary situation such as a pandemic. 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.
4. 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 GPC 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 GPC 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 College 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 College prior to the defense date.