2-14-2024 This Addendum is added to include two new programs at Davis University and to outline the holidays in the 2024 Academic Calendar.

Data Science Associate Degree

Data Science combines knowledge of concepts from statistics and computer science to extract meaning from data to inform evidence-based decisions. It applies to the collection, manipulation, storage, retrieval, and computational analysis of data in its various forms, including numeric, textual, image, and video data from small to large volumes.

Upon graduation a student will:

- Have an understanding of the mathematical basis and theoretical foundations of statistics.
- Be able to collect, manipulate, store, and retrieve data in various forms.
- Be able to analyze and interpret data critically using statistical models and programming skills.

Course Outline	**Credit Hrs.**
COM121 Composition I	5
COM122 Composition II	5
COMxxx Communication Elective	4
SSC201 Economics	4
HUMxxx Humanities Elective	4
MTH121 Pre-Calculus	4
MTH221 Calculus	4
MGT230 Statistics	4
IDS110 Forum on Technology and Resources	5
OAM223 Business Communications	4
MGT102 Introduction to Business	5
ECT103 Fundamentals of Computer Science	5
DSC104 Introduction to Data Structures	4
DSC106 Object-Oriented Programming (Python)	4
DSC130 Data Management and Reporting	4
DSC110 Programing with Data	4
DSC202 Intermediate Programming with Data	4
DSC204 Foundation of Data Science	4
DSC206 Large-Scale Information Storage and Retrieval	4
DSC208 Database Systems (SQL)	4
DSC210 Data Mining with Python	4
DSC212 Computational Methods for Data Analytics	4
DSC220 Data Visualization and Presentation (Power BI)	4
Total Program Credits	97

Associate of Applied Science in Data Science
Course Descriptions

MTH121 Pre-Calculus 4 Credit Hours
An introduction to differential and integral calculus. Topics include limits, derivatives, exponential and logarithmic functions, and applications of the derivative. This class will also examine indefinite and definite integrals and applications to business problems.

MTH221 Calculus 4 Credit Hours
An introduction Vector Calculus, including line integrals, Green's theorem, surface integral and Stokes theorems. Introduce of Infinite Series: Power series, and Taylor series. Solution of power series with ODE. Laplace Transform and Fourier series and transform. Introduce of Sturm Liousville systems. Derivation of PDE and applications.

MGT230 Statistics 4 Credit Hours
An introduction to the following are covered in this course: methods of collection, tabulation, presentation, and analysis of numerical data including frequency distributions, measures of central tendency and dispersion, construction of tables and graphs, probability, sampling, decision-making under uncertainty, study of indexes, simple regression, and correlation. Prerequisite: MTH102 Introductory Algebra I.

ECT103 Fundamentals of Computer Science 5 Credit Hours
Introduces the fundamental ideas of computing and the principles of programming. Discusses a systematic approach to word problems, including analytic reading, synthesis, goal setting, planning, plan execution, and testing. Presents several models of computing, starting from nothing more than expression evaluation in the spirit of high school algebra.

DSC104 Introduction to Data Structures 4 Credit Hours
Abstract Data Types using core programming library classes (such as stacks, queues, linked lists, and binary trees); Recursion; Sorting and Searching. Prerequisite: ECT103 Fundamentals of Computer Science

DSC106 Object-Oriented Programming (Python) 4 Credit Hours
The design and implementation of software using object oriented programming techniques including inheritance, polymorphism, object persistence, and operator overloading. Students will analyze program specifications and identify appropriate objects and classes. Additional programming topics include dynamic memory recursion, using existing object libraries, and binary/ASCII file processing. Prerequisite: Fundamentals of Programming

DSC130 Data Management and Reporting 4 Credit Hours
The student is introduced to the theory and application of database management. Students design and build a database on personal computers using Microsoft Access. Prerequisite: IDS110 Forum on Technology and Resources.

DSC110 Programing with Data 4 Credit Hours
Introduces programming for data and information science through case studies in business, sports, education, social science, economics, and the natural world. Presents key concepts in programming, data structures, and data analysis through Python and Excel. Integrates the use of data analytics libraries and tools. Surveys techniques for acquiring and programmatically integrating data from different sources. Explains the data analytics pipeline and how to apply programming at each stage. Discusses the programmatic retrieval of data from application programming interfaces (APIs) and from databases. Introduces predictive analytics for forecasting and classification. Demonstrates the limitations of statistical techniques.

