DATA ENGINEERING - BS

The Data Engineering program trains students in data handling, manipulation, mining, visualization, and storage methods that lead to optimal information and knowledge extraction to facilitate decision-making in complex systems.

Data Engineering is an emerging field focused on transforming data into contextual information using quantitative and computational tools. The program includes a two-semester long capstone senior design experience, which is a part of the hands-on experience with workshop-style real-world problem-solving situations.

Program Requirements

The freshman year is identical for degrees in aerospace engineering, architectural engineering, civil engineering, computer engineering, computer science, data engineering, electrical engineering, electronic systems engineering technology, environmental engineering, industrial distribution, industrial engineering, interdisciplinary engineering, manufacturing and mechanical engineering technology, mechanical engineering, multidisciplinary engineering technology, nuclear engineering, ocean engineering, and petroleum engineering. The freshman year is slightly different for chemical engineering, biomedical engineering and materials science and engineering degrees in that students take CHEM 119 or CHEM 107/CHEM 117 and CHEM 120. Students pursuing degrees in biological and agricultural engineering should refer to the specific curriculum for this major. It is recognized that many students will change the sequence and number of courses taken in any semester. Deviations from the prescribed course sequence, however, should be made with care to ensure that prerequisites for all courses are met.

First Year

Fall		Semester Credit Hours
CHEM 107	General Chemistry for Engineering Students [1,4]	3
CHEM 117	General Chemistry for Engineering Students Laboratory [1,4]	1
ENGL 103 or ENGL 104	Introduction to Rhetoric and Composition [1] or Composition and Rhetoric	3
ENGR 102	Engineering Lab I - Computation [1]	2
MATH 151	Engineering Mathematics I [1,2]	4
University Core Curriculum (https://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/) [3]		3
	Semester Credit Hours	**16**
Spring		
ENGR 216/ PHYS 216	Experimental Physics and Engineering Lab II - Mechanics [1]	2
MATH 152	Engineering Mathematics II [1]	4
PHYS 206	Newtonian Mechanics for Engineering and Science [1]	3
University Core Curriculum (https://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/) [3]		3
Select one of the following:		3-4
CHEM 120	Fundamentals of Chemistry II [1,4]	
University Core Curriculum (https://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/) [3,5]		
	Semester Credit Hours	**15-16**
	Total Semester Credit Hours	**31-32**

1. A grade of C or better is required.
2. Entering students will be given a math placement exam. Test results will be used in selecting the appropriate starting course which may be at a higher or lower level.
3. Of the 21 hours shown as University Core Curriculum electives, 3 must be from creative arts (see AREN curriculum for more information), 3 from social and behavioral sciences (see DAEN and IDIS curriculum for more information), 3 from language, philosophy and culture (see CVEN, EVEN and PETE curriculum for more information), 6 from American history and 6 from government/political science. The required 3 hours of international and cultural diversity and 3 hours of cultural discourse may be met by courses satisfying the creative arts, social and behavioral sciences, language, philosophy and culture, and American history requirements if they are also on the approved list of international and cultural diversity (https://catalog.tamu.edu/undergraduate/general-information/degree-information/international-cultural-diversity-requirements/) courses and cultural discourse (https://catalog.tamu.edu/undergraduate/general-information/degree-information/cultural-discourse-requirements/) courses.
4. BMEN, CHEN and MSEN require 8 hours of fundamentals of chemistry which are satisfied with CHEM 119 or CHEM 107/CHEM 117 and CHEM 120; Students with an interest in BMEN, CHEN and MSEN can take CHEM 120 second semester freshman year. CHEM 120 will substitute for CHEM 107/CHEM 117.
5. For BS-PETE, allocate 3 hours to core communications course (ENGL 210, COMM 203, COMM 205, or COMM 243) and/or 3 hours to UCC elective. For BS-MEEN, allocate 3 hours to core communications course (ENGL 203, ENGL 210, COMM 203 or COMM 205) and/or 3 hours to UCC elective.

Second Year

Fall		Semester Credit Hours
CSCE 120	Program Design and Concepts [1]	3
CSCE 222/ ECEN 222	Discrete Structures for Computing [1]	3
ENGR 217/ PHYS 217	Experimental Physics and Engineering Lab III - Electricity and Magnetism [1]	2
MATH 251 or MATH 253	Engineering Mathematics III [1] or Engineering Mathematics III	3
PHYS 207	Electricity and Magnetism for Engineering and Science [1]	3
STAT 211 or ECEN 303	Principles of Statistics I [1] or Random Signals and Systems	3
	Semester Credit Hours	**17**
Spring		
CSCE 221	Data Structures and Algorithms [1]	4
DAEN 210	Uncertainty Modeling [1]	3
ECON 202 or ECON 203	Principles of Economics [1, 6] or Principles of Economics	3

MATH 304 or MATH 323	Linear Algebra [1] or Linear Algebra	3
Select one of the following:		3
CSCE 305	Computational Data Science [1]	
ECEN 360	Computational Data Science [1]	
STAT 315	Computational Data Science [1]	
	Semester Credit Hours	**16**
Third Year		
Fall		
CSCE 310	Database Systems [1]	3
DAEN 300	Data Engineering Coding Experience I [1]	1
DAEN 321 or STAT 212	Quantitative Models for Statistical and Machine Learning [1] or Principles of Statistics II	3
DAEN 331	Optimization of Analytics [1]	3
ISEN 302	Economic Analysis of Engineering Projects [1]	2
MATH 308	Differential Equations [1]	3
	Semester Credit Hours	**15**
Spring		
DAEN 301	Data Engineering Coding Experience II [1]	1
DAEN 323	Statistical Learning and Decisions [1]	3
DAEN 328	Data Engineering for Humans [1]	3
CSCE 320/ STAT 335	Principles of Data Science [1]	3
Select one of the following:		3
COMM 203	Public Speaking	
COMM 205	Communication for Technical Professions	
ENGL 203	Writing about Literature	
ENGL 210	Technical and Professional Writing	
University Core Curriculum (https://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/) [3]		3
	Semester Credit Hours	**16**
Fourth Year		
Fall		
DAEN 400	Case Studies in Data Engineering [1]	3
DAEN 429	Data Analytics II [1]	3
DAEN 459	Capstone Senior Design Planning [1]	3
DAEN 427/ ISEN 427	Decision and Risk Analysis [1]	3
University Core Curriculum (https://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/) [3]		3
DAEN Technical Elective [7]		3
High Impact Experience [8]		
DAEN 399	Professional Development	
	Semester Credit Hours	**18**
Spring		
DAEN 460	Capstone Senior Design [1]	3
University Core Curriculum (https://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/) [3]		3
DAEN Technical Elective [1, 7]		6
Technical Elective [9]		3
	Semester Credit Hours	**15**
	Total Semester Credit Hours	**97**

[6] ECON 202 or ECON 203 will count as the Social and Behavioral Sciences requirement.

[7] Select from DAEN 410, DAEN 420, DAEN 430, DAEN 489.

[8] All students are required to complete a high-impact experience in order to graduate. The list of possible high-impact experiences is available in the ISEN and DAEN undergraduate advising office.

[9] Select from ISEN 414, ISEN 440, ISEN 489, MATH 407, MATH 411, STAT 414, STAT 421, STAT 424/MATH 424.

Total Program Hours 128