Data Science, Data Analytics, and Statistics Majors

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Statistics vs. Data Science

- Statistics is classically “The Science of Data”. It is focused on making interpretable models of phenomena, making predictions, and testing hypotheses - all utilizing probability and mathematical statistics.

- Data Science combines Statistics, Mathematics, and Computer Science. It is less focused on interpretable models and more focused on making predictions.

Data Science at USC

- Data Science programs tend to lean either more Statistics/Mathematics or more Computer Science. At USC we're more of the former.

- The Data Science B.S. has a more specified curriculum than the Statistics B.S. and involves an additional MATH requirement, a data visualization course, and a specified ethics choice. It doesn't particularly work easily for actuaries.

Data Analytics at USC

- Data Analytics is the application of Data Science to a particular applied area. Related fields include Business Analytics and Data Visualization.

- The Data Analytics B.S. differs from the Data Science B.S. (and Statistics too) by being significantly less math intensive, requiring a minor in an applied area, and having major electives from many fields.

Preparing for Grad School

- The Data Science B.S. can be set-up to prepare for graduate school in Computer Science, Data Science, Mathematics, Statistics, or an area of application by choosing the appropriate courses in a Cognate, Minor, or 2nd Major (depending on the field).

Preparing for Grad School

- The Data Analytics B.S. will not qualify someone for graduate school in Computer Science, Mathematics, or Statistics. (It may for a very applied Data Science program).

- In many cases, the Data Analytics B.S. + required minor can prepare for grad school in the area of the minor. Some may want a second major. Some may want additional math for a Ph.D. (biology and economics) and Data Science might be better.

		Statistics	**Data Science**	**Data Analytics**
CCore	ARP	MATH 141 - Calculus I MATH 142 - Calculus II	MATH 141 - Calculus I MATH 142 - Calculus II	MATH 122 – Bus/SS Calc or 141 - Calculus I; MATH 170 - Finite Math
	VSR	ANY	ISCI 215, ITEC 101, or PHIL 325	ISCI 215, ITEC 101, or PHIL 325
	Other	ANY	ANY	ANY
CAS	Analyt Reas.	MATH 241 – Calculus III; CSCE 145 - Java or 106 - Python	MATH 241 – Calculus III; CSCE 106 - Python	MATH 328 – Math for DA CSCE 106 - Python
	FinArt/ Hum	ENGL 363, 462, or 463 - Bus. or Tech. Writing	ENGL 363, 462, or 463 – Bus. or Tech. Writing	ENGL 363, 462, or 463 – Bus. or Tech. Writing
	Lang/ Hist/ SSci	ANY	ANY	ANY

Prog. Reqs.	MATH 344 or 544 - Linear Alg.	MATH 344 or 544 – Linear Alg. MATH 344L - Linear Alg. Lab MATH 374 or 574 - Discrete	*(See MATH 328 in College Slot)*
	Optional Minor or 2nd Major	Optional Minor or 2nd Major	Required Minor or 2nd Major (see exclusions)
		STAT 509 or 515 - Statistical Methods I	STAT 201, 205, 206, 509 or 515 – Statistical Methods I
Major Reqs.	STAT 509 or 515 - Statistical Methods I		
	STAT 516 - Statistical Methods II	STAT 516 - Statistical Methods II	STAT 301 or 516 - Statistical Methods II
	STAT 540 - R & SAS or 542 - Computing w/ R	STAT 542 - Computing w/ R	STAT 542 - Computing w/ R

Major Reqs. Cont.	STAT/MATH 511 - Probability	STAT/MATH 511 - Probability or MATH 528 – Math for DS/ML or 529 – Intro Deep Neur.Nets or 572 – Math for Network Sci.	
	STAT 512 – Math Stats		
	STAT 513 – Adv. Stat. Theory or 517 – Adv. Stat. Models or 520 – Time Series or 535 – Bayesian Statistics		
		CSCE 567–Data Visualization	CSCE 567-Data Visualization
		STAT 530 or CSCE/STAT 587 - Intro to Machine Learning	STAT 530 or CSCE/STAT 587 - Intro to Machine Learning
		STAT 531/CSCE 588 - Adv. Machine Learning with Python	
	Three STAT 5XX	Two MATH/STAT/CSCE 5XX (see list)	Four Major Electives (see list)

Note on What to Take

A student who is undecided between Statistics, Data Science, and Data Analytics should take:

- MATH 141
- STAT 515

as early as possible (hopefully 1st semester).

These also work for Mathematics. CSCE will want STAT 509 which requires MATH 142.

Note on Grades

The required STAT, MATH, CSCE, and ENGL courses for the Data Science B.S., Data Analytics B.S., Statistics B.S., and Data Science minor must all be C or higher.

Note on Data Analytics B.S. Choice of Minor

The minor or second major may not be from fields closely aligned to data science theory, and the following programs are excluded:

- Actuarial Mathematics and Statistics Minor
- Computer Engineering, B.S.E
- Computer Information Systems, B.S.
- Computer Science, B.S.C.S;
- Data Science, B.S. or Data Science, Minor
- Mathematical Biology Minor
- Mathematics B.S. or Mathematics, Minor
- Statistics, B.S. or Statistics, Minor

Note on Program Requirements

- The specified program requirement MATH/STAT/CSCE courses can “double count” with a minor or 2nd major.

  They should essentially say “0-3 hours, must be taken here if not used elsewhere”.

- They can be swapped with the similarly quantitative MATH/STAT/CSCE college requirements .

Course Sections

STAT 301, 515, 516, 530, and STAT /CSCE 587 are offered every semester.

We have fall Stat major sections of 515, and Spring Stat major sections of 516. They may be open to Data Science.

MATH 328 is currently offered falls

STAT 531/CSCE 588 is currently offered springs

STAT 542 is currently offered springs

Data Science Minor

Prerequisite Course:

- MATH 122 or MATH 141

Minor Core Courses

(substitute with minor electives if used for major)

- CSCE 106 or CSCE 145
- STAT 509 or 515 or 301
- CSCE/STAT 587 or STAT 530
- CSCE 567 or STAT 542

Minor Electives

- Large list of CSCE/MATH/STAT courses.

Contacts

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