DSC202 Intermediate Programming with Data 4 Credit Hours
Offers intermediate to advanced Python programming for data science. Covers object-oriented design patterns using Python, including encapsulation, composition, and inheritance. Advanced programming skills cover software architecture, recursion, profiling, unit testing and debugging, lineage and data provenance, using advanced integrated development environments, and software control systems. Uses case studies to survey key concepts in data science with an emphasis on machine-learning (classification, clustering, deep learning); data visualization; and natural language processing. Prerequisite: DSC110 Programming with Data

DSC204 Foundations of Data Science 4 Credit Hours
Introduces core modern data science technologies and methods that provide a foundation for subsequent Data Science classes. Covers: working with tensors and applied linear algebra in standard numerical computing libraries (e.g., NumPy); processing and integrating data from a variety of structured and unstructured sources; introductory concepts in probability, statistics, and machine learning; basic data visualization techniques; and now standard data science tools such as Jupiter notebooks. Prerequisite: DSC202 Intermediate Programming with Data

DSC206 Large-Scale Information Storage and Retrieval 4 Credit Hours
Introduces data and information storage approaches for structured and unstructured data. Covers how to build large-scale information storage structures using distributed storage facilities. Explores data quality assurance, storage reliability, and challenges of working with very large data volumes. Studies how to model multidimensional data. Implements distributed databases. Considers multitier storage design, storage area networks, and distributed data stores. Applies algorithms, including graph traversal, hashing, and sorting, to complex data storage systems. Considers complexity theory and hardness of large-scale data storage and

retrieval. Requires use of nonrelational, document, key-column, key-value, and graph databases and programming in R, Python, and C++. Prerequisite: DSC204 Foundations of Data Science

DSC208 Database Systems (SQL) 4 Credit Hours
This course offers lecture, laboratory, and online interaction to provide a foundation in data management concepts and database systems. It includes representing information with the relational database model, manipulating data with an interactive query language (SQL) and database programming, database development including internet applications, and database security, integrity and privacy issues.

DSC210 Data Mining with Python 4 Credit Hours
Data mining (or Data Science in general) is the science of discovering structure and making predictions in large, complex data sets. This course serves as an introduction to data science/data mining methods. Students will learn Python for predictive and descriptive analytics tasks. They will also learn to assess the predictive and practical utility of various methods, challenges, and research frontiers in data mining. Prerequisites: DSC106 Object-Oriented Programming and DSC204 Foundations of Data Science

DSC212 Computational Methods for Data Analytics 4 Credit Hours
This course studies the ways in which enterprises such as businesses, non-profits, and governments can use date to gain insights and make better decisions. This foundational course will provide students with the hands-on skills and knowledge to gather, describe and analyze data and make meaningful recommendations. Students will also learn how to use advanced statistical tools to make decisions on marketing, finance, strategic planning among other functions in an organization.

DSC220 Data Visualization and Presentation (Power BI) 4 Credit Hours
This course is all about data visualization, the art and science of turning data into readable graphics. This course explores how to design and create data visualizations based on data available and tasks to be achieved. This process includes data modeling, data processing (such as aggregation and filtering), mapping data attributes to graphical attributes, and strategic visual encoding based on known properties of visual perception as well as the task(s) at hand. Students will also learn Power BI and Business AI.

Electrical and Computer Engineering Associate Degree

The Electrical & Computer Engineering (ECE) program is a combined-major program. It prepares students for a wide range of engineering studies and computer science career options, including business, biomedical engineering, computer hardware, the aerospace industry, computer software, nanoelectronic chips, photonics, nanoengineering, robotics and solar energy harvesting and distribution. Students take required courses for both majors along with technical electives.

Upon graduation a student will be able to:

- Build on a solid foundation in engineering, science, computing, and mathematics.
- Resolve common technical issues.
- Design technologies as diverse as robots, cell phones, GPS devices and computers.

Course Outline	**Credit Hrs.**
COM121 Composition I	5
COM122 Composition II	5
COMxxx Communication Elective	4
SSC201 Economics	4
HUMxxx Humanities Elective	4
MTH121 Pre-Calculus	4
MTH221 Calculus	4
MTH225 Linear Algebra and Matric Theory	4
IDS110 Forum on Technology and Resources	5
OAM223 Business Communications	4
MGT102 Introduction to Business	5
ECT101 Fundamentals of Programming and Problem Solving	5
ECT103 Fundamentals of Computer Science	5
ECT105 Digital Logic Systems	5
ECT107 Circuits and Signals	5
ECT109 Fundamentals of Electronics	5
ECT201 Fundamentals of Electromagnetics	5
ECS203 Digital Design and Computer Organization	5
ECS205 Computer Systems and Architecture	5
DSC212 Computational Methods for Data Analytics	4
ECT209 Electrical and Computer Engineering Capstone	5
Total Program Credits	97

Associate of Applied Science in Electrical and Computer Engineering

Course Descriptions

MTH225 Linear Algebra and Matric Theory 4 Credit Hours
This course is intended for students in mathematically rich disciplines including those who want to choose Electrical and Computer Engineering or Data Science major. An introduction to vectors, matrices, systems of linear equations and three-dimensional geometry.

ECT101 Fundamentals of Programming and Problem Solving 5 Credit Hours
Algorithm development and refinement in problem solving. Modular programming using sequence, selection, and repetition control structures. Program debugging and testing. Formatted input/output. Data files. Fundamental data types. Arrays and arrays of structures. Simple sorting and searching algorithms. Character data and string processing. Algorithm efficiency considerations. Classes, objects, and introduction to object-oriented programming. (Prerequisite: A study of algebra topics which are background knowledge for Precalculus.)

