Data Science (BS)

The Data Science BS is jointly offered by the Department of Mathematical Sciences in the School of Natural Sciences and Mathematics and the Department of Computer Science in the Erik Jonsson School of Engineering and Computer Science. Data Science is an emerging discipline that lies at the intersection of Computer Science, Mathematics, and Statistics. The curriculum for the program provides a solid foundation in all the three disciplines. It prepares students for Data Scientist or related positions in industry, business, and government that are currently in high demand and also for graduate study in either of the three disciplines. The curriculum also includes a capstone project course.

Bachelor of Science in Data Science

**Degree Requirements** [120 semester credit hours]

**NSM Faculty**

**Professors:** Larry P. Ammann, Zalman I. Balanov, Pankaj K. Choudhary, Mieczyslaw K. Dabkowski, Vladimir Dragovic, Sam Efromovich, Yulia Gel, M. Ali Hooshyar, Wieslaw Krawcewicz, Susan E. Minkoff, L. Felipe Pereira, Dmitry Rachinskiy, Viswanath Ramakrishna, Janos Turi, John Zweck

**Professors Emeritus:** Patrick Odell, John W. Van Ness

**Clinical Professors:** Natalia Humphreys, Wenyi (Roy) Lu

**Associate Professors:** Swati Biswas, Yan Cao, Min Chen

**Assistant Professors:** Mohammad Akbar, Maxim Arnold, Carlos Arreche, Bhargab Chattopadhyay, Sy Han (Steven) Chiou, Qingwen Hu, Frank Konietzchke, Yifei Lou, Oleg Makarenkov, Tomoki Oshawa, Sunyoung Shin, Anh Tran, Nathan Williams

**Senior Lecturers:** Mohammad Ahsan, Kelly Aman, Malgorzata Dabkowska, Rabin Dahal, Anatoly Eydelzon, Manjula Foley, Bentley T. Garrett, Farid Khafizov, Yuly Koshevnik, David L. Lewis, Changsong Li, Brady McCary, Derege Mussa, My Linh Nguyen, Jigarkumar Patel, Paul Stanford, Julie Sutton, Tristan Whalen

**UT Dallas Affiliated Faculty:** Hervé Abdi, Titu Andreescu, Alain Bensoussan, Stefano Leonardi, Faruck Morcos, John J. Wiorowski, Zhenyu Xuan, Hyuntae Yoo, Michael Qiwei Zhang

**ECS Faculty**

**Professors:** Farokh B. Bastani, R. Chandrasekaran, Ovidiu Daescu, Yvo G. Desmedt, Ding-Zhu Du, András Faragó, Paul Fishwick, Gopal Gupta, Zygmunt Haas, Sandra M. Harabagiu, Dung T. Huynh, Jason Jue, Murat Kantarcioğlu, Latifur Khan, Andrian Marcus, Dan I. Moldovan, Yu-Chung (Vincent) Ng, Simeon C. Ntafos, Ivor P. Page, Balakrishnan Prabhakaran, Ravi Prakash, Balaji Raghavachari, Ivan Hal Sudborough, Bhavani Thuraisingham, Subbarayan Venkatesan, W. Eric Wong, Weili Wu, I-
Ling Yen, Kang Zhang, Si Qing Zheng

Professors Emeritus: William J. Pervin, Klaus Truemper

Associate Professors: Sergey Bereg, Lawrence Chung, Jorge A. Cobb, Vibhav Gogate, Xiaohu Guo, Kevin Hamlen, Zhiqiang Lin, Yang Liu, Neeraj Mittal, Sriraam Natarajan, Tien Nguyen, Kamil Sarac, Haim Schweitzer, Rym Zalila-Wenkstern

Assistant Professors: Alvaro Cárdenas, Kyle Fox, Shuang Hao, Cong Liu, Ryan McMahan, Benjamin Raichel, Nicholas Ruozzi, Shiyi Wei, Lingming Zhang


I. Core Curriculum Requirements: 42 semester credit hours

Communication: 6 semester credit hours

RHET 1302 Rhetoric

Select any 3 semester credit hours from Communications option (see advisor)

