

## CS and DSML FAQ

### **What is the difference between a degree in Computer Science versus a degree in Data Science & Machine Learning?**

Choosing between a B.S. in Computer Science and a B.S. in Data Science and Machine Learning depends on your career goals, interests, and the kind of work you envision yourself doing in the future. Both fields are promising and offer a wide range of opportunities, but they cater to different aspects of a career in the technology field. Here's a breakdown of what each degree typically involves and what you might consider in making your decision.

#### **B.S. in Computer Science**

**Broad Scope:** A degree in Computer Science covers a wide range of topics including programming, algorithms, data structures, computer architecture, operating systems, software engineering, and databases. It provides a solid foundation in computing principles and software engineering.

**Flexibility:** This degree can offer more flexibility in terms of career options. Graduates can pursue various roles in software development, system architecture, cybersecurity, mobile and web development, and much more.

**Problem Solving:** It emphasizes problem-solving and computational thinking, preparing you for a variety of challenges in designing and optimizing systems.

**Innovation and Development:** If you're interested in creating new software, applications, or working on the foundational aspects of tech products, this could be more aligned with your goals.

#### **B.S. in Data Science and Machine Learning**

**Specialization:** While there are still many career options to choose from with a DSML degree, this program does focus more on the specific areas of data analysis, machine learning, and statistical modeling. It's tailored for those who are specifically interested in working with data, extracting insights, and building ML-based software applications.

**High Demand:** With the explosion of data in every sector, skills in data science and machine learning are in high demand. This degree prepares you for a range of roles like

data engineer, data scientist, machine learning engineer, data analyst, and roles in AI development.

**Interdisciplinary Approach:** Data Science and Machine Learning often involve an interdisciplinary approach, combining computing with elements of statistics, mathematics, and domain-specific knowledge, making it ideal for those interested in applying computational techniques to solve problems in specific areas such as healthcare, finance, or environmental science.

**Research and Analysis:** If you are keen on analyzing trends, patterns, and making predictions based on data, this degree might be more appealing to you.

### **How do I choose between the two then?**

Ultimately, the decision should be based on where your passions lie and how you see yourself contributing to your chosen industry in the future. It's also worth noting that the fields of Computer Science and Data Science are not mutually exclusive; there is considerable overlap, and professionals often find themselves learning skills from both areas throughout their careers. Here are some considerations to keep in mind though.

**Interests and Strengths:** Reflect on your interests and strengths. Are you more excited about the prospect of developing software and understanding the intricacies of computing systems, or does the idea of working with large datasets, creating predictive models, and deriving insights excite you more?

**Career Goals:** Consider your long-term career goals. While both degrees offer lucrative opportunities, they lead to different paths in the tech industry.

**Curriculum and Courses:** Look at the specific curriculum and courses offered for each degree at your college. This can give you a better idea of what to expect and which program aligns more with your interests.

**Industry Demand:** Research the demand for professionals in both fields. While both are in high demand, local market needs can vary, and some industries may have a higher demand for one skill set over the other.

**Opportunities for Further Education:** Consider whether you plan to pursue further education after an undergraduate degree, and how each of these programs could serve as a steppingstone to your further academic and professional aspirations.

### **What is the difference between Data Science & Machine Learning and Statistical Science (available in the Dept of Math/Statistics)?**

A degree in Data Science and Machine Learning and a degree in Statistical Science, while overlapping in some areas, particularly in the use of statistical methods, differ significantly in focus, applications, and the skill sets they emphasize. Here's a breakdown of the differences:

### Data Science and Machine Learning (DSML)

**Machine Learning Focus:** A significant portion of a DSML degree is dedicated to machine learning — the development and application of algorithms that enable computers to learn from and make predictions or decisions based on data.

**Interdisciplinary Nature:** DSML is inherently interdisciplinary, blending computer science, statistical methods, and domain-specific knowledge to analyze and interpret complex data. It focuses on using algorithms and computational techniques to derive insights and predictions from data.

**Practical Applications:** DSML programs often emphasize practical applications, including data processing, visualization, and the implementation of machine learning models to solve real-world problems.

**Technical Skillset:** Students in DSML programs typically learn a range of programming languages (such as Python or R), data manipulation and analysis libraries, and tools for data visualization and machine learning model development.

**Career Paths:** Graduates are prepared for roles such as data scientists, machine learning engineers, data analysts, and roles in artificial intelligence and big data analytics.

### Statistical Science

**Theoretical Foundation:** Statistical Science focuses more on the mathematical foundations of data analysis. It delves deeply into probability theory, statistical inference, experimental design, and the development of new statistical methods.

**Emphasis on Inference:** Unlike DSML, which often focuses on prediction, Statistical Science places a greater emphasis on understanding and modeling the underlying processes that generate data, hypothesis testing, and drawing conclusions from data.

**Methodological Focus:** Programs in Statistical Science are likely to focus more on the theoretical aspects of statistics, including the rigorous development and validation of statistical models.

**Applications Across Fields:** While also applicable across various domains, Statistical Science is more about the universal application of statistical methods to make informed decisions and infer properties about populations based on sample data.

**Career Paths:** Graduates may pursue careers as statisticians, quantitative analysts, risk analysts, or go into research and academia, where they might develop new statistical methods or contribute to various fields through statistical analysis.

When choosing between these degrees, consider your career goals, interests, and whether you're more drawn to the theoretical aspects of data analysis or the practical application of statistical and computational methods to solve problems. Both fields are highly valuable and offer diverse opportunities, but the choice should align with what you are most passionate about and the type of work you envision yourself doing in the future.

### **Can I major in both Computer Science and Data Science & Machine Learning?**

Yes, if requirements from both programs are satisfied. Several required courses in DSML degree are required courses or elective courses in CS. So, pursuing both DSML and CS degrees at MSU Denver might be more manageable than at other universities.