

Data Science is

the methodology and engineering behind

managing, **analyzing**, and **communicating**

ethical and **useful**

decisions informed by data.

What is Data Science:

What skills *should** a Data Scientist have?

(1) To efficiently **manage**, process, and compute on a wide variety of data types.

Computer
Science
Fundamentals

(2) To apply probabilistic and statistical thinking and **analysis**.

Probability,
Statistics,
Linear Algebra

(3) To take an abstract task involving a data set, and perform appropriate and **useful** data analysis.

Data Wrangling,
Math Foundation,
Data Ethics

(4) To **interact** meaningfully with experts in a technical data domain.

Data Domain
Interaction

What is Data Science:

What skills *should** a Data Scientist have?

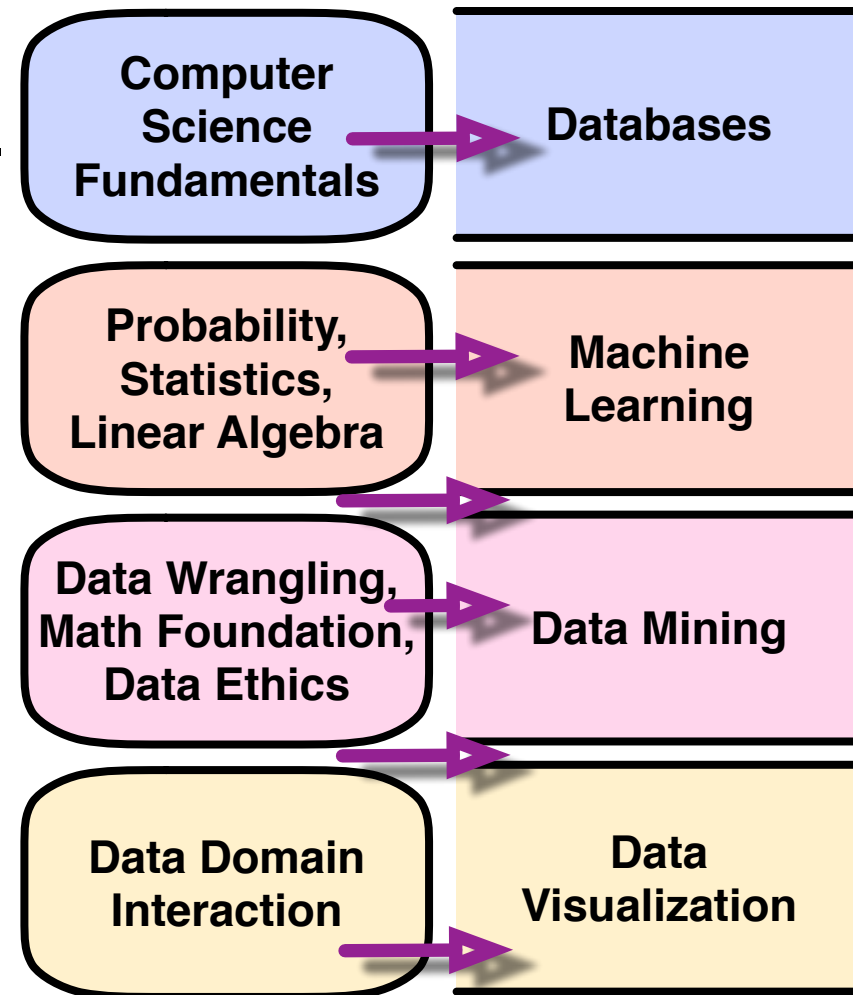
2013

(1) To efficiently **manage**, process, and compute on a wide variety of data types.

(2) To apply probabilistic and statistical thinking and **analysis**.

(3) To take an abstract task involving a data set, and perform appropriate and **useful** data analysis.

(4) To **interact** meaningfully with experts in a technical data domain.



