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Demystifying Data: A Guide to Choosing Between Data Science vs. Data Analytics

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Securing and performing well in an engineering leadership role generally requires a graduate degree. However, it can be difficult to decide which degree makes the most sense for your strengths, experiences and career goals.

Data science and data analytics are rapidly evolving fields that offer powerful frameworks and tools for understanding complex information. These disciplines are increasingly valuable across industries, providing insights that can inform decision-making, improve processes and uncover patterns in large datasets.

“In the last decade, technology has advanced to the point that granular data has become visible for the first time, and you can process that for the first time,” explains Professor Vwani Roychowdhury from the UCLA Samueli School of Engineering. “**Because of this, people in every industry want to learn how to model and manage data to optimize.**”

The World Economic Forum’s 2023 “Future of Jobs Report” highlights this trend, listing data analysts and scientists among the top roles increasing in demand across industries. The U.S. Bureau of Labor Statistics projects a 35% growth rate for data scientist roles from 2022 to 2032, much faster than the average for all occupations.

As organizations continue to recognize the value of data-driven decision-making, understanding the nuances between data science and data analytics becomes crucial for professionals looking to enter or advance in these fields.

While both data science and data analytics involve using data to extract insights, they can differ in their approaches, applications and career paths.

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Identifying Trends vs. Making Decisions: General Differences Between Data Science and Data Analytics

Very generally, data science and data analytics are interconnected fields that serve different purposes:

- **Data science** is an interdisciplinary field that combines statistical, computational, and machine learning techniques. It is used to understand and extract knowledge from data.
- **Data analytics** is the use of theories, tools, and technology to extract insights from data. It is used to inform decision-making processes.

According to IBM, the skillset of a data science professional is generally broader than that of a data analytics professional. Data scientists also more commonly use programming languages like R and Python to perform advanced statistical inference and data visualization.

Why Do Data Science and Data Analytics Overlap?

In the grand scheme of things, both data science and data analytics are relatively new fields. According to Google Ngram, neither term gained significant popularity until after 2006.

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"[D]ata science is at a very early stage and is engendering enormous hype and even bewilderment; issues and possibilities that are unique to data science and big data analytics are not clear, specific or certain," writes Longbing Cao in *ACM Computing Surveys*.

This ambiguity can be an advantage. Because data science is a burgeoning field, it presents an excellent opportunity for those who want to be at the forefront of innovation and influence how data are used in their organizations.

Deep knowledge of data science or data analytics has the potential to set you apart from your peers in your company and may give you a competitive edge in the job market. But which one is the best choice for you?

Data Science: A Brief Overview

Data science is a broad field that emerged from the intersection of statistics and computer science. Professionals in this area use statistical analysis, machine learning, data mining, and programming to analyze complex datasets and solve real-world problems.

The data science process usually starts with finding relevant data from diverse sources like surveys, databases, or even web scraping tools. Raw data are often large and unstructured, so they require cleaning and organization before analysis can take place.

Data scientists then use their knowledge to develop algorithms. These models can be used to classify data, make predictions, and facilitate testing to ensure accuracy.

Finally, data scientists employ data visualization tools to create clear and compelling charts, maps, and graphics. This visual storytelling translates complex analyses for both technical and non-technical audiences, enabling informed business decisions based on the insights gleaned.

> "If you want to excel in data science, you need to have an interdisciplinary background, and coupling data science with an engineering education allows you to not only gain data-driven insights but also apply your findings to real products and discoveries." —**Vwani Roychowdhury, Data Science Area Director and Professor of Computer Science, UCLA Samueli School of Engineering**

Essential Skills in Data Science

- **Programming languages:** Python, R, and Scala are the cornerstones of a data scientist's skillset as they allow for the manipulation and analysis of complex datasets.
- **Statistical analysis and probabilistic reasoning:** Understanding statistical methods such as Bayesian inference, regression analysis, and hypothesis testing is important for interpreting data and building models.
- **Machine learning and AI:** Machine learning enables data scientists to develop algorithms that learn from and make predictions based on data. Artificial intelligence involves a broader set of techniques to create systems capable of performing tasks that require human-like intelligence, such as understanding natural language and recognizing patterns.
- **Data visualization:** Mastery of tools such as Tableau, Power BI, and Matplotlib allows data scientists to present their findings clearly and compellingly to stakeholders, including those who do not have a technical background.

