Description of Course Project:

As a part of the assigned work for this course, you are required to conduct a course project. The purpose of the project is different from doing homework. It is to give you a feeling how to handle a real life dataset, make decisions yourself, and justify your undertaking. Performing this project encourages you to explore an avenue related to, but not limited to, the material in the class. You may need to read additional literature and broaden your knowledge base.

The project is based on a set of data collected from a manufacturing process, in which both in-control and out-of-control data are present. You are asked to develop a method or a procedure to identify the data falling in the respective categories. This is amounted to a Phase I analysis, whose purpose to isolate the in-control data for estimating the in-control distribution parameters so that a monitoring scheme can be set up for future missions.

There is no fixed path in the project execution. Many actions are "acceptable" but it does not mean they will receive the same scores. I want you to treat your own team as a professional analytic team in the following scenario. Pretend that I am a manager of a manufacturing business unit and you are the analytic team supporting the business unit. I have this set of data and want to do a Phase I analysis to the best extent possible, so that I can have the most effective process monitoring set up for my manufacturing process. I do not know how to do it. So I provide the data to your team and ask for help. I need you to make the recommendations to me concerning which part of data samples are the out-of-control points and which are in control, so as for me to compute the in-control parameters. You need to justify your recommendations.

Description of the dataset

(a) This is a manufacturing related dataset, and it has a total of 552 data records.

(b) Each row is a data record. Each data record contains 209 values.

(c) This is a multivariate detection dataset in which $p = 209$. The sample size is $n = 1$.

(d) The physical meaning of each value is omitted.

Teaming: Each team includes 4 members (on-campus students). For DL students, each student can be his/her own team or form team with other DL students.

Report and Presentation: Each team should submit one written report and make a set of Power Point slides as if you were to give a presentation (no actual presentation).

Format of your report: You need to start with a single-page executive summary (no more than one page) to state what you have done and the insights you gained from doing the project, that is, *anything* that you feel you have a better understanding because of doing this project. The main text of the report should clearly present your approaches, justification, results, and conclusion. The final report should not exceed 30 pages. Keep in mind that the grade is given upon the quality instead of the length of your report. Also, please do NOT include any code or pseudo-code in your report.

When you have formatting and writing style questions, you can consult the publications in *IISE Transactions* for guidance. This is not to ask you to write a paper to be submitted to *IISE Transactions*. Instead, it is to give you an idea how professionals in our field write a formal technical report (a published paper is a technical report by itself) -- how they lay out their problem,

argue their cases, and reach their conclusions. Papers in the *Transactions* also show you how to present your figures, how to present your tables, and how to cite a source and list the references.

Please make sure to write your report in a single column format.

Format of your Power Point slides: Your set of slides will start with a title slide, which includes the title of your project and the team members. The total number of slides, including the title slide, MUST be equal to, or less than, **ten** (**10**). Inclusion of each EXTRA slide will receive one point reduction in the project score, until the project score reaches zero. Suppose that you have 30 slides. It gives you – 20 points. Even if your team has done everything else perfectly, gaining +10 points, your project score will still be zero (0).

Timeline:

> **Formation of team**: Due on by 11:59 PM on March 6.

> **Report/Slides**: by 11:59PM on the due date that is specified in the Planning File.

Submission:

- Both the written report and the set of slides are due by **11:59PM on the designated due date in the Planning File**. One submission (a written report plus a set of slides) per team.
- **Electronic submission (to eCampus) is required**, and the electronic time stamp will be used to determine whether the report is submitted on time.
- **You must submit both report and presentation in PDF files**. If you used the MS WORD, or MS Power Point, or other word processors, please make sure to convert your report and your presentation into PDF format before submission.
- **Your report must be in a single column format.**
- You need to submit <u>exactly two</u> files, both in PDF format. No more and no less.
- A late submission will be penalized 0.5 points for the first hour it is late and an additional 0.5 points per hour it is late. The time is counted starting from 11:59 PM on the project due date. This means that if your submission happens after 11:59 PM and before 01:00 AM, your project score will be deducted 0.5 points, and if it is after 01:00 AM and before 02:00 AM, your project score will be deducted 1 point, and so on. A complete submission is defined as submitting BOTH files in the REQUIRED format. Anything other than a complete submission is considered "late submission."

Grading: A total of 10 points are allocated to this project. Grading depends on your report and slides combined. Emphasis will be given to the sophistication of your methodology as demonstrated in your reasoning/arguments and results (6 points).

Please note that *sophistication* of your methodology does not equate to *complexity* of a method. If you believe a simple method will do the best for answering the questions raised, it is Okay to use a simple method but you still need to provide convincing arguments and results to support your claim. Other considerations for grading include the organization and clarity of your report and slides (2 points for report and 2 points for slides).

Mandatory point deductions:

> -1   per extra slide beyond ten (10);

-1   per extra file submitted;
-1   executive summary longer than one page;
-1   report not in a single column format;
-1   submission of report not in PDF format;
-1   submission of presentation not in PDF format;
-0.5   per hour the report/presentation is late.