

Status of Statistics Curricula in Canada

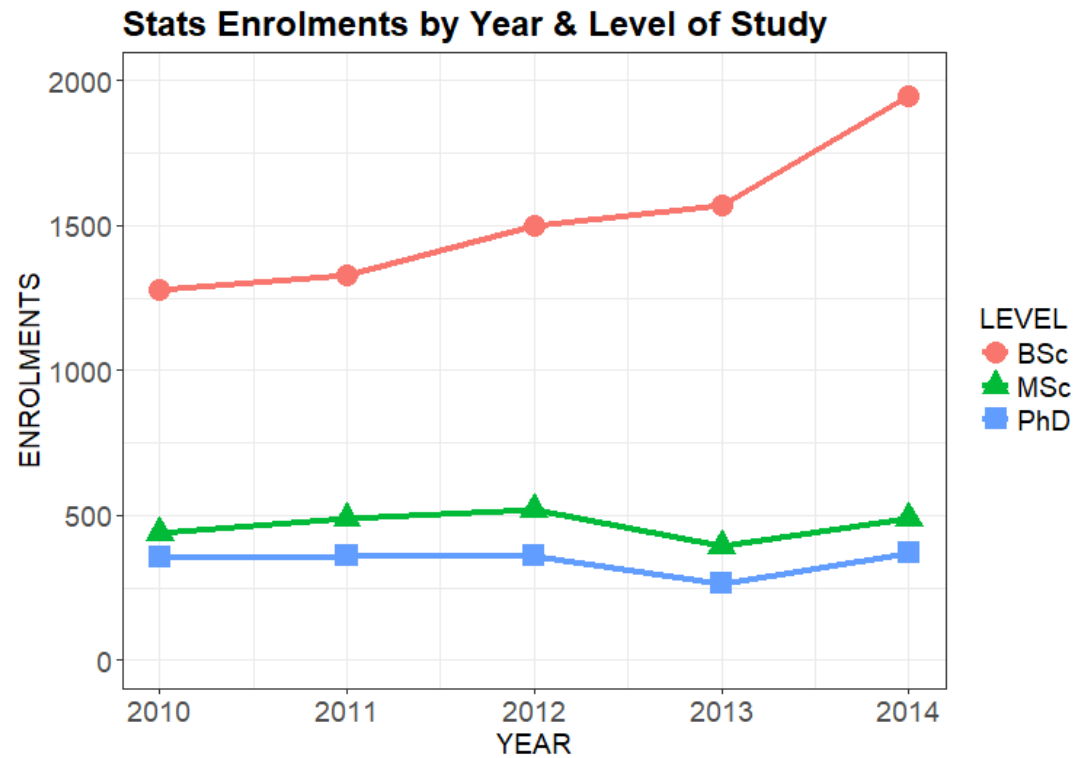
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U of T Scarborough

Data Sources

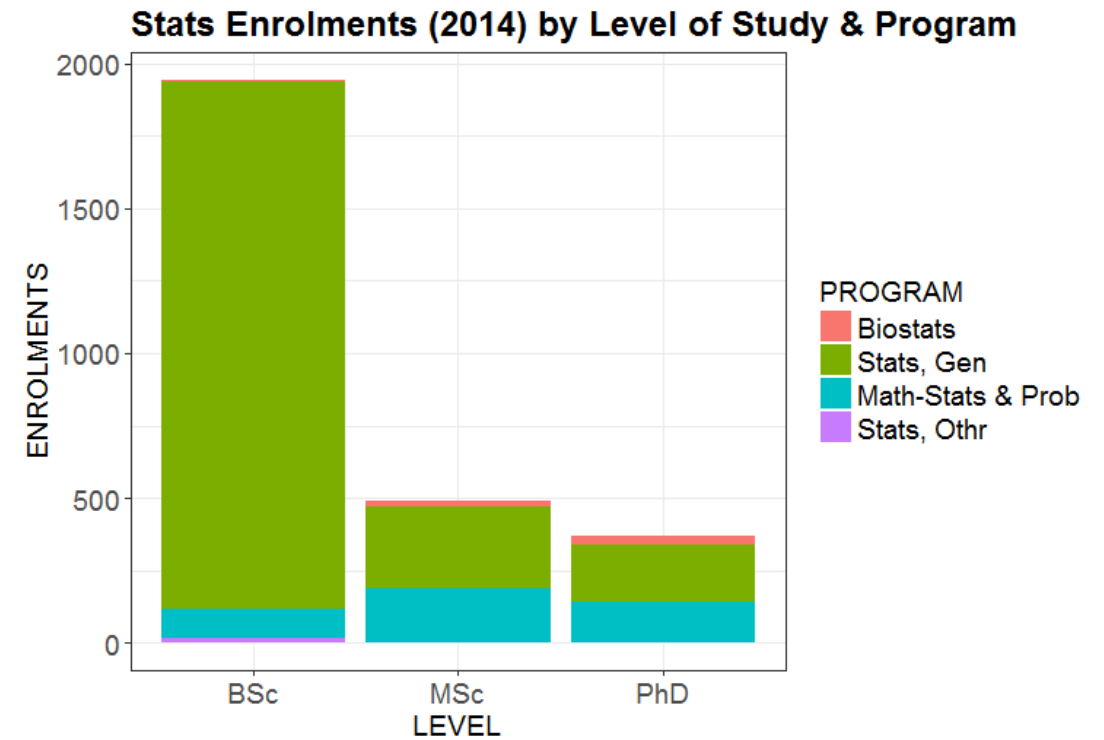
- Stats program enrolments/graduates: Postsecondary Student Information System ([PSIS](#)) survey, from Statistics Canada
 - Microdata available through StatCan's [RTRA](#)
- Stats program curricula: collected from universities' calendars
 - Many thanks to Olivia Rennie (UTSC NeuroSci BSc) for her help
- All data & code available through GitHub
 - <https://github.com/damouras/SoSC>

