

## SI 485 Winter 2019 - Information Analytics Project Course

Instructor: Kevyn Collins-Thompson

Winter 2019: Wed 1-4pm NQ 2255

Instructor: Kevyn Collins-Thompson

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Office: NQ 3344

Office hours: 4-5pm Wed or by appointment

If you have questions about the course or your project, please feel free to come and talk with me during my office hours. You can also contact me via email: please put “**485**” in the subject line so I can be sure to attend to it. (Please note that I may not be available on email over the weekend.)

GSI: **Ryan Burton** ([ryb@umich.edu](mailto:ryb@umich.edu))

GSI Office Hours: For technical support on assignments, projects, see the GSI after class, by appointment or reserve available 20min slots during office hours ([Reserve an appointment on Google Calendar](#))

Course Email: via Canvas

Note: Some syllabus details may be subject to change.

There is no midterm or final exam for this course. However, there are deliverables in the form of milestones/progress reports and other assignments, including peer assessments, that must be completed satisfactorily to pass the course.

**Class and assignment schedule** (May be subject to minor adjustments).

All reports will be due by start of class (1pm) on the due date.

### Course schedule with deliverables

Wednesday, January 9, 2019 (1-4pm).

- 1-2:30pm: Weekly team updates and discussion (required)
- 2:30-4pm: Reserved slot for team/client meetings

**Wed. Jan. 16** Group 1 report-outs. Due: Progress report 0.

**Wed. Jan. 23** Group 2 report-outs.

**Wed. Jan. 30** [Class cancelled] Due: Progress report 1.

**Wed. Feb. 6** Group 1 report-outs.

**Wed. Feb. 13** Group 2 report-outs.

**Wed. Feb. 20** Group 1 report-outs. Due: Progress report 2

**Wed. Feb. 27** Midterm presentations: **\*\*all teams\*\***.  
Due: Midterm checkpoint slides (12:01pm Wed)

**Fri. Mar. 1** **\*\*Due: Midterm checkpoint report (11:59pm)**

**Wed. Mar. 6** *No deliverables: spring break*

**Wed. Mar. 13** Group 2 report-outs.

**Wed. Mar. 20** Group 1 report-outs. Due: Progress report 3. Report draft.

**Wed. Mar. 27** Group 2 report-outs.

**Mon. Apr. 8** Due: Progress report 4. UMSI Winter Expo poster presentations.

**Wed. Apr. 10** Due: Report draft sent to client.

**Wed. Apr. 17** Due: Final project presentation and final report.

**Wed Apr. 24** (provided by clients) Final client assessment: Measurement of team performance and outcome against project specifications.

### **Classroom policy**

A key element of the project course is that it is a team effort - between members of your team, but also between the instructional team, student team, and client team. You should think of this as being similar to an internship in an organization, where being part of a team means being present when expected, showing up on time, and making consistent contributions.

Therefore, regular participation in this class and in team/client meetings is mandatory and required to pass the course. "Regular" means you must not miss more than two scheduled class discussions, or more than two client meetings without a valid, critical, documented reason (e.g. health reasons, job interview) and without letting the instructor know in advance. Multiple unexcused absences from class and client meetings will result in academic penalties up to and including failing the course, regardless of whatever other activities you might have completed. The instructor may take attendance for both class discussions and for client meetings as part of the project assessment and

factor this in when assessing participation credit and final grades. Students are asked to attend class or meetings on time and remain through the entire class or meeting.

### Learning Objectives

Students in this course will learn to:

- Apply concepts and methods that span several topic areas in informatics to solve a challenging real-world data-centered problem in coordination with a project sponsor (industry, non-profit, government or academic partner).
- Work together in teams to systematically define and develop the project, as measured by progress on regular milestone assignments.
- Produce and demonstrate a non-trivial working software artifact (broadly defined) that addresses the project goals.
- Present their work to the sponsor and broader UM community via formal oral presentations/videos and written reports.
- Work and interact professionally with external project sponsors, faculty, and student peers.

Specific goals include:

#### ***Mastery:***

- The ability to apply core data analytics and exploratory tools (e.g. data manipulation, statistical methods, visualization) to extract insights from unfamiliar datasets.
- The ability to clearly and professionally communicate results, issues, and progress with clients and peers.