Potential Career Opportunities with Data Science Skills

According to the labor database Lightcast, the top 10 job titles that request data science skills are:

- Data engineer
- Software engineer
- Machine learning engineer
- Software engineering intern
- Software development engineer
- Data scientist
- Engineer
- Client performance manager
- Cloud engineer
- Hardware/firmware engineer

According to Lightcast, professionals with data science skills and a master's degree earn a median advertised salary of $150,300 annually.* Notably, many top positions requiring these skills are related to engineering fields, underscoring the integral nature of data science skills within the engineering profession.

While these are some of the most common roles for individuals with data science skills, they are not the only opportunities available. Many other companies may also seek employees with data science skills.

**Job titles, job postings and salary information are sourced from Lightcast, whose data come from millions of job postings from 2022 to 2024. Please note that salary will vary by experience, responsibilities, location and other factors. UCLA Samueli does not project job placements and salaries for its graduates.*

Data Science Skills for Career Advancement

Data science skills can be incredibly valuable for professionals who do not want to change jobs but want to have more impact within their current organization.

Data science knowledge enhances one's ability to solve complex problems, improve processes, and make data-driven decisions, all of which can be highly valued in any technical or leadership role.

As an example, a mechanical engineer could use predictive analytics to foresee maintenance needs and prevent costly equipment failures, thereby increasing operational efficiency. A software engineer could use machine learning to develop intelligent systems that adapt and learn from user interactions, providing a better user experience and driving innovation.

For those interested in management and larger decision-making roles, engineers with data visualization skills can present complex data in a clear and compelling way. This ability to communicate effectively with data could enhance an engineer's influence within the organization and showcase their leadership potential.

Data Analytics: A Brief Overview

Analysis is the key to unlocking the true value of data. Data analytics involves discovering, interpreting, and communicating significant patterns within data to drive informed decisions.

With the right tools and techniques, you can turn pieces of data into valuable insights that provide crucial information.

Many organizations are invested in the potential of data analytics, as it can help explain historical performance and predict future outcomes. This can lead to benefits such as process optimization, better resource allocation, more targeted strategies and even an improved ability to predict future trends. It is a way to transform "we think" into "we know."

Essential Skills for Data Analysts

The sheer volume and diverse nature of data require a comprehensive data analytics toolkit. However, there are four key skills that are essential for success in this field:

- **Data Visualization:** Tools like Tableau and Power BI empower analysts to translate complex data into clear and useful visualizations.
- **Database Management:** A strong understanding of database structures and querying languages is crucial for efficiently retrieving and manipulating data.
- **Business Intelligence:** Analysts connect data and business decisions, so familiarity with business processes and acumen is vital.
- **Communication Skills:** The ability to translate data insights into clear and actionable narratives for a diverse audience is essential.

Career Opportunities with Data Analytics Skills

According to Lightcast, the top 10 job titles* that request data analysis skills are:

- Financial analyst
- Data analyst
- Accountant
- Data scientist
- Project manager
- Business analyst
- Controller
- Data engineer
- General manager
- Operations manager
- Companies seeking professionals with data analytics skills span a wide range of industries, including entertainment, healthcare and finance.

According to Lightcast, professionals with data analytics skills and a master's degree earn a median advertised salary of $125,800 annually.*

For those interested in higher-level management or strategic roles, proficiency in data analysis may move you from intuition-based choices to data-driven decision-making. This approach can lead to improved project outcomes, more efficient resource allocation and stronger team performance.