Stats Programs Vital Statistics

52% increase in Stats BSc enrolments ('10 to '14)



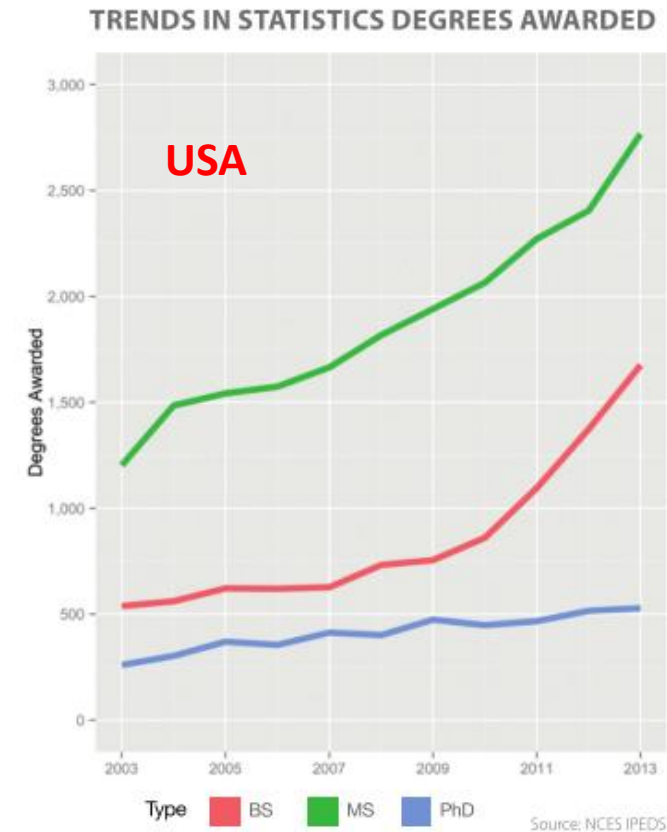
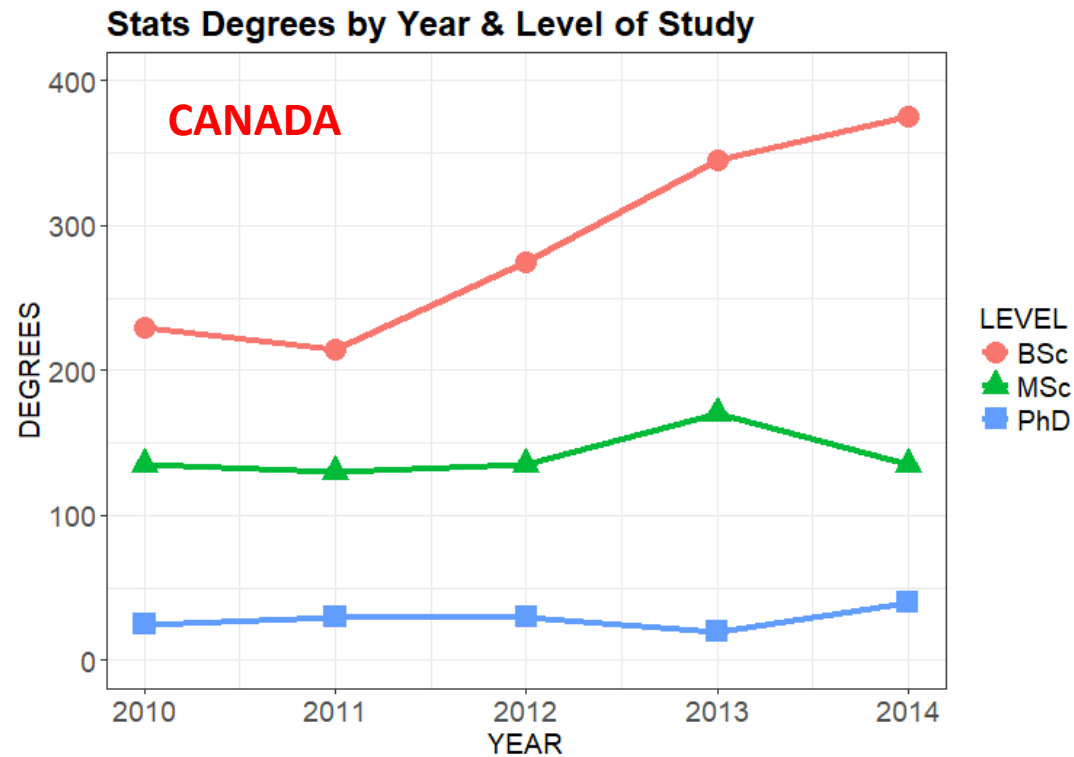
Majority of BSc's in General Statistics