BS in Data Science Flow Chart

2013

Databases

**Data
Visualization**

**Machine
Learning**

Data Mining

BS in Data Science Flow Chart

2014

Databases

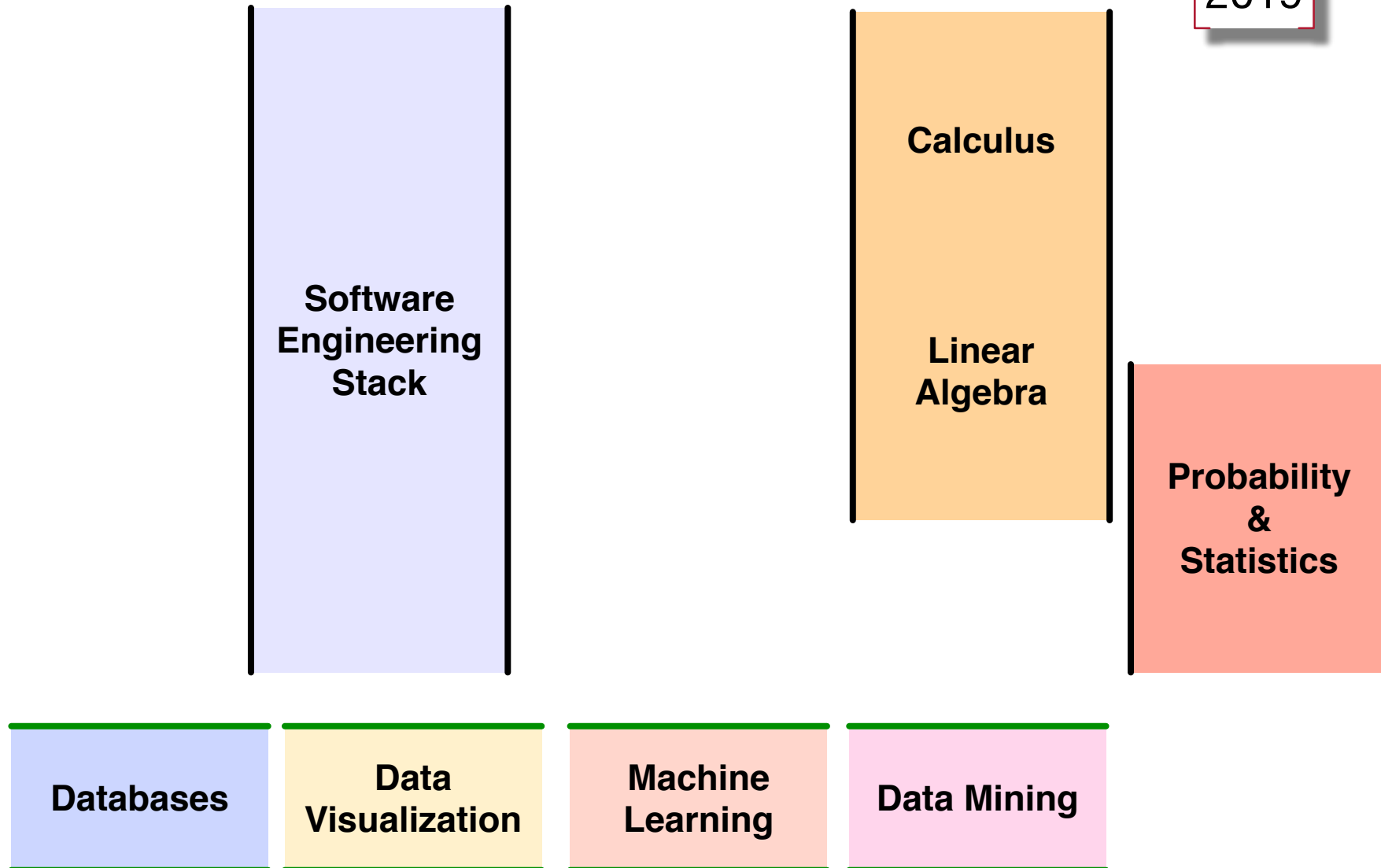
**Data
Visualization**

**Machine
Learning**

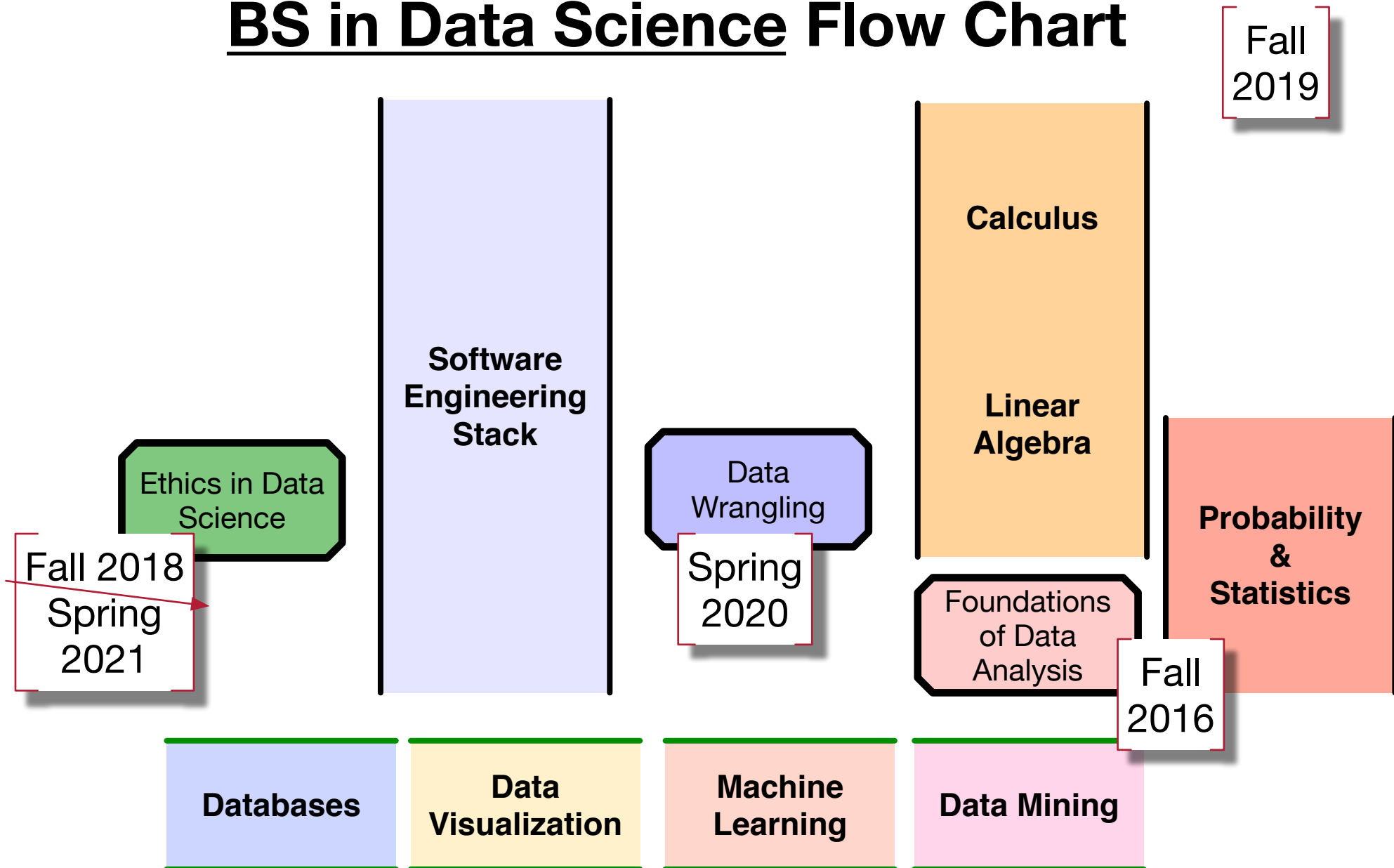
Data Mining

BS in Data Science Flow Chart

Fall
2019



BS in Data Science Flow Chart



BS in Data Science Flow Chart

Fall
2019

3x
Data
Domain
Courses

Ethics in Data
Science

Software
Engineering
Stack

Data
Wrangling

Calculus

Linear
Algebra

Probability
&
Statistics

Foundations
of Data
Analysis

Databases

Data
Visualization

Machine
Learning

Data Mining

Capstone Project

UG Certificate in Data Science Flow Chart

Fall
2020

1x
Data
Domain
Courses

Ethics in Data
Science

Intro to
Programming

Data
Wrangling

assumes
Calculus

Linear
Algebra

Foundations
of Data
Analysis

Probability
&
Statistics

UG Certificate in Data Science Flow Chart

Fall 2020

1x
Data
Domain
Courses

Ethics in Data
Science

COMP 1010 +
1020 : Prog.
for All I & 2

or

CS 1410:
Object-Orient.
Programming

Data
Wrangling

assumes
Calculus

Linear
Algebra

Probability
&
Statistics

Foundations
of Data
Analysis

or

COMP 5360:
Intro Data Sci

UG Certificate in Data Science Flow Chart

Fall
2020

1x
Data
Domain
Courses

Ethics in Data
Science

COMP 1010 +
1020 : Prog.
for All I & 2

or

CS 1410:
Object-Orient.
Programming

Data
Wrangling

assumes
Calculus

Linear
Algebra

Probability
&
Statistics

Foundations
of Data
Analysis

or

COMP 5360:
Intro Data Sci

Targeted Majors

- * Computer Science
- * Engineering (Mechanical, Electrical, Biomedical, ...)
- * Sciences (Math, Physics&Astronomy, ...)
- and maybe*
- * Social Sciences (Economics, Geography, ...)
- * Business