**Job titles, job postings and salary information are sourced from Lightcast, whose data come from millions of job postings from 2022 to 2024. Please note that salary will vary by experience, responsibilities, location and other factors. UCLA Samueli does not project job placements and salaries for its graduates.*

Choosing Your Path: A Program Comparison

The scope of data science and data analytics can be broad, and academic programs designed for these fields often reflect that diversity. The following information provides a high-level overview to help you navigate your options. **Individual programs will vary in curriculum, admissions, and outcomes.**

Data science programs are typically more mathematically rigorous, emphasizing programming, statistics and machine learning. Data analytics programs may focus more on business acumen, data visualization and communication skills.

Data Science Degree vs. Data Analytics Degree: Sample Courses

These sample courses are drawn from 10 universities and colleges that offer data science master's degrees and 10 that offer data analytics master's degrees*. The list is ordered by frequency, from most to least common.

Data Science

- Machine Learning
- Data Visualization
- Programming for Data Science (Python, R)
- Data Ethics
- Database Management
- Applied Statistics
- Algorithms for Data Science
- Natural Language Processing
- Cloud Computing
- Deep Learning

Data Analytics

- Statistical Methods
- Machine Learning
- Data Visualization
- Big Data Analytics
- Predictive Analytics
- Data Mining
- Database Systems/SQL
- Business Analytics
- Ethics in Analytics
- Data Wrangling/Preprocessing

**Results based on an analysis of 2024 curriculum lists from Columbia University; Duke University; Harvard University; Rice University; Texas A & M University; The University of Texas at Austin; UCLA; University of California-Santa Barbara; University of Michigan and University of Virginia (data science); and Carnegie Mellon University; Columbia University; Georgia Institute of Technology; George Washington University; Pennsylvania State University; Tufts University; University of California, Berkeley; University of Michigan and University of Wisconsin (data analytics). Analyzed using school-based curriculum pages and ChatGPT, OpenAI, August 15, 2024.*

This is a sample of what students might expect in a data science or data analytics master's program, but each program will have its unique approach.

The UCLA Samueli School of Engineering offers a Master of Applied Statistics and Data Science. UCLA Samueli also offers one of the nation's few engineering degrees that includes an area of study in data science. The degree includes some courses that overlap with the list of sample courses, but the online program also includes unique offerings such as "Large-Scale Social and Complex Networks" and "Neural Networks and Deep Learning."

Admissions Expectations for Data Science and Data Analytics Programs

For bachelor's degrees:

- **High School Diploma or Equivalent:** Applicants must have completed high school or an equivalent qualification.
- **Strong Background in Math and Science:** Courses in mathematics (such as algebra, calculus and statistics) and sciences (like computer science and physics) are highly recommended.
- **Standardized Test Scores:** SAT or ACT scores may be required
- **GPA Requirements:** A competitive GPA, typically above 3.0, is often necessary.
- **Personal Statement/Essay:** Applicants may need to submit an essay explaining what led them to data science or data analytics.
- **Letters of Recommendation:** Usually from teachers or counselors who can attest to the applicant's academic abilities and potential.

For master's degrees:

- **Bachelor's Degree:** Applicants typically must have a bachelor's degree from an accredited institution, usually in a related discipline such as mathematics, computer science, physics or engineering.
- **Prerequisite Courses:** Completion of specific undergraduate courses in statistics, programming and mathematics may be required.
- **GRE/GMAT Scores:** Some programs require standardized test scores, although this requirement may be waived in some cases, such as a highly competitive holistic portfolio.
- **GPA Requirements:** A strong undergraduate GPA may be necessary, typically 3.0 or higher.
- **Personal Statement/Essay:** Applicants usually need to submit a statement of purpose outlining their goals and motivation for pursuing the degree.
- **Letters of Recommendation:** Usually from academic or professional references who can speak to the applicant's qualifications and potential.
- **Programming Skills:** Proficiency in programming languages such as Python, R or SQL is often expected — and these skills are required at UCLA Samueli.

