I. Instructor

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Office Hours: By appointment

II. Class

Time: 6:00 pm – 08:40 pm on Wednesday
Room: Pigott 100

III. Course Description

The Capstone is an application of data analytics in the planning and execution of a one-quarter-long development project. Students work in teams to define and carry out an analytics project from initial requirements analysis to final implementation. Primary tasks include an identification of problems, datasets, data preprocessing, building data mining/statistical models, and validation. This activity will culminate in a formal presentation of results at the end of the quarter.

This course is designed to offer students the opportunity to apply the principles, concepts, and skills learned in prior classes to actual business situations. Students will be expected to use their knowledge and judgment to make decisions and recommendations concerning the business requirements and objectives that they will investigate.

During the quarter, students will need to utilize a variety of communication techniques: brainstorming, encoding, decoding, role-playing, decision-making, problem solving, library research, report writing, and more.

The overall objectives of the course are as follows:

- Provide a foundation for understanding the processes and practices of business analytics, which will assist students in their future career positions.
- Understand and develop the ability to deal with the array of critical decisions facing the management of companies engaged in business analytics.
- Develop a working familiarity with the availability and reliability of data, both qualitative and quantitative, relating to business requirements.
IV. Readings


- [https://cran.r-project.org/](https://cran.r-project.org/) The R Manuals

- Lecture Notes – Available on Canvas.

V. Software Tools

For your analysis, you can use any software packages you have learned in the prior courses. We have the following software systems available for this course: MS SQL Server, Visual Studio, R Studio, and others.

VI. Learning Objectives

- Planning and execution of data analytics
- Understanding how data mining projects, including data extraction, transformation, and loading (ETL), can be applied to solve real world problems
- Understanding how data mining or big data projects assist client organizations to achieve their goals
- Exhibit the ability to identify, measure, interpret, and incorporate relevant information in analyzing problems and making effective business decisions
- Demonstrate an ability to write a data analytics consulting report, make recommendations, develop conclusions from the research, and make substantial recommendations to the client organizations.
- Demonstrate an ability to orally present a consulting report to an executive audience

VII. Class Procedures and Activities

To a great extent, this will be a self-directed class wherein student responsibilities will be of a different scope and nature than in the normal classroom environment. The teamwork that is required will also differ from previous team project experience, in that the projects are actual situations requiring decisions, recommendations, and action. Considerable interaction will be required between the student teams and participating companies or an instructor. Insofar as possible, students will be given a choice as to the datasets or the company which they will work with.

The class will be organized into teams of three or four students each. Student teams will work together with a participating local company in order to accomplish a project or analyze the publicly available datasets.

Materials covered in class during the quarter will be directly and systematically linked to the projects that are being performed. Explanation and rationale for the techniques and skills that will be required to complete the projects successfully will be explained sequentially. Lectures, if any, will focus on subjects directly relevant to the objectives of student projects, and will use these projects as illustrative "live" case studies for class discussion.
Schedules permitting, executives of participating firms will be invited to class to describe their companies' products/services and industry and to discuss, informally, their business plans, objectives, activities and experiences, as well as the issues which affect the choices and decisions which they face. Consultants, government sources, and others may periodically discuss with you their perspectives and resources.

VIII. Course Design

This course is designed around four phases of the consultation process: Engagement, Discovery, Design, and Delivery. The highly participatory class sessions will focus on these phases to build awareness of the principles, concepts, and skills of the consulting profession – and, to set students up for success on the required deliverables for the course which are directly tied to each process phase. Throughout the project, student-teams will explore ways to increase client engagement and empowerment and to create deeper learning.

<table>
<thead>
<tr>
<th>Engagement Process/Problem Identification</th>
<th>Discovery Process/Data Preprocessing</th>
<th>Design Process/Building Models</th>
<th>Delivery Process</th>
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<tbody>
<tr>
<td>Partner with client to understand business needs/Problem Identification</td>
<td>Understanding Data/Building Data Dictionary</td>
<td>Design potential interventions to mitigate gaps</td>
<td>Identify key considerations to mitigate gaps</td>
</tr>
<tr>
<td>Determine Gaps between current and desired future/Identification of Relevant Datasets</td>
<td>Data Preprocessing and Cleaning</td>
<td>Identify organizational elements required to support intervention</td>
<td>Communicate steps to desired future</td>
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<tr>
<td>Explore potential approaches to address client needs</td>
<td>Literature Reviews</td>
<td>Secure buy-in of key stakeholders to interventions</td>
<td>Design a user-friendly deliverable that promotes learning</td>
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IX. Project Descriptions

Student teams will perform the research, analysis, and evaluation required to advise the company's management in project areas similar to those described below. Actual project assignments will depend on company requirements and may differ from the examples given.

Team Reports

The results of each team's efforts will be formalized in a written report. It is expected that these reports will be prepared carefully, thoroughly, and in a manner consistent with high academic and professional standards. Teams should have the confidence that their work is sound enough to withstand scrutiny by company executives – because it will – and complete enough for these executives to utilize the information productively in their business activities.

Reports will be 15 to 25 pages in length, plus appropriate appendices, and a bibliography of sources utilized. The objective of each team's efforts will be to provide the company with a report which is practical, useful, and provides the firm with information they do not already know.
Teams will make practice oral presentations to the class and final presentations to company executives summarizing the results of their efforts, explaining the rationale behind recommendations/conclusions, and indicating the next steps to be taken. Oral reports will be presented at the company's offices.

**Research Paper**

One of our final goals is to write an article and have it published in a research journal or conference proceedings. This class is a joint research project with students and faculty.

**X. Grading** will be based on the following criteria:

<table>
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<tr>
<th>Criteria</th>
<th>Weight (%)</th>
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<tbody>
<tr>
<td>Mid-term briefings to class</td>
<td>10</td>
</tr>
<tr>
<td>Midterm Exam (May 10th)</td>
<td>20</td>
</tr>
<tr>
<td>Oral presentation to the company/Class</td>
<td>25</td>
</tr>
<tr>
<td>Final written report</td>
<td>35</td>
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<tr>
<td>Participation and effort – including class attendance</td>
<td>10</td>
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* Because these projects have such a high profile and are so important to both our client firms and to Seattle University, the Oral and Written reports will be discounted by your individual score on peer evaluations. In other words, the team could score well, but if you received a poor evaluation, your grade could be severely impacted. This is designed to make sure the team works well together and to minimize the free-rider syndrome, among other issues.
Tentative Class Schedule\textsuperscript{1}

<table>
<thead>
<tr>
<th>Week</th>
<th>Activities</th>
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| **Week 1** | 1. Orientation – Review of class objectives  
2. Project descriptions, guidelines and expectations.  
3. Introductions of class members, team formation, project selection.  
4. **Assignment**: Before next session, teams meet with client companies or select datasets to establish/confirm project objectives and begin preparation of: Statements of Work, Engagement Letters and class briefings. |
| **Week 2** | 1. Client briefings/Explanation of Datasets  
2. Problem Identification/Complete Statements of Work & Engagement Letters  
3. Schedule team meetings with instructor:  
   - Sign off on Engagement Letters  
   - Prepare for class presentations |
| **Week 3** | 1. Guidelines for written reports  
2. **Team presentations** to class outlining projects, approach adopted, resources to be utilized and task allocations  
3. Team meetings with instructor |
| **Week 4 - 9** | Team meetings with instructor |
| **Week 10** | **Presentations/Final Paper Due** |

\textsuperscript{1} Depending on the topic or company your team choose, the schedule can vary for each team.