

Undergraduate Data Science Education at Scale

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Berkeley, UMBC, and Mills College



UMBC Context

- Over 13000 students
- ~ 50% minority enrollment – emphasis on diversity and inclusive excellence, student success
- *Times Higher Education* - one of the world's top universities. In a new THE impact ranking, UMBC is #3 in the U.S. and #62 worldwide in global social and economic impact.
- *U.S. News & World Report* : the #9 most innovative university and #12 top university for undergraduate teaching in the nation.
- Emphasis on Research and pedagogical innovation
- IS Department- Over 1500 students (~1200 UG), 8 degrees, multiple certifications and tracks

Establishing the Undergraduate **Foundations in Data Science** course: Some Considerations

- Number of credits
- Contact hours
- Prerequisites
- Institutional framework

Spring 2020

IS 296: Foundations of Data Science

- 3 majors (IS, Comp Sci, BTA)
- Small class – 10 students
- Structuring tightly around UCB-Data8 with modifications
 - Some new homework
 - Two different projects
 - Ethics Module

Variations

- Some new home works
 - Case studies (assessing what's happening around us, types of research with data)
 - Take a lab (regressions/classification) and use your own data
- Two different projects
 - Tool exploration
 - Final project - Investigate research question with your own/real world data
- Ethics module
 - Guest lecture
 - Reading materials
 - Survey
 - In the works – Jupyter notebooks for a lab on ethics

Experiences and Outlook for upcoming semesters

- Jupyter notebook infrastructure , Google Colab
- Resourcing with the right expertise, at the right time and the right amount
- Labs and projects (solutions and experiences)
- Auto grading
- Emphasis on “data science-intensive” elements in IS 296
- Modules Vs Connectors, ramping up the efforts (learning from, once upon a time in Berkeley...)
- Campus connections
 - Physics, Mech Eng, CSEE, IS, CBEE
 - GWP course for BTA majors
 - BTA track in business analytics
 - Other intersections in geo-spatial analysis
 - Adoption of some lessons to a foundational grad course in Data Science, feeding into graduate tracks