Stats Programs Vital Statistics

>2 times more BSc
than MSc+PhD grads

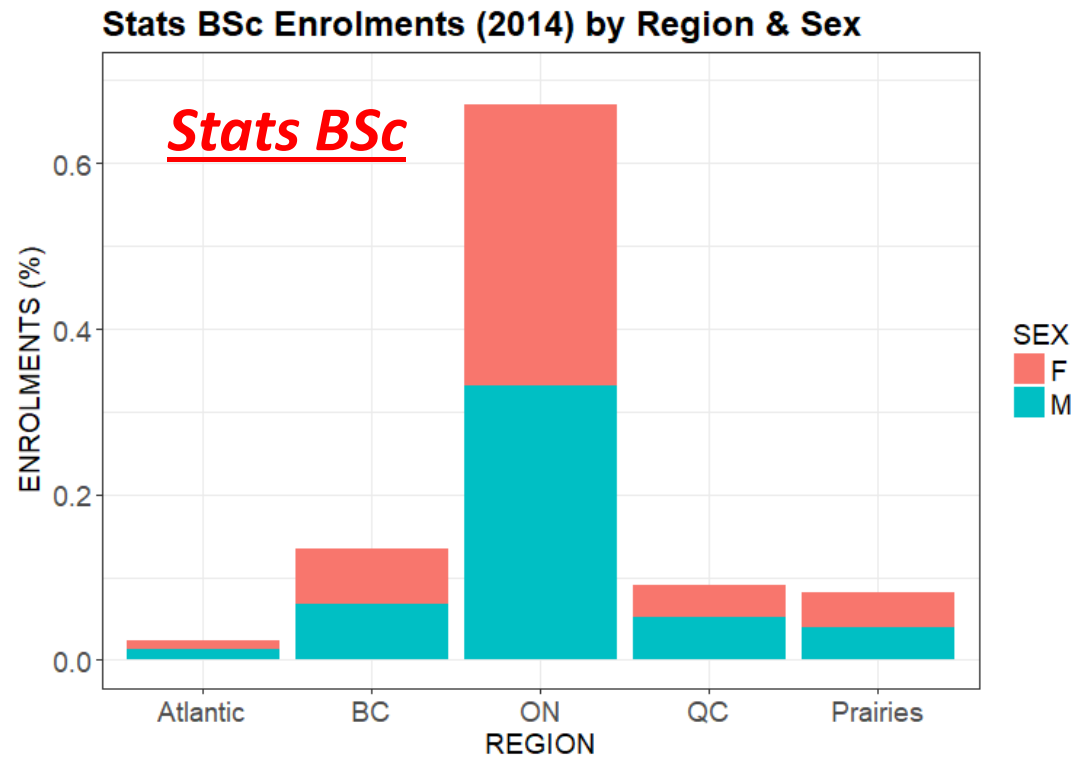
Different from US
(where MSc > BSc)