#### ***Competency:***

- Eliciting, clarifying, and formalizing client requirements.
- Breaking down a complex problem into manageable subtasks and prioritized milestones.
- Basic project tools and methods: e.g. scheduling and tracking, collaboration tools, evaluation metrics.

#### ***Literacy:***

- Gain experience balancing time/quality tradeoffs for engineering, testing.

#### ***Awareness:***

- Recognizing potential project problems early and developing strategies to address them.

### Course Content and Structure

This 4-credit, team-based project course is intended to bring together what students have learned in previous UMSI courses and is focused on advanced projects involving a significant data-oriented analytics problem, working with an external client.

Class time will focus on project logistics, tracking team progress towards milestones, and discussion of issues of project design and implementation. Each team will be required to give regular short presentations on their progress - typically, every other week. Class time may also include lectures on the practical application of advanced topics such as machine learning, or be used to host industry guest speakers.

Specific topics include:

- Reviewing the progress of projects, with teams giving updates on their project's progress and challenges;
- Planning and discussion of use of specific technology tools and project resources;
- Teaching principles and tools for project and team development;
- Engaging each team in feedback and discussion with the rest of the class on what's going well, what's not going well, and ideas for how to solve project issues as they arise;

Generally, class will meet weekly, and up to the first 90 minutes of class are required attendance: these will be used for team presentations, updates, and discussion. After a short break, the remaining time will be optional 'flex time' that can be used for (a) a dedicated team meeting time, (b) meetings with the GSI or (c) lectures on optional topics covered by the instructor for interested teams. We will post any exceptions to this schedule in advance to the class calendar.

**Intellectual property:** While some corporate projects may involve Non-Disclosure and Intellectual Property obligations, students will always have the option to work on a project where they retain full IP rights with no obligation to confidentiality.

### Prerequisites

To enroll in this project course, students must have taken and passed the following courses with a minimum grade of C or better (or a Satisfactory grade):

- SI 405 Information Analysis Final Project Preparation Course (Fall term)
- The BSI core required courses SI 206, SI 301, SI 310
- SI 330 Data Manipulation and/or SI 370 Exploratory Data Analysis/Visualization

### Course Materials

There are no required texts for this class. Any readings will be provided online as needed. Any lecture slides will be made available on Canvas before and after each class meeting.

You may find the following textbook very useful for applied machine learning with Python. It's available for free online to UM students here:

**Introduction to Machine Learning with Python. A. Mueller and S. Guido. O'Reilly.**

<http://proquest.safaribooksonline.com/book/programming/machine-learning/9781449369880/firstchapter>

### Assignments and Grading

The course is project-based. The instructor and instructional team will serve as a guide and facilitator of the design and development process, and the interaction with clients. As described above, attendance at weekly classes and client meetings is mandatory.

All projects will result in:

- A non-trivial working software artifact (broadly defined)
- A written report that describes the project and its results, justifying major decisions and approaches.
- A demo-based presentation.

**Student teams will exhibit their projects (poster presentation) at the UMSI Winter Term Exposition on Monday, April 8, 2018.**

Evaluation will be based on:

- Instructor grades for deliverables and presentations
- Client evaluation from project sponsors on the project outcomes and the effectiveness and professionalism of the student teams.
- Peer evaluation on team member performance within a project.

The following is the grading rubric for the course. Deliverables are intentionally front-loaded toward the first half of the project when tracking progress more closely is

important. Some adjustments to this grading scheme may be made as circumstances require.

**Team report-outs:** 10% (= 5 x 2%)

**Progress report 0.** 5%

**Progress report 1.** 5% (includes assessment of commitments from PR 0)

**Progress report 2.** 5% (includes assessment of commitments from PR 1)

**Midterm checkpoint. Interim report and presentation.** 15%

**Progress report 3.** 5% (includes assessment of commitments from PR 2)

**Progress report 4.** 5% (includes assessment of commitments from PR 3)

**Final project presentation (includes poster at UMSI Exposition)** 5%.

**Final project report:** 20%. Graded by instructors.

**Final client assessment:** 25%. Graded by client\*.

The client grade reflects their assessment of team performance and outcome against project specifications as mutually agreed upon in Progress Report 1 (e.g. desired adequate/good/excellent outcomes.)