ECT103 Fundamentals of Computer Science 5 Credit Hours
Introduces the fundamental ideas of computing and the principles of programming. Discusses a systematic approach to word problems, including analytic reading, synthesis, goal setting, planning, plan execution, and testing. Presents several models of computing, starting from nothing more than expression evaluation in the spirit of high school algebra.

ECT105 Digital Logic Systems 5 Credit Hours
Boolean algebra and logic primitives, simplification of Boolean functions, number systems and codes, digital encoder, decoder, multiplexer, demultiplexer, Boolean based adding, subtraction, multiplication and different primitive elements of the CPU. Introduction to hardware description languages such as Verilog. Analysis and design of synchronous sequential circuits; applications to computation, measurement, and control. (Prerequisite: ECT101 and ECT103)

ECT107 Circuits and Signals 5 Credit Hours
Offers an integrated lecture/lab course that covers circuit theory, signal processing, circuit building, and MATLAB programming. Introduces basic device and signal models and circuit laws used in the study of linear circuits. Analyzes resistive and complex impedance networks. Uses the ideal operational amplifier model, focusing on differential amplifiers and active filter circuits. Introduces basic concepts of linearity and time-invariance for both continuous and discrete-time systems and concepts associated with analog/digital conversion. Demonstrates discrete-time linear filter design on acquired signals in the MATLAB environment. (Prerequisite: ECT101)

ECT109 Fundamentals of Electronics 5 Credit Hours

Covers the theory and practical uses of active semiconductors. Topics include the operating characteristics of diodes, field-effect transistors, bipolar junction transistors, MOS transistors, and op amps; the analysis and design of single-stage amplifiers, diode circuits, and transistor circuits; rectifier circuits, clamping and clipping circuits, voltage multipliers, Zener regulators, temperature measuring, discrete amplifiers, feedback, basic op amp circuits, and switching circuits. SPICE is used to simulate circuits. (Prerequisite: ECT101)

ECT201 Fundamentals of Electromagnetics 5 Credit Hours
Introduces electromagnetics and high-frequency applications. Topics include transmission lines: transmission line model with distributed circuit elements, transmission line equations and solutions, one -dimensional traveling and standing waves, and applications; electromagnetic field theory: Lorentz force equations, Maxwell's equations, Poynting theorem, and application to the transmission line's TEM waves. Also studies uniform plane wave propagation along a coordinate axis and along an arbitrary direction; equivalent transmission lines for TEM, TE, and TM waves; reflection and refraction of uniform plane waves by conducting and dielectric surfaces. (Prerequisite: Calculus II)

ECT203 Digital Design and Computer Organization 5 Credit Hours
Covers the design and evaluation of control and data structures for digital systems. Uses hardware description languages to describe and design both behavioral and register -transfer -level architectures and control units. Topics covered include number systems, data representation, a review of combinational and sequential digital logic, finite state machines, arithmetic-logic unit (ALU) design, basic computer architecture, the concepts of memory and memory addressing, digital interfacing, timing, and synchronization. Assignments include (Prerequisite: ECT103 and ECT107)

ECT205 Computer Systems and Architecture 5 Credit Hours
A study of the fundamental concepts of computer architecture and factors that influence the performance of a system. Topics include data representation, assembly language, central processing unit architecture, memory architecture, and input/output (I/O) architecture. (Prerequisite: ECT103 and ECT107)

DSC212 Computational Methods for Data Analytics 4 Credit Hours
Introduces the programming tools, algorithms, and software tools used in data analytics. Offers hands- on experience working with statistical software/packages and scripting languages and shows students the power of computational tools. Covers concepts of correlation, regression analysis, classification, and decomposition. Includes example data-oriented applications taken from multiple science/engineering disciplines and applies linear algebra and probability to analyze actual data sets. (Prerequisite: MTH225 and ECT107)

ECT209 Electrical and Computer Engineering Capstone 5 Credit Hours
Aims to give undergraduate engineering students significant experience in dealing with a senior design project. Students form teams and select a project requiring design and implementation of an electrical, electronic, and/or software system, including evaluation of multiple constraints, the use of appropriate engineering standards during the design to carry out the project, as well as the submission and presentation of a detailed proposal for the work. The project plan includes the consideration of public health, safety, and welfare and global, cultural, social, environmental, and economic factors.

This is an updated list of Holidays that fall within the 2022-2024 Academic Calendar as of February 14, 2024.

Spring Quarter 2024
President's Day: May 19, 2024
Easter Friday: March 29, 2024

Summer Quarter 2024
Memorial Day Holiday: May 27, 2024
Fourth of July Holiday: July 4, 2024 (Thursday)

Fall Quarter 2024
Labor Day Holiday: September 2, 2024

This addendum to the Davis College 2022-2024 catalog is effective 2/14/2024. The school website has been updated with this information and all students have access to this information.

Diane Brunner

Diane Brunner
President
Davis University