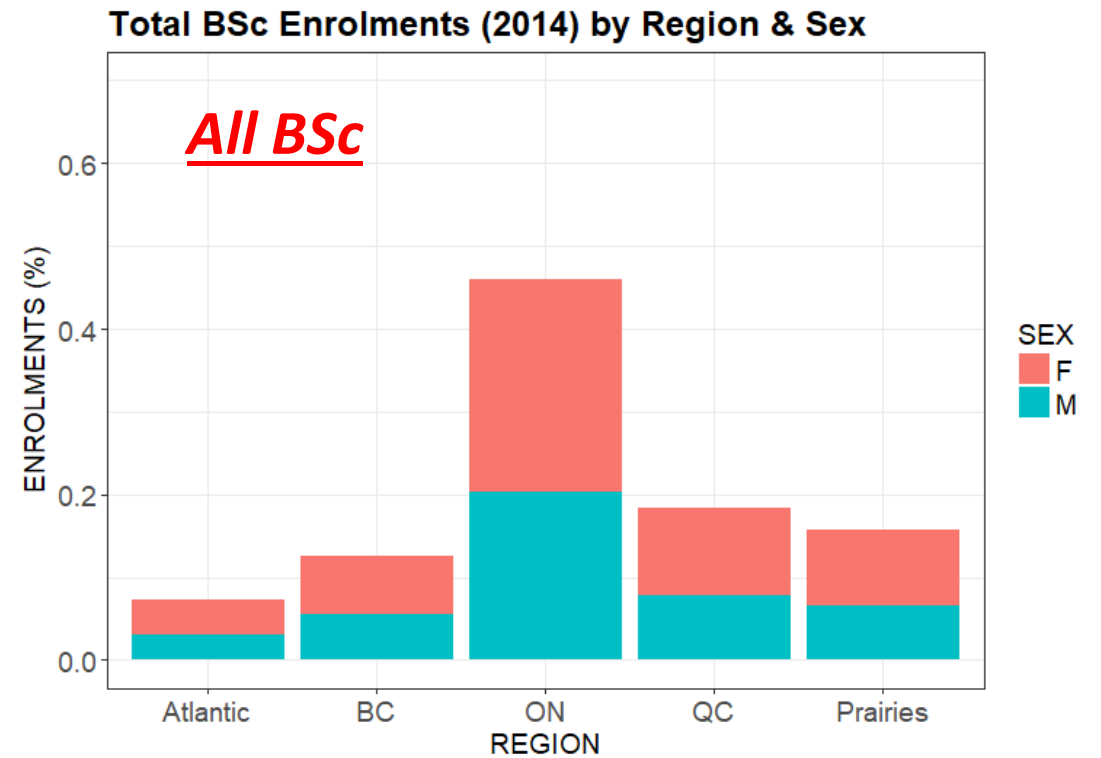
(reproduced from 2014 ASA Curriculum Guidelines
for undergraduate programs in statistical Science)