UG Certificate in Data Fluency Flow Chart

Fall
2020

3x
Data
Domain
Courses

Ethics in Data
Science

COMP 1010:
Prog. for All I

or

CS 1410:
Object-Orient.
Programming

does
NOT
assume
Calculus

Math 1070:
Intro to
Stat Inference

Data
Wrangling

or

COMP 5360:
Intro Data Sci

UG Certificate in Data Fluency Flow Chart

Fall 2020

3x
Data
Domain
Courses

Ethics in Data
Science

COMP 1010:
Prog. for All I

or

CS 1410:
Object-Orient.
Programming

does
NOT
assume
Calculus

Math 1070:
Intro to
Stat Inference

Data
Wrangling

or

COMP 5360:
Intro Data Sci

Programming
Familiarity

Statistical
Familiarity

UG Certificate in Data Fluency Flow Chart

Fall 2020

3x
Data
Domain
Courses

COMP 1010:
Prog. for All I

or

CS 1410:
Object-Orient.
Programming

does
NOT
assume
Calculus

Math 1070:
Intro to
Stat Inference

Ethics in Data
Science

Data
Wrangling

or

COMP 5360:
Intro Data Sci

Ties
to
Application
Domains

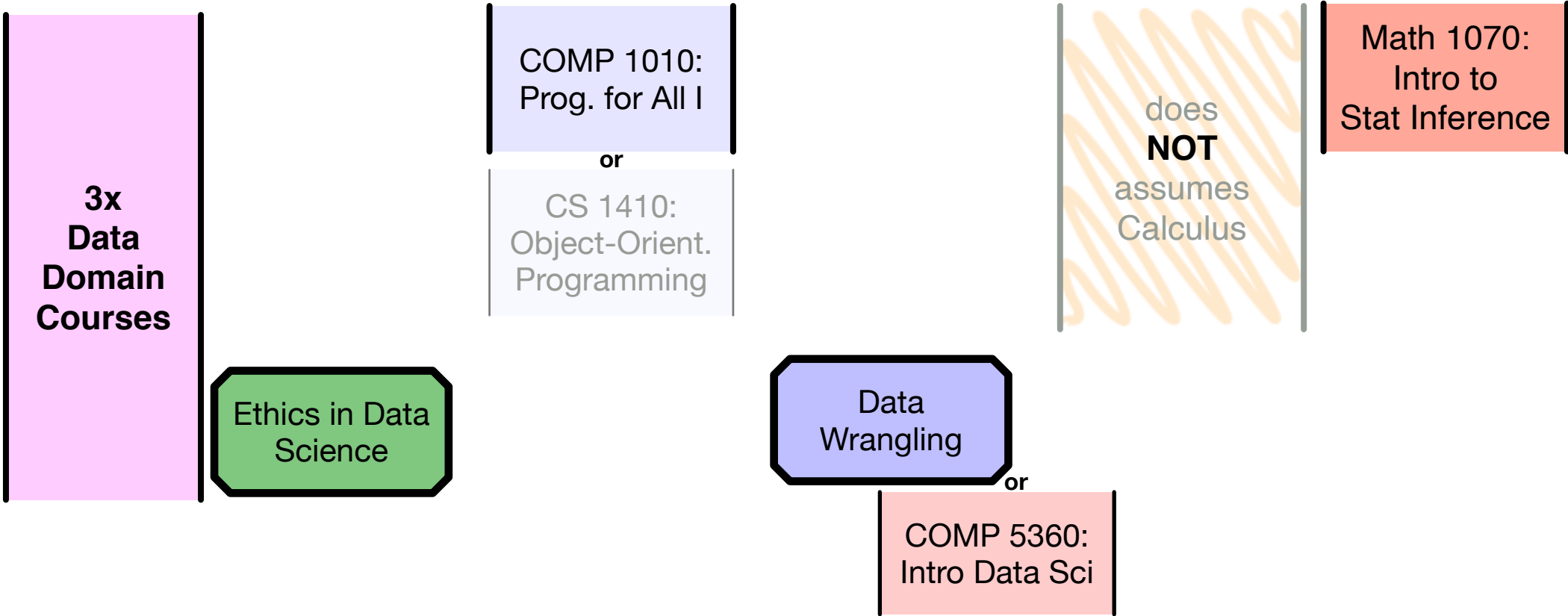
Data
Ethics

Programming
Familiarity

Data
Wrangling

Statistical
Familiarity

UG Certificate in Data Fluency Flow Chart



Most undergraduates do not take calculus!

Targeted Majors

- * Social Sciences (Economics, Geography, Psychology, Sociology, ...)
- * Business (Information Systems, Finance, QAMO, ...)
- * Humanities (Linguistics, Philosophy, ...)
- and some*
- * Engineering, Science, CS, ...

Grad Certificate in Data Science Flow Chart

Fall
~~2014~~
2020

5 Grad-Level Courses

at most one
“warm up” course

Programming
for
Engineers

Intro to
Data Science

Foundations
of Data
Analysis

at least 3
required courses

Databases

Data
Visualization

Machine
Learning

Data Mining

Domain
Course

Information
Retrieval

Adv. Data
Visualization

Deep
Learning

Probabilistic
Learning

...

Grad Certificate in Data Science Flow Chart

Fall
2020

5 Grad-Level Courses

