15.572: Analytics Lab: Analytics, Machine Learning & the Digital Economy

Syllabus as of October 3, 2016 – Consult Stellar for most up-to-date information and readings

Instructors
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Office hours by appointment

Class times
Thursdays 4:00-5:30pm, E62-262 
Special Sessions 4:00-8:30pm, September 16, Bartos Theater (E15) 
12:00-6:00pm, December 12, Media Lab, Sixth Floor (E14)

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Course Support Team
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Summary and Objectives:

The growth in big data and analytics is transforming management decision-making, operations, marketing, finance, and product innovation. Businesses across the world are wrestling with challenges and opportunities that call for the application of analytics. We are on the cusp of a second machine age – a digital era that holds opportunities and challenges for both individuals and the economy. Workers and professionals in all fields are racing to acquire the skills and capabilities necessary to survive and thrive in this digital revolution.

The purpose of the Analytics Lab (A-Lab) is to match student teams with leading-edge projects involving analytics, machine learning or digital technologies as they apply to business questions and problems. The particular focus of the projects is on the technical and analytical aspects, but business relevance sets the context and nature of the technical problem.
Course Principles and Expectations:

The primary criterion for projects is to provide a learning experience for the students. In addition, the projects should be of high relevance and interest to a particular organization and senior managers and professionals in it.

Project teams of three students are expected to work independent of regular class meetings. Project sponsoring organizations will cover costs of travel and lodging, if any. Each project team will have an MIT-associated faculty or research mentor to provide guidance and assistance and a link to outside project sponsors on an as-needed basis.

Two special sessions are scheduled: Match Day on September 16 and Final Presentations on December 12. Attendance at both sessions is required.

Several optional sessions will be available: on September 23, representatives from the provider of the third-party data analytics tool, Civis Analytics, will present the platform and answer student questions. Later in the semester, students will have the opportunity to attend skill seminars designed around issues they are confronting as they complete their project work (details to be determined). Attendance is strongly encouraged.

The following states the MIT Action Learning Office’s policies on data destruction:

Host companies share confidential and proprietary information to student teams doing Action Learning projects. MIT Sloan has an obligation to destroy that data at the end of the project so that it does not inadvertently get disclosed to unauthorized people and it is not used for any other purpose than the project.

MIT Sloan depends on the student teams for destroying the data in a timely and appropriate manner. Please note that destruction of data is a requisite step for the completion of course requirements.

What Data is required to be destroyed?
Any information supplied by company in any format- emails, notes from a phone meeting, worksheets, records, company documents, any kind of company data. This includes data that is marked confidential and unmarked data. If the company supplied it, it must be destroyed at the end of the project.

What Data is NOT required to be destroyed?
Students can keep their final paper and other derivative work that does not include company proprietary or confidential information. If there is any doubt, ask for help to discern what needs to be destroyed.

What are acceptable destruction methods?
• Printed Materials: Documents should be recycled in MIT approved secure recycle bins. Each academic area and many program offices have these bins.
• Digital Data Controlled by Students: If students have the data in Dropbox or on their computer, they must delete the data using appropriate tools.
• Digital Data Controlled by Sloan Technology Services: STS will destroy the data according to MIT Sloan IT policies.

If there are any issues or questions on this issue, please contact Ellen Baum, Contract Administration, at 3-5617 at ebaum@mit.edu or Will Hedglon, STS, at 5-4176 at hedglon@mit.edu.
Notes on Class Activities and Due Dates:

- Prior to 9/8: Students are given project proposals from all proposing companies and are expected to be familiar with them before the first session.

- 9/8: The first session will be followed by an informal huddle to facilitate team formation; pizza will be provided.

- 9/16: On Match Day (4:00-8:30pm, Bartos Theater, http://whereis.mit.edu/?go=E15), we will meet jointly with the representatives from project proposing companies. Each will briefly describe their project as proposed, and students will have an opportunity meet and informally mix with them and fellow students. The session will be followed by a reception. The chief aim of this session is to help inform student team formation and project selection.

- 9/19, 11:59pm: DUE team formation; each team should submit one document (guidelines posted on Stellar, “Guidelines: Team Formation for Projects”) to Oz. In the following days, faculty, mentors, and the course support team will review and confirm the teams.

- 9/22, 11:59pm: DUE project bids; each team should complete the survey (link to be distributed via Stellar, where guidelines will also be posted, “Guidelines: Bidding for Projects”). In the following days, faculty, mentors, and the course support team will work out assignments of projects to teams, subject to review by the proposing company.