Stats BSc Enrolment Breakdown

**Gender Parity!!
(F/M = 970/975)**

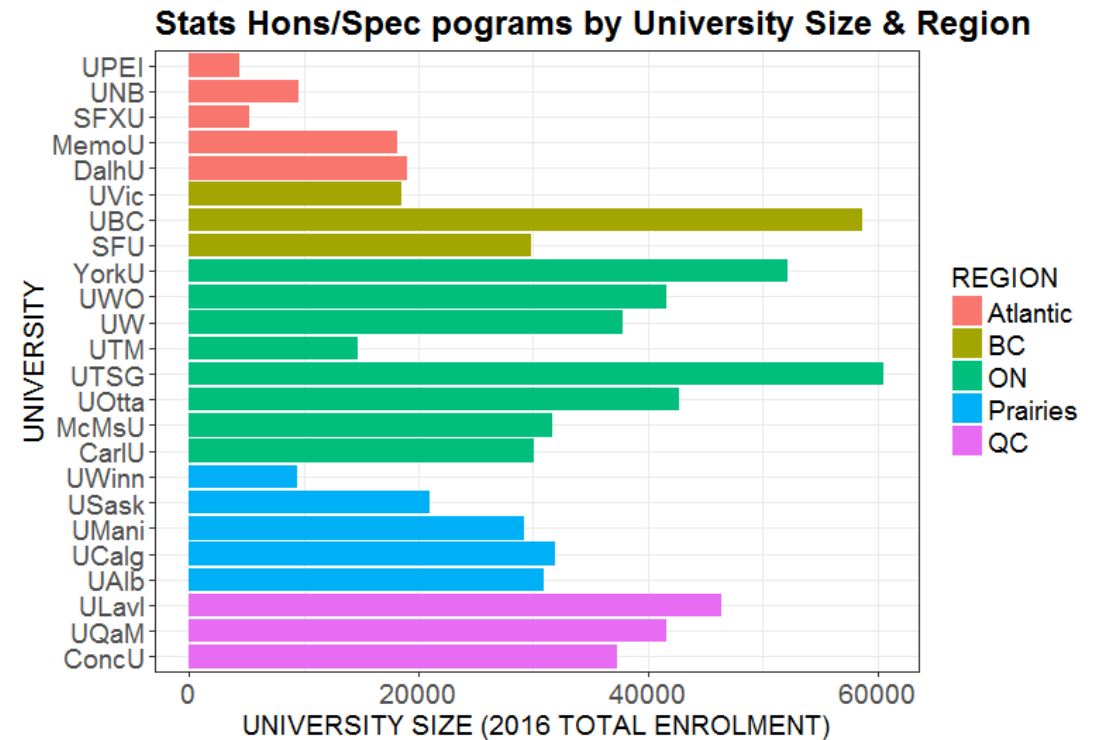


**ON has relatively more Stats BSc's;
Atlantic/QC/Prairies have less**



Stats Curricula - Target Population

- Consider only (pure) *Statistics Honours/Specialist programs*
 - Excludes Minor, Major, 3-yr BA/BSc, etc
 - Excludes programs not focused purely on Statistics (e.g. Probability & Statistics, or Mathematical Statistics)
- Analyzed programs from n=24 Universities



Stats Curricula - Variable Description

- For each course requirement, create the variables:
 - **Code, Title & Description:** copied from calendar
 - **Credits:** in full-course equivalents; i.e. 1-semester course = 0.5 credits
 - **Discipline:** department/discipline offering course
 - One of: *COMP*, *MATH*, *STAT*, or *OTHR*
 - **Level:** “year” in which course is offered (capped at 4)
 - **Type:** *Core* or *Elective* requirement
 - **Topic Category:** Multi-valued variable; (subjective) grouping of covered topics
 - One or more of:

<i>Statistical Theory</i> (ST)	<i>Statistical Methodology</i> (SM)	<i>Statistical Practice</i> (SP)	
<i>Mathematics</i> (MT)	<i>Probability</i> (PT)	<i>Computing</i> (CS)	<i>Other</i> (OT)

Topic Category Word Clouds

Stat Theory

methods
tests
ratio
testing
confidence
bayesian
theory
estimation
likelihood
distributions
interval
point
hypothesis
inference

Stat Methodology

techniques
estimation
simple
selection
models
data
analysis
regression
sampling
multiple
linear
model
designs
inference
random

Stat Practice

student
sas
honours
project
member
report
data
oral
research
year
software
supervision
presentation
study
written

Computing

types
topics
computer
solving
language
problem
programming
structures
computing
design
data
science
methods
include
recursion