***Admissions requirements vary across universities, departments and programs. View our admissions page for the requirements for the UCLA Samueli School of Engineering's online Master of Science in Engineering with Certificate of Specialization in Data Science Engineering.*

Individuals from outside of the United States who are applying to U.S.-based institutions should also plan to provide proof of English language proficiency, such as test scores from TOEFL or IELTS.

What to Ask Yourself When Considering These Programs

Choosing the right program is important, and one of the first steps should entail reflecting on your goals and preferences. By reflecting on the following statements, you may better understand which direction is right for you.

	Data Science	Data Analytics
Career Goals	• I am interested in developing new algorithms and models. • I aspire to work in advanced machine learning and predictive modeling.	• I want to focus on interpreting data to inform business decisions. • I aim for roles in business intelligence and data visualization.
Skill Set	• I enjoy working with statistics, programming, and complex mathematical concepts.	• I am interested in developing practical skills for immediate application in business environments.
Educational Background	• I have a strong foundation in mathematics, statistics, and computer science.	• I would benefit more from a program that emphasizes business acumen and data interpretation.
Tools and Technologies	• I am excited about learning and using programming languages and tools like Python, R, and TensorFlow.	• I prefer working with data visualization tools like Tableau and Power BI to create impactful reports.
Project Interests	• I want to work on projects involving Big Data, machine learning, and developing new data-	• I am more interested in projects that involve analyzing existing data to improve business

	driven solutions.	processes and decision-making.
Program Content	- The program curriculum offers a balance of theoretical and practical knowledge in data science.	- The program curriculum offers practical knowledge and emphasizes business-related applications of data analytics.
Long-Term Vision	- I see myself pioneering new data science research and technologies. - This degree will provide the best foundation for my long-term career growth in data science and technology development.	- I see myself leading data-driven business strategies. - This degree will provide the best foundation for my long-term career growth in business and data analysis.

Keep in mind that these statements are meant to be a general starting point and not an official checklist. You may not perfectly align with one area of study, but remember that data science and data analytics often overlap. Based on your strengths, interests and long-term career goals, certain aspects of each field may resonate more with you and help inform your decision.

You should also consider whether you need a degree in general data science or data analytics, or if your career goals may be better served by a degree in a specific area that includes an emphasis on data.

For example, the UCLA Samueli online M.S. in Engineering with Certificate of Specialization in Data Science Engineering offers a unique blend of these disciplines, preparing you for cutting-edge roles at the intersection of engineering and data science.

Why Choose UCLA Samueli for Your Data Science Master's Degree?

The UCLA Samueli School of Engineering offers an online Master of Science in Engineering with Certificate of Specialization in Data Science Engineering (MSOL: DATA SCIENCE ENGR) that prepares students to solve problems and harness data ethically using responsible artificial intelligence through a curriculum of five core courses and four electives.

The UCLA Samueli School of Engineering is a tightly knit community of more than 200 full-timefaculty members, nearly 7,000 undergraduate and graduate students, as well as 50,000 active alumni. Known as the Birthplace of the Internet, UCLA Samueli is also where countless other fields took some of their first steps — from artificial intelligence to reverse osmosis, from mobile communications to human prosthetics. In 2021, UCLA became the first university to win an XPRIZE, with a UCLA Samueli team awarded a $7.5 million grand prize in the NRG COSIA Carbon XPRIZE.

Times Higher Education lists UCLA among the top 10 universities for engineering in the U.S. and top 20 in the world. U.S. News & World Report has ranked the overall Master of Science in Engineering Online program No. 1 in the nation.

Request a program brochure to learn more, or start the application process today.

Request Information

To learn more about the **Online Master of Science in Engineering with Certificate of Specialization in Data Science Engineering**, contact an enrollment specialist at (424) 443-7385 or fill out the form below to download a free brochure.

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