

# Ph.D. in Data Science

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The PhD program in Data Science will prepare and train individuals who can immediately obtain positions in industry using data to guide decision-making, it can be applied to an array of industries which includes enterprise management, marketing, medical treatment options, scientific research and development services, aerospace product and parts manufacturing, securities, commodity contracts, and financial investment activities. The program is open to individuals from many backgrounds.

## Admissions Requirements

Applicants who hold a Bachelor of Science degree or equivalent from any regionally accredited university, or international institutions of comparable stature, will be considered for admission.

We will also consider the following kinds of applications for admission to the PhD program:

- Applicants who hold a degree in a related field in the mathematical and computational sciences (e.g., mathematics, computer sciences, statistics, data science, economics, business analytics, computational biology, computational chemistry, engineering, health sciences) or any technical field, as long as they have completed sufficient courses in mathematics, statistics and computing, as determined by the Doctoral Program Committee
- Applicants who have a Master's degree in these fields, as well as those who have a doctoral degree in another field.
- Applicants must have at least a 3.0 undergraduate major GPA (or equivalent, as determined by the Doctoral Committee; for example, some universities do not assign GPAs).
- Applicants must provide three letters of recommendation from previous professors, supervisors, or others qualified to evaluate the applicant.
- Applicants must submit a statement summarizing her/his research interests and future plans.
- Applicants must provide the Graduate Record Exam (General or Mathematical Sciences).
- Applicants from countries where English is not the first language are required to demonstrate English proficiency. Please consult the graduate school (<http://catalog.utep.edu/admissions/graduate/graduate-student/>) website for required scores.
- Exceptional applicants who do not meet all of these requirements (with the exception of a required score on the TOEFL exam) may be accepted conditionally but must maintain a 3.5 GPA in the first 12 units of instruction. After they have satisfied this requirement, they will be admitted to regular status.
- Both full-time and part-time students will be accepted into the program.
- Students transferring from other graduate programs will be accepted if they meet all requirements listed above; their previous coursework will be credited upon evaluation by the Doctoral Program Committee.

Undergraduate coursework should include at least one semester of calculus and statistics and at least one upper-division course in either mathematics, statistics or computing. Undergraduate preparation in the core fields of mathematics, computing and statistics is highly recommended. Basic computer skills are essential, including word processing, database development and maintenance, and operational knowledge of statistical software or a basic computing software.

## Candidacy/Dissertation

The student will be expected to form a doctoral committee before completing 24 credit hours, and present a research proposal to the committee members before completing 40 credit hours. The committee will meet at least once per term with the student, to evaluate progress. If the progress is deemed inadequate, the student will be given one year to remedy the situation. If progress continues to be inadequate, the student will be dismissed from the program. Inadequate progress shall be defined as not completing coursework on schedule, or not completing research objectives, as outlined by the advisor and the student's committee.

Students will be required to pass a written qualifying exam in Data Science within 6 months of completing the core coursework. If a student fails the exam, he/she may repeat the exam once within a 6-month period. If a student fails the exam the second time, he/she will not be allowed to continue in the program. After consultation with the Doctoral Committee, such a student may be allowed to complete the requirements for a Master's Degree, using the coursework completed as part of the doctoral requirements. Once a student passes the exam she/he will be advanced to candidacy. An oral exam will be required at the end of the third year. This will be focused on the chosen research topic of the candidate and the questions will be provided by the doctoral committee members.

A doctoral dissertation, directed by the major professor and doctoral committee, will be required of all students. A member of the core faculty of the Department of Mathematical Sciences will advise the dissertation with the possibility of an associated faculty member outside of the Department of Mathematical Sciences co-advising. A candidate must successfully defend his/her dissertation orally, in a forum that is open to the public. Each student is expected to submit or publish at least one peer reviewed paper during his or her tenure at UTEP. Students will normally graduate within 4 or 5 years. Current Graduate School regulations mandate that once a student exceeds 90 units, he/she may not be eligible for a state supported assistantship.

## Degree Plan

Code	Title	Hours
<b>Required Core Courses:</b>		
DS 6380	Math Found of DS I	3
DS 6381	Math Found of DS II	3
DS 6474	Introduction to Data Mining	4
MATH 6330	Comp Methods of Linear Algebra	3
STAT 6385	Statistics in Research	3
<b>Prescribed Elective Courses:</b>		
Take one course from each domain-four total		
Data Science Theory Courses		3
DS 6382	Stat. Theory for Big Data	
DS 6384	Linear Models for DS	
DS 6388	Multivariate Stat Meth HD Data	
Data Science Application Courses		3-4
BINF 5354	Post-Genomic Analysis	
DS 6494	Statistical Data Mining	
DS 6392	Adv. Computational Data Sci.	
STAT 6388	Multivariate Data Analysis	
Mathematical Application Courses		3
DS 6336	Math Applications in DS	
MATH 6329	Numerical Analysis	
MATH 6335	Techniques in Optimization	
Computing Courses		3
CS 6361	Machine Learning	
DS 6339	Data Visualization	
STAT 6329	Statistical Programming	
STAT 6392	Statistical Computing	
<b>Elective Courses:</b>		
Take four of this set		12
CS 6334	Parallel & Concurrent Program	
CS 6350	Advanced Algorithms	
CS 6362	Data Mining	
Advanced Inference		
MATH 6311	Topics in Applied Mathematics	
MATH 6386	Stochastic Dif Eqns and Ap	
MATH 6343	Numer Solution Part Diff Equat	
MATH 6321	Measure and Probability Th	
STAT 6336	Categorical Data Analysis	
STAT 6370	Special Topics	
STAT 6386	Stochastic Processes	
STAT 6391	Time Series Analysis	
STAT 6393	Survival Analysis	
STAT 6397	Longitudinal Data Analysis	
STAT 6428	Intro to Statistical Analysis	
<b>Required- Other:</b>		
DS 6335	Intro to DS Collaborations	3
DS 6390	DS Research Collaborative (Must take 3 times)	9
Select 9 hours of DS, MATH, STAT graduate courses with advisor approval		9
<b>Dissertation</b>		
DS 6398	Dissertation I	3

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DS 6399	Dissertation II	3
<b>Total Hours</b>		<b>67-68</b>