Master of Science in Applied Data Science (Physics)

About This Program

The Master of Science in Applied Data Science with an emphasis in Physics prepares students to analyze and interpret large-scale physical data using modern computational tools. Through coursework in areas such as artificial intelligence in dynamic system control, astrophysics, biophysics, computational physics, experimental physics and design, instrumentation, particle physics, space physics, and statistical physics, students gain the knowledge necessary to apply data science techniques to complex questions in the physical sciences. This emphasis enables students to leverage massive datasets and catalogs generated by some of the largest data collection instruments and missions in the world (such as the high energy particle detectors in Fermilab and CERN, NASA's astronomy and space missions, as well as "-omics" datasets in biophysical research) to uncover patterns, test hypotheses, and generate meaningful physical insights. A 3-semester credit hour (SCH) capstone project or professional internship provides hands-on experience applying analytical methods to real-world physical challenges. The program can be completed in 18 months (full-time students may complete it in 12 months).

Competencies

1. Upon completion, students will be able to apply statistical methodologies to real-world data from diverse applications.
2. Upon completion, students will be able to understand computational aspects of big data analytics.
3. Upon completion, students will be able to work across a variety of disciplines, understanding modern physical science data collection tools, procedures, cleaning, feature engineering, and analytical approaches. They will learn to use high-performance computing and AI methods to address complex physical problems, develop and apply models to predict physical phenomena and simulate physical systems, and visualize complex datasets to identify patterns and communicate findings effectively.

Admissions Criteria

All applicants for the Applied Data Science MS must meet UT Arlington's graduate admission requirements (https://catalog.uta.edu/academicregulations/admissions/graduate/). The program does not consider GRE scores in evaluating candidates for admission.

To be considered for admission, applicants must demonstrate undergraduate preparation equivalent to a baccalaureate degree in natural, physical, or social sciences, technology, engineering, mathematics, business, or related fields. To apply for a specific track, applicants must demonstrate sufficient background in that concentration with a relevant bachelor's degree.

Applicants must submit two letters of recommendation from evaluators who can assess the candidate's potential for academic success.

UNCONDITIONAL ADMISSION

Applicants who demonstrate a GPA of 3.0 and strong support from references will be considered for unconditional admission. Applicants with a GPA of 2.7 or higher (but less than 3.0) who demonstrate relevant work experience and/or certification may be offered unconditional admission upon review.

All admitted students must complete the program's self-paced, non-credit online review, "Math Foundation of Machine Learning," prior to enrolling in classes.

Curriculum

Foundations		
ASDS 5301	STATISTICAL THEORY AND APPLICATIONS	3
ASDS 5302	PRINCIPLE OF DATA SCIENCE	3
ASDS 5303	STATISTICAL AND SCIENTIFIC COMPUTING I	3
ASDS 6306	INTERNSHIP/CAPSTONE RESEARCH PROJECT	3
Physics Specialization		
PHYS 5319	MATHEMATICAL METHODS IN PHYSICS III	3
Select three from the following:		9
PHYS 5305	CHAOS AND NONLINEAR DYNAMICS	
PHYS 5306	CLASSICAL MECHANICS	
PHYS 5307	QUANTUM MECHANICS I	
PHYS 5308	QUANTUM MECHANICS II	
PHYS 5309	ELECTROMAGNETIC THEORY I	
PHYS 5310	STATISTICAL MECHANICS	

PHYS 5311	MATHEMATICAL METHODS IN PHYSICS I	
PHYS 5312	MATHEMATICAL METHODS IN PHYSICS II	
PHYS 5313	ELECTROMAGNETIC THEORY II	
PHYS 5315	SOLID STATE I	
PHYS 5325	INTRODUCTION TO ELEMENTARY PARTICLES I	
Data Science Electives		
Select 6 hours from the following:		6
ASDS 5305	DEEP LEARNING AND ARTIFICIAL NEURAL NETWORKS	
ASDS 6300	SPECIAL TOPICS	
ASDS 6301	ADVANCE REGRESSION ANALYSIS	
ASDS 6302	MACHINE LEARNING WITH APPLICATIONS	
ASDS 6303	DATA MINING WITH INFORMATION VISUALIZATION	
ASDS 6304	OPTIMIZATION AND BIG DATA ANALYTICS	
ASDS 6305	STATISTICAL AND SCIENTIFIC COMPUTING II	
ASDS 5100	INDEPENDENT STUDY	
Total Hours		**30**

Advising Resources

UNDERGRADUATE AND GRADUATE ADVISING

Location:

Life Science Building Room 206A and 206B

Email:

data.advising@uta.edu

Phone:

817-272-1512

Web:

Speak to an advisor in the Division of Data Science or schedule an appointment. (https://www.uta.edu/academics/schools-colleges/science/departments/division-data-science/advising/)