# IEOR 4524 Analytics in Action: MSBA Capstone Spring 2020

## Course Description

In this course, groups of students will work on real world projects in analytics. Students will focus on three aspects of analytics: identifying client analytical requirements; assembling, cleaning and organizing data; identifying and implementing analytical techniques (statistics, OR, machine learning); and delivering results in a client friendly format. Each project has a well defined goal and comes with the sources of data pre-identified. All projects and have been structured so that they can be completed in one semester.

Please note that this is a client facing class and you must ensure that you have the skills, time, and energy required to satisfy the requirements of the project. You will need to communicate with the client on a regular basis so please make sure you have some time free on Fridays, either in the morning or in the afternoon.

## Collaboration

The project is a collaborative exercise. You will work in groups ranging from 3 to 5 students and need to build a culture of collaboration between yourselves. Expect to have regular meetings, at least twice a week is a good idea. You will also work under the guidance of an industry mentor, the project client so one of the 2+ weekly meetings should be with the client. Clients are busy and it will be your responsibility to ensure that you are well prepared before the meeting and that the meeting takes place.

## Peer reviews

Each project group will also be responsible for peer reviewing one other project. You will be required to meet with the other group, review their progress, and submit a brief report to the other group as well as to the instructor. The report should evaluate their progress and suggest alternative approaches or methodologies. Each peer review meeting should be scheduled for about 20 minutes and may be attended by a TA.

## Class meetings

Every project group is required to make two 10 minute presentations to the class over the course of the semester. The deadlines and requirements for these presentations are listed below and it is the group's responsibility to make sure they meet these deadlines by signing up for presentations (a signup mechanism will be made available at the beginning of the semester).

## Project milestones

Project activity is divided into the eight phases below. This is meant to be a rough timeline - the actual requirements at each phase depends on the nature of the project.

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| Phase 1: | (Before the semester begins) Connect with the industry mentor. Get a brief overview of the project. Sign NDAs or other necessary documents. Do any preliminary software setup. |
| Phase 2: | (Weeks 1 and 2) Problem definition. Identify data sources |
| Phase 3: | (Weeks 3 and 4) Collect data. Clean Data. Begin building appropriate feature sets |
| Phase 4: | (Weeks 5, 6, 7) Feature exploration. Examine distributions. Visualize data. Figure out dependent variables. Do feature engineering. Identify appropriate data analysis techniques. |
| Phase 5: | (Weeks 8, 9, 10) Modeling. Run models. Iteratively re-engineer features, adjust hyper parameters, evaluate results |
| Phase 6: | (Weeks 11 and 12) Finish modeling. Work on visualizations of the results. Build a prototype app if required by the project. |
| Phase 7: | (Weeks 13 and 14) Complete work. Make final presentation to client. Deliver report/Presentations/dashboards/apps to client. |

## Deliverables

1. Peer review reports. A peer review form will be provided. Each group should submit one report
2. Phase 3 project report. 3-5 page report summarizing the background, a description of the data, a timeline for the project, and anything else worth reporting at this point
3. Phase 5 project report. 4-8 page report summarizing the work done in phases 4 and 5. At this point, you should already have some initial results (not necessarily good ones).
4. Final project report.  The problem. The data. The methodology. The results. Focus on top level statements in the report and use appendices for technical details.

## Deliverables and events timeline

Project:

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|---|---|
| 2/21/2020 | Phase 3 project report due. |
| 3/12/2020 | Presentation 1 completed |
| 4/11/2020 | Phase 5 project report due |
| 5/2/2020 | Final project report due. Presentation 2 completed. |

Peer review:

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|---|---|
| 2/14/2020 | First peer review report due |
| 4/4/2020 | Second peer review report due |
| 5/2/2020 | Final peer review report due |

## Evaluation

**Industry mentor feedback**: Students are expected to be professional in their meetings with industry mentors. Punctuality, performance, and participation is the minimal expectation from all students. Any negative feedback from an industry mentor will adversely affect your grade

**Peer grade**: Your peer group will rate your project in the final peer report and this will flow back into your grade

**Deliverables**: The quality of the various project and peer review reports described above

**Project**: The quality of the project work. This will be jointly decided by the industry mentor, the TAs and the Instructor

**In-group feedback**: Each group will submit a "contribution" rating for all other group members. Generally, this will have no impact on the grade but, if there are cases where one group member is consistently shown to have not contributed meaningfully to the project, then that persons grade will be adversely affected.

**Timely completion of milestones**: Groups are expected to meet the milestone deadlines listed above. Failure to do so will have an adverse effect on your final grade.