Data Science Ph.D. Degree Program at WPI

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WPI’s Ph.D. Degree in Data Science

Across multiple departments and schools:

- Computer Science Department
- Mathematical Sciences Department
- Foisie School of Business

with affiliated faculty from

- Bioinformatics and Computational Biology Program
- Electrical & Computer Engineering Department
- Learning Sciences and Technology Program
- Social Sciences and Policy Studies Department

(over 50 faculty in total)
Big Data - Big Opportunity

Exceptional opportunity:
Extracting insights from digital data is important for businesses, sciences, engineering, and solving societal problems.

• Analytics Skills in High Demand: Jobs *
• Leverage our Momentum of MS Degree in Data Science
• Attract Top Student Talent to WPI
• Gain Access to Projects & Industrial Partnerships
• Leverage WPI Projects & Interdisciplinary Competencies
• Revenue Stream for WPI

* McKinsley’s Report 2012; and Edu. Advisory Board Rep. 2013 (commissioned by WPI CPE)
Degree Programs in Data Science

• Existing Programs (approved Nov. 2013)
  • M.S. Degree
  • Graduate Certificate

• Proposed (Direct Extension of Above):
  • Ph.D. Degree
Data Science

Concentration in Diverse Disciplines

Data Scientists with Interdisciplinary Skills
Reminder: WPI Data Science M.S. Degree
(Graduate Level Work of 33 credits)

Graduate Qualifying Project or MS Thesis
(3 to 9 credits)

Concentration and Electives
(9 to 15 credits)

- Mathematical Analytics (3 credits)
- Data Access & Management (3 credits)
- Data Analytics & Mining (3 credits)
- Business Intelligence & Case Studies (3 credits)

Integrative Data Science (3 credits)
WPI Data Science Ph.D. Degree

Ph.D. 90
- Dissertation
- Research & Milestones
- Electives
- Data Science Core Courses

Ph.D. 60
- Dissertation
- Research & Milestones
- Electives
- Data Science Core Courses, Or petition

Data Science MS Degree
- DS Core
- Electives
- Thesis

MS Degree Elsewhere
Ph.D. Degree Requirements

• Ph.D. 90:
  • Complete WPI MS in Data Science degree
  • Complete Ph.D. 60 requirements below (*)

• Ph.D. 60:
  • Core breadth competency [15 credits] (**) 
  • Core depth competency [6 credits] (**) 
  • Program electives [9 credits] 
  • Research credits [30 credits]

(*) If requirement already met as part of MS, can petition to take alternate course.
(**) Must achieve 4 A and 3 B or above grades in 7 core courses.
Ph.D. Degree Requirements

• Ph.D. 90:
  • Complete WPI MS in Data Science degree
  • Complete Ph.D. 60 requirements below (*)

• Ph.D. 60:
  • Core breadth competency [15 credits] (**)
  • Core depth competency [6 credits] (**)
  • Program electives [9 credits]
  • Research credits [30 credits]

(*) If requirement already met as part of MS, can petition to take alternate course.
(**) Must achieve 4 A and 3 B or above grades in 7 core courses.
Core Breadth & Depth Competency
(Graduate Level Course Work for Ph.D. 60)

Concentration and Electives
(9 credits)

- Mathematical Analytics
- Data Access & Management
- Data Analytics & Mining
- Business Intelligence & Case Studies

Integrative Data Science

- Core breadth competency [15 credits]: 3 cr in each of five areas
- Core depth competency [6 credits]: 3 cr extra in two areas
Ph.D. Research Requirements (Ph.D. 60)

• Ph.D. Qualifying Examination (within 1.0 year)
  • Directed study; 1 primary and 2 assigned co-advisors

• Ph.D. Committee Formation
  • 4 members; at least from 2 core DS depts; one from outside WPI.

• Ph.D. Dissertation Proposal (within 2.0 years)
  • Proposal manuscript & presentation & examination

• Ph.D. Dissertation Defense
  • Dissertation manuscript & presentation & examination
Logistics
Program Growth & Assessment

• Flexible program enables natural growth:
  • Specializations: Health Care Analytics, Data Science for Smart Cities, Cybersecurity, etc.

• Data Science Advisory Board:
  • for external guidance, project recruiting, and employment opportunities

• DS Steering Committee:
  • establishes assessment plan and manages growth of program
Resources

Robust Revenue:
• Strong application pool for MS in DS (280 apps on april/2015)
• 35+ M.S. students per cohort; for ~70+ students in total a year
• Off-site CPE offerings at UTC is 15 M.S. students strong

Resources:
• **Available:** Initial Ph.D. launch can proceed without new resources beyond those already committed by administration & departments for managing strong MS cohort:
  • Several faculty hired for Data Science in last 2 years
  • Courses and course offerings established
  • Hardware and software being set up
  • Teaching assistants in support of courses and research
• **Needed:** To strengthen WPI’s research and reputation in Data Science, on-going recruitment of top quality tenure-track faculty as well as additional TAs in Data Science important.
• Implementation Date:  2015/16
Questions?