Example grades might be: adequate (15/25), good (20/25) and excellent (25/25).

\* The instructor reserves the right to provide a proxy or adjustment for the client assessment if needed.

Teams must satisfactorily complete all deliverables, including the final report and presentation – regardless of grade – to pass the course.

The final score out of 100 will be converted to a letter grade on the following scale:

A+ 98; A 95; A- 90; B+ 87; B 83; B- 80; C+ 77; C 73; C- 70; D+ 67; D 63; D- 60; E 50; F 40.

### Late Policy

All deliverables in the course will have a specific deadline. Because of the pace of this course, and the dependency on client feedback, your team must work to keep on track with the course schedule and submit deliverables on time. There is a 25% penalty for each 24h period after the deadline that any deliverable is late. For example, if the due date is 1pm on Wednesday, the possible late penalties would be:

Before 1pm Thursday: 25% deduction

Before 1pm Friday: 50% deduction

Before 1pm Saturday: 75% deduction

After 1pm Saturday: 100% deduction

Again, teams must satisfactorily complete all deliverables, including the final report and presentation – regardless of grade – to pass the course.

Peer feedback and individual contributions: An individual's final grade may be adjusted at the discretion of the instructor to reflect especially large or small relative contributions, as measured by any aggregated peer feedback scores, class participation, client feedback, and the instructor's own assessment.

At the discretion of the instructor, a bonus of up to 10% may be awarded for especially creative, high-quality projects.

### GSI Support

We are fortunate to have one full-time GSI assigned to this course to support the course through activities that include:

- Assisting with team/client coordination (e.g. attending meetings) and problem-solving.
- Consultant for machine language and statistics problems.
- Setup, tutorials, and support of course infrastructure/tools.
- Grading and evaluation (e.g. tracking milestone assignments, final projects, soliciting, gathering, and evaluating peer & client feedback).

### **Academic Integrity and Original Work Policy**

Unless explicitly specified, all submitted work must be original work to you and/or your team, as appropriate. It is a violation of the original work policy to copy code or other work from previous projects or sources. In written project reports, any excerpts from the work of others must be clearly identified as a quotation, and a proper citation provided. For programming-related deliverables including project code, copying code wholesale or with trivial modifications from an external source (e.g. not written by anyone on the project team) without attributing the source of the code is also a violation of the original work policy. Any violation of the School's policy on Academic and Professional Integrity will result in severe penalties, which might range from failing an assignment, to failing a course, to being expelled from the program, at the discretion of the instructor and the Associate Dean for Academic Affairs.

### **Accommodations for Students with Disabilities**

If you think you need an accommodation for a disability, please let me know at your earliest convenience. Some aspects of this course, e.g. assignments, the in-class activities, and the way we teach may be modified to facilitate your participation and progress. As soon as you make me aware of your needs, we can work with the Office of Services for Students with Disabilities (SSD) to help us determine appropriate

accommodations. SSD (734-763-3000; <http://ssd.umich.edu/>) typically recommends accommodations through a Verified Individualized Services and Accommodations (VISA) form. I will treat any information you provide in as confidential a manner as possible.

### **Student Mental Health and Wellbeing**

The University of Michigan is committed to advancing the mental health and wellbeing of its students. If you or someone you know is feeling overwhelmed, depressed, and/or in need of support, services are available. For help, contact Counseling and Psychological Services (CAPS) at (734) 764-8312 and <https://caps.umich.edu/> during and after hours, on weekends and holidays, or through its counselors physically located in schools on both North and Central Campus. You may also consult University Health Service (UHS) at (734) 764-8320 and <https://www.uhs.umich.edu/mentalhealthsvcs>, or for alcohol or drug concerns, see [www.uhs.umich.edu/aodresources](http://www.uhs.umich.edu/aodresources).

For a listing of other mental health resources available on/off campus, visit <http://umich.edu/~mhealth/>