Mathematics

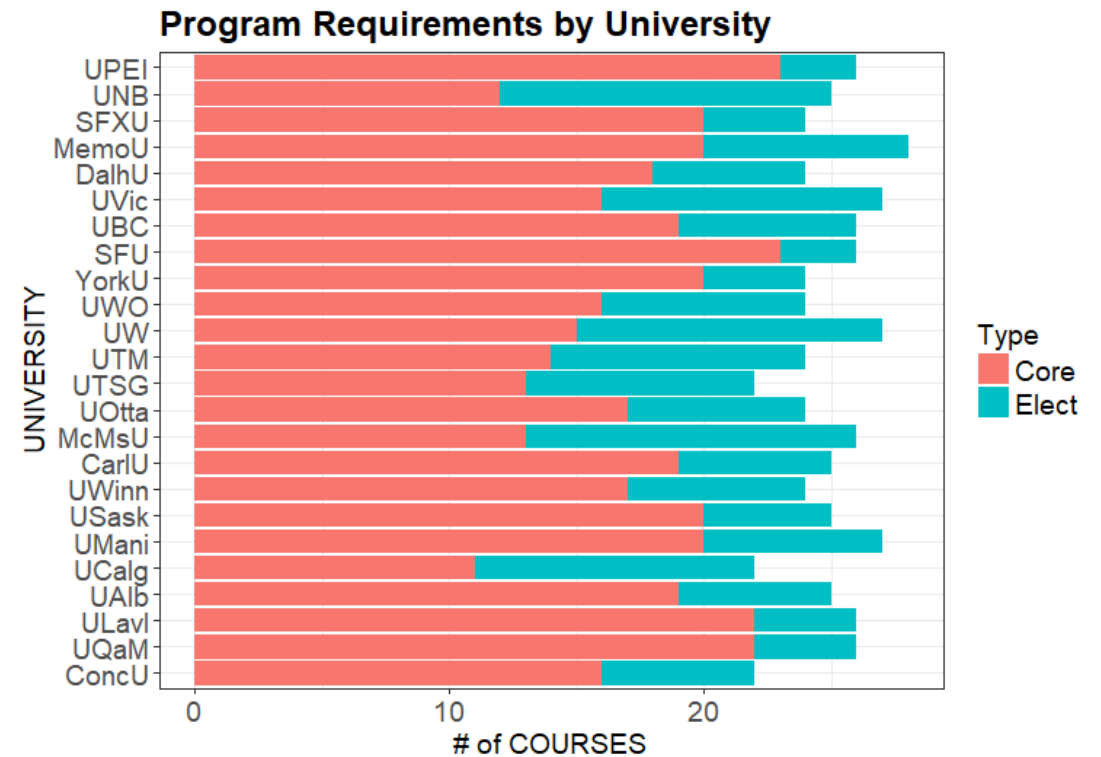
limits
vector
sequences
spaces
equations
series
theorem
integrals
differential
real
applications
functions
linear
calculus
integration

Probability

theory
limit
processes
continuous
conditional
discrete
random
functions
expectation
theorem
variables
distributions
probability
chains
markov