- 9/23: Civis Analytics will give tutorials on the platform and modeling, and will provide on-site troubleshooting assistance (11:30-3:00, E62-276). Attendance is optional but strongly encouraged; lunch will be provided.

- 9/28: Final team-project pairings will be communicated to students. MIT and every proposing company have executed a jointly signed NDA. Each student team member will be required to review and sign an acknowledgment stating that all will abide by the terms agreed to in the NDA. Additional information will follow from Ellen Baum.

- 10/6, 11:59pm: DUE: project plan; each team should submit one document to their mentor and Oz.

- 10/13, 10:00am: DUE: mid-point presentation slides; each team should submit their slides to their mentor and Oz.

- 10/13 and 10/20: Student teams will deliver 5 minute presentations on their project work at the mid-point of the term. The chief aim of these sessions is to help illuminate issues common across teams in order to foster collaboration and set the agenda for the optional skill seminars to follow.

- 12/12, 10:00am: DUE: final presentation slides; each team should submit their slides to their mentor and Oz.

- 12/12: During the Final Presentations Workshop (12:00-6:00pm, Media Lab, Sixth Floor, http://whereis.mit.edu/?go=E14), each team will present their project work to an audience of experts, entrepreneurs, and executives, including representatives from project sponsoring organizations. Teams will have 8 minutes to present their project work, plus 4 minutes for Q&A and judge remarks (12 minutes total per team).

- 12/14, 11:59pm: DUE: final report (10 pages maximum, 3000 words, not including figures or references); report should consider feedback received during final presentations on 12/12. Each team should submit one document to their mentor and Oz.
Grading:

- 40% final presentation content and delivery – team-wide
- 30% final report – team-wide
- 10% mid-point presentation content and delivery – team-wide
- 20% contribution to class discussions and team project enablement – individual

Required Book:

Data Science for Business: What You Need to Know About Data Mining and Data-Analytic Thinking, Foster Provost and Tom Fawcett. 2013. O'Reilly Media Inc. (Online access available at http://library.mit.edu/item/002221893)

All other required readings are freely available on the course Stellar site: https://stellar.mit.edu/S/course/15/fa16/15.572/
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<th>Date</th>
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<tbody>
<tr>
<td>S1 9/8</td>
<td>Welcome Lecture: The Economic Payoff From Analytics</td>
<td>4:00-5:30</td>
<td>Erik Brynjolfsson</td>
<td>S2 9/15</td>
<td>Lecture: Social Analytics – A Deep Dive</td>
<td>4:00-5:30</td>
<td>Sinan Aral</td>
<td>S3 9/16</td>
<td>Match Day</td>
<td>4:00-8:30</td>
<td>Pedro Domingos</td>
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<td>S4 9/22</td>
<td>Lecture</td>
<td>4:00-5:30</td>
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<td>S5 9/23</td>
<td>Optional: Civis Analytics Visit and Tutorial</td>
<td>12:00-3:30</td>
<td>Visitors from Civis Analytics</td>
<td>S6 10/6</td>
<td>Lecture</td>
<td>4:00-5:30</td>
<td>Claudia Perlich</td>
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<td>S7 10/13</td>
<td>Mid-Point Presentations</td>
<td>4:00-5:30</td>
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<td>S8 10/20</td>
<td>Mid-Point Presentations (cont.)</td>
<td>4:00-5:30</td>
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<td>SIP Week – No Class on 10/27</td>
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<td>S9 12/12</td>
<td>Final Presentations Session</td>
<td>12:00-6:00</td>
<td>Guests, Erik/Sinan</td>
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<td>No Class through 12/12 – Team-Mentor Meetings + Optional Skill Seminars</td>
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Reading List:

Session 1: *The Economic Payoff from Analytics* (Erik Brynjolfsson):
1. Carefully review all project proposals and this syllabus.

Optional Reading:

Session 2: *Social Analytics: A Deep Dive* (Sinan Aral)

Optional Reading:


Session 3: Match Day: Meet Project Proposers

Optional Reading:


Session 4: (Pedro Domingos)


Optional Reading:


Session 5: (Ellen Baum + Foster Provost)


Session 6: (TBD)

Sessions 7 & 8: Mid-Point Presentations

Optional Reading:


41. Browse: http://www.enlitic.com


Session 9: Final Presentations Workshop