Mathematics: 3 semester credit hours

MATH 2417 Calculus 3, 4

Life and Physical Sciences: 6 semester credit hours

PHYS 2325 Mechanics

or PHYS 2421 Honors Physics I Mechanics and Heat

PHYS 2326 Electromagnetism and Waves

or PHYS 2422 Honors Physics II Electromagnetism and Waves

Language, Philosophy and Culture: 3 semester credit hours

Select any 3 semester credit hours from Language, Philosophy and Culture core courses (see advisor)

Creative Arts: 3 semester credit hours

Select any 3 semester credit hours from Creative Arts core courses (see advisor)
American History: 6 semester credit hours
Select any 6 semester credit hours from American history core courses (see advisor)

Government/Political Science: 6 semester credit hours
   GOVT 2305 American National Government
   GOVT 2306 State and Local Government

Social and Behavioral Sciences: 3 semester credit hours
Select any 3 semester credit hours from Social and Behavioral Sciences core courses (see advisor)

Component Area Option: 6 semester credit hours
   MATH 2417 Calculus I
   MATH 2419 Calculus II
   PHYS 2125 Physics Laboratory

II. Major Requirements: 65-67 semester credit hours

Major Preparatory Courses: 22-24 semester credit hours beyond Core Curriculum
   CS 1136 Computer Science Laboratory
   CS 1336 CS Programming Fundamentals
   CS 1337 Computer Science I
   CS 2336 Computer Science II
   CS 2305 Discrete Mathematics for Computing I
      or MATH 3315 Discrete Mathematics and Combinatorics
   MATH 2417 Calculus I
   MATH 2418 Linear Algebra
   MATH 2419 Calculus II
   MATH 2451 Multivariable Calculus with Applications
   PHYS 2125 Physics Laboratory
   PHYS 2325 Mechanics
      or PHYS 2421 Honors Physics I Mechanics and Heat
   PHYS 2126 Physics Laboratory II
**PHYS 2326** Electromagnetism and Waves$^{3, 5}$

or **PHYS 2422** Honors Physics II Electromagnetism and Waves$^{3, 5}$

**Major Core Courses: 43 semester credit hours**

**CS 3345** Data Structures and Introduction to Algorithmic Analysis

**CS 4347** Database Systems

CS 4371 Introduction to Big Data Management and Analytics

CS 4372 Computational Methods for Data Scientists

**CS 4375** Introduction to Machine Learning

**MATH 3310** Theoretical Concepts of Calculus

**MATH 4301** Mathematical Analysis I

**STAT 3355** Data Analysis for Statisticians and Actuaries

**STAT 4351** Probability

**STAT 4352** Mathematical Statistics

**STAT 4354** Numerical and Statistical Computing

**STAT 4355** Applied Linear Models

**STAT 4360** Introduction to Statistical Learning

STAT 4475 Capstone Project

or CS 4475 Capstone Project

or MATH 4475 Capstone Project

### III. Elective Requirements: 11-13 semester credit hours

**Guided Electives: 11-13 semester credit hours**

Although both lower- and upper-division courses may count as guided electives, they must be approved by the advisor and the student must complete at least 51 semester credit hours of upper-division courses to qualify for graduation.

**NOTE:** Students transferring into this program at the upper-division level are expected to have completed all of the 1000- and 2000-level Mathematics and Computer Science core course requirements.

1. Incoming freshmen must enroll and complete requirements of UNIV 1010 and the corresponding school-related freshman seminar course. Students, including transfer students, who complete their core curriculum at UT Dallas must take UNIV 2020.
2. Curriculum Requirements can be fulfilled by other approved courses from institutions of higher education. The courses listed are recommended as the most efficient way to satisfy both Core Curriculum and Major Requirements at UT Dallas.

3. A required Major course that also fulfills Core Curriculum requirements. If semester credit hours are counted in the Core Curriculum, students must complete additional coursework to meet the minimum requirement for graduation. Course selection assistance is available from the undergraduate advisor.

4. Three semester credit hours of Calculus are counted to fulfill the Mathematics Core Requirement with the remaining one semester credit hour to be counted under Component Area Option Core.

5. Six semester credit hours of Physics are counted under Science core, and one semester credit hour of Physics (PHYS 2125) is counted under Component Area Core.

6. MATH 2417 and MATH 2419 requirements can be fulfilled by completing MATH 2413, MATH 2414, and MATH 2415.

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