Number of Courses

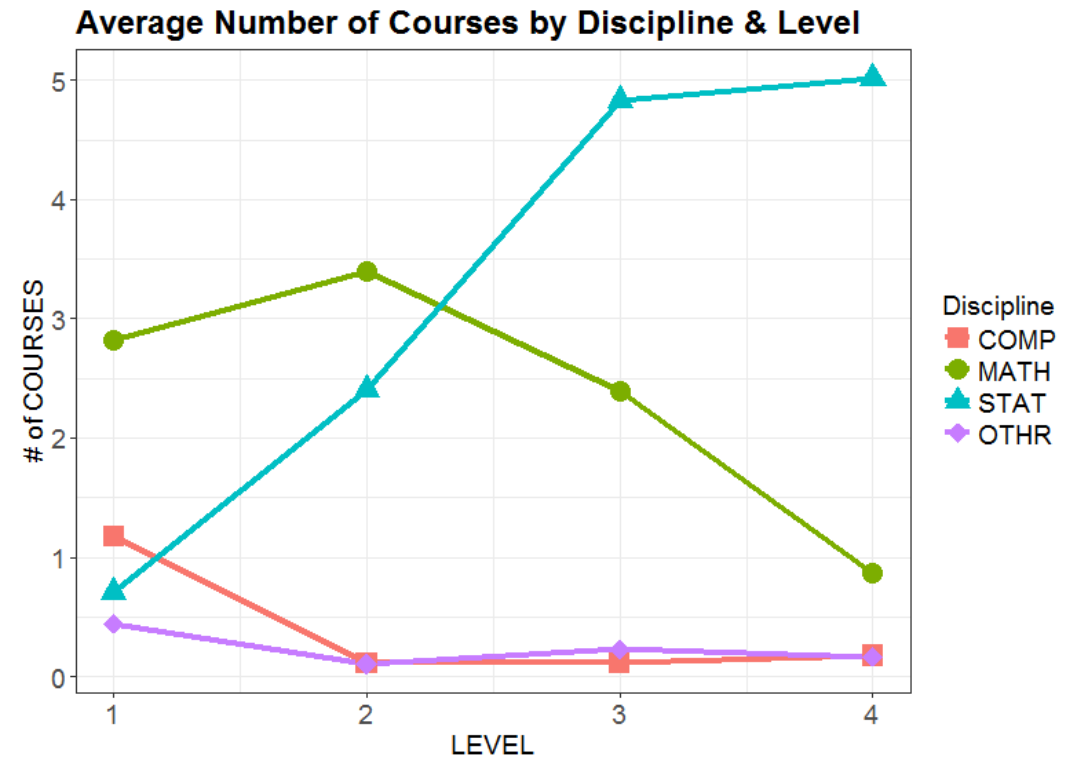
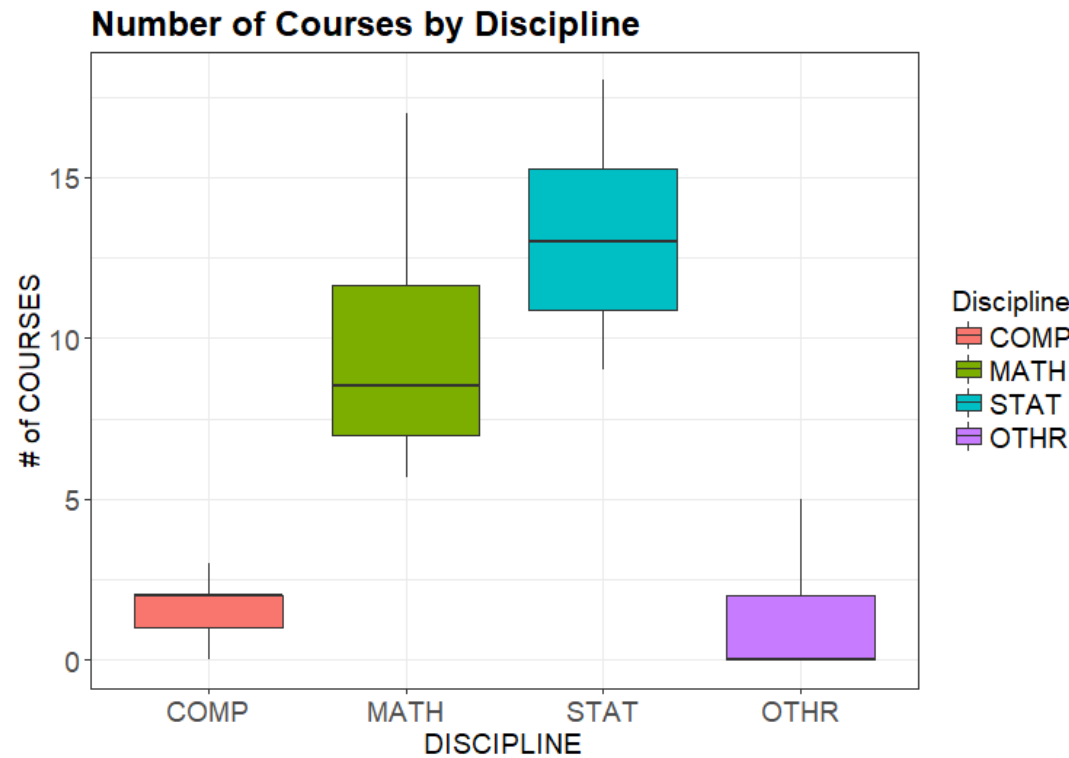
- **25 semester courses** required on average; with most programs between 24-26
 - i.e. 12 - 13 full-year equivalents, or 72 - 78 credit hours
- **70% of courses specified (core)**
 - Most programs ranging between 60% - 80%



Breakdown of Courses by Discipline

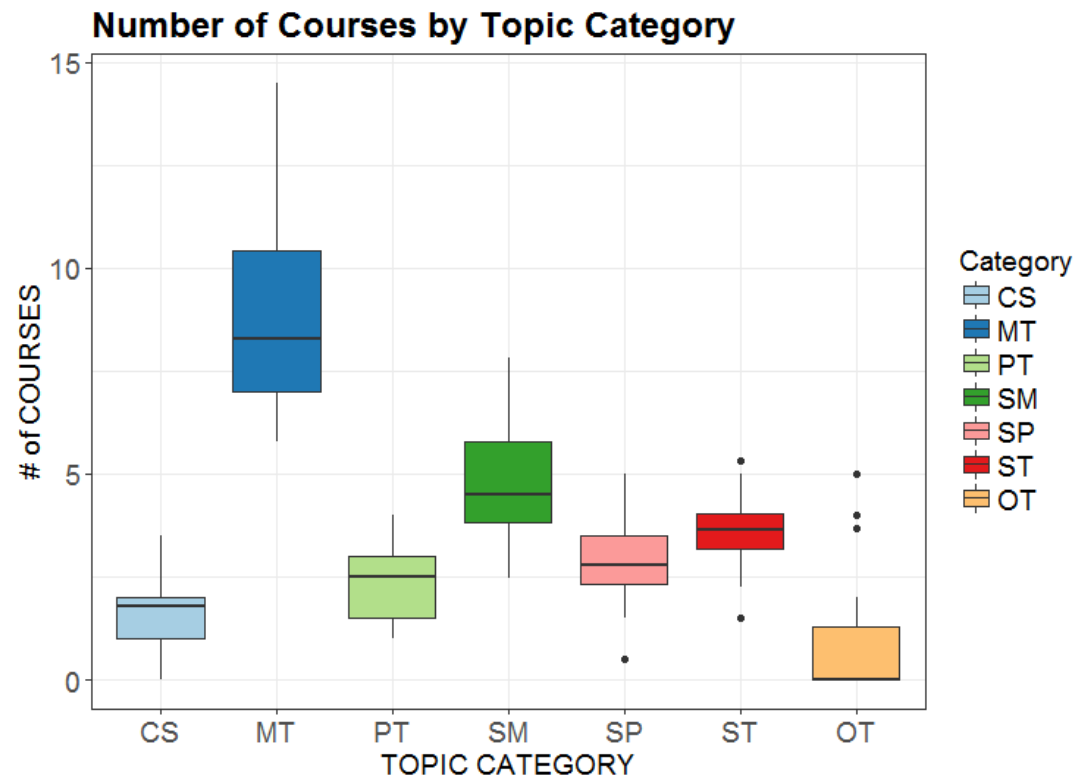
**52% STAT courses on average
(and 38% MATH courses)**

**few STAT courses in
1st year (mostly none)**

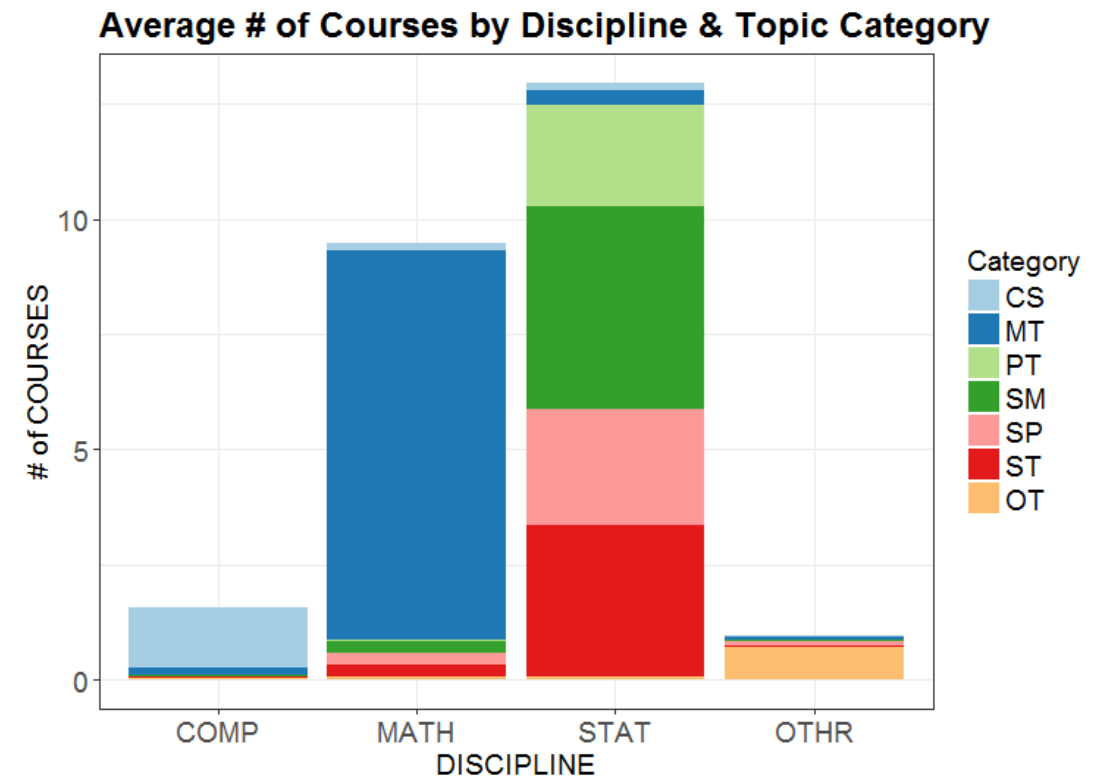


Breakdown of Courses by Topic Category

**Practice is least
developed Stats category**



Math/Prob-heavy curriculum



Conclusions/Recommendations

- Train Stats Hons/Spec BSc's primarily for the workplace (rather than graduate study)
- Offer more Stats-specific courses (at expense of Math courses)
- Offer Stats courses early on (1st year)
- Place more focus on Statistical Practice