Business Intelligence II – 2nd Semester 2024/2025

Project Assignment Handout

This handout details the rules for the mandatory practical project for the Business Intelligence II class, to be handed in as per delivery rules below.

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1. Project Summary

The project for this class is meant to continue the practical work that you have already completed in the Business Intelligence I class, during the last semester. We expect you to complete the design, implementation and explanation (in a written report) of a fully-working BI solution for whatever information problem you have chosen.

Although we expect you to continue working on your own solution from last semester, you can – if you think it is a better option – change the one used in BI I. However, we consider this a very critical (and dire) decision, and do not recommend you do this without first talking to your Lab teacher.

During the course of the practical project, each group is expected to implement a Business Intelligence Semantic Model (using Microsoft Fabric, with optional use of additional tools like Power BI Desktop) and then develop a varied set of reports, dashboards and dynamic analyses (using a range of techniques, as demonstrated in the Labs) on top of this Semantic Model.

Please do remember that all of this valuable and time-consuming BI work needs to be narrated, in detailed fashion, within a Project Report (pdf format) delivered by your Group.

2. Group Rules

The project should be done in a **group of one to four (1-4) students**; we consider 2-3 students to be ideal size, but allow these other sizes, to facilitate things.

Should you constitute groups of other than 1 to 4 members without explicit permission from the teachers, you will be subjected to the following penalties:

- For each member in excess the stated size: cumulative penalty of **1,5 points** (out of 20 total points) in final project grade.

The only allowed exceptions that will be made regarding group size will be for situations beyond the control of the group members (for example, one of the students dropping out of the course) and will be evaluated on a case-by-case basis.

Exceptionally, if your Group is already of 4-member size, we do allow you to take in one more member, if that student is new to BI (a new BI II student, not having done – not enrolled - in BI I, in the first semester). This facilitates the integration of these few students into the project evaluation of our BI class.

We will provide, as was the case in the BI I class, a Moodle group tool that will allow you to check and engage with different class members, to help you find a group; however, this is the sole responsibility of each student, and the only formal group that counts is the one listed in the cover page of your Report, when you submit your project.

Note, also, that members "gone missing" from Group (or not contributing to desired level), are not the teacher's problem; as such, this will not be an acceptable excuse for deadline extension requests or for asking for a project grade review/allowance.

3. Project Starting Point – The Data Warehouse

It is the responsibility of each group to have a data warehouse that can be used as the foundation of this practical project; in the large majority of cases, you should be able to use your BI I project solution and carry on from what you already have. We expect that your data warehouse should contain, at the very minimum, the following features:

i. A star schema (this is the recommended structure) to employ for the project; constellations – two or more fact tables – are quite acceptable and have been used with success, in the past. We do not allow snow flake schemas, as these are not a good fit for the work we plan to carry out.

ii. At least 1 Fact table (as stated above, solutions with two or more Fact tables are quite acceptable and may make later work easier but are not mandatory; a single Fact table is perfectly ok). Your fact tables should contain at least 2 (but more is better) "native" (implicit) data warehouse measures, in each table.

iii. At least 5 different Dimension tables (we recommend that you do not go beyond 8 or 9 different dimensions, but you can use whatever worked in BI I).

iv. Your fact table should contain data that is applicable across at least one or two years (preferably, across 3 or more years), so that time-related analysis can be employed over your measures.

v. Your dimension attributes should allow for the construction of at least 5 different hierarchies, with an average depth of 3 levels; you are allowed to have more than one hierarchy in a single dimension, but it is recommended that you do not concentrate all of your hierarchies in only one or two dimensions.

3.1. What to do if your current solution does not meet the minimum criteria above?

In essence, your group has two choices:

- Rework or repair whatever solution you already have, so that it meets the above criteria. Note that this will not count for project credit, so we are not concerned in how you achieve this – you are free to do whatever you feel is more effective, in getting your solution to the required state!
- Choose to start over and build/find a new Data Warehouse. WE DO NOT RECOMMEND THIS APPROACH, unless in very dire and special cases! From what we have seen from BI I projects, most Groups have done very good work and should be able to use their current project, continuing the development of solution to a business problem that they are already familiar with, in BI II.

  We would recommend that you discuss this option with your Lab teacher, if you have doubts about your current Data Warehouse solution and are thinking about starting over.
- Note that the same rules about NOT being able to use demonstration databases also apply in BI II; you cannot use, as your Data Warehouse, the well-known teaching databases, such as Microsoft's AdventureWorks DW, Northwind, MySQL Sakila, etc.

4. Expected Deliverables

Your group must build and deliver a BI solution that contains the following items:

i. At least one (1) Semantic Model (SM), built in Microsoft Fabric.

ii. The SM tabular model must present:

   a. At least 5 dimensions.

   b. At least 6 calculated (explicit) measures (using DAX expressions).

   c. At least 2 Key Performance Indicators (KPI's, also using DAX).

   d. We expect that it demonstrates Semantic modelling best practices, as covered in Labs (naming, hierarchies, sorting, mark date table, etc.).

iii. You are expected to also develop and demonstrate:

   a. simple use of DAX formulas (in the calculated measures and the KPIs).

iv. A set of "paginated reports", built on top of the SM, comprising of:

   a. 2 (or more) Fabric-based reports (simple reports developed inside Fabric).

v. You are expected to also develop at least one (1) or more Fabric (visual) report, as demonstrated in the Labs, with each of these reports containing distinct pages dealing with your different business needs.

   a. Your Fabric report (visual, dashboard-type report) must have between 3 to 9 pages, demonstrating a rich and carefully developed use of visual elements for analytical purposes, that make sense in light of the Group's original Business Needs; if needed, you can develop additional reports, but please don't build more than 3 dashboard-type reports.

   b. In essence, note that ALL of your (revised) Business Needs MUST be answered and quantified through the combination of these deliverables: the two (2) or more paginated reports plus the "normal" Fabric (dashboard) reports (one or more, as needed).

vi. In addition to these deliverables, you are expected to carefully document your project and provide a fully-structured final project report that aptly describes all the work that your group carried out.

5. Detailed Evaluation Criteria

1. Report – the report is worth **4 points** (out of 20) of the final project grade, in accordance with the following points:
    1.1. Business Needs: are the Business Needs clear, objective and succinct? Do they meet with expected guidelines, in terms of useful and appropriate organizational questions that the Group can answer using BI techniques?
    1.2. Explanation of the work developed by the Group: does the Report primarily explain the work carried out by the Group, during their project (rather than repeating general and theoretical considerations about BI themes…)? Do the Group mention their difficulties, challenges, errors and other decisions made?
    1.3. Potential for analysis of results: *did the group outline the different possibilities for data exploration and analysis of business results made possible by their project? Note: the group DOES NOT need to analyse results, but MUST prove that their solution is able to answer the Business Needs. In other words, explaining "how was the BI solution useful for this analysis"?*
    1.4. Critical Assessment: *does the Group provide a critical assessment of the project? By "critical assessment" we mean what lessons and reflections did the Group take away from having done this semester's project (from their point of view, not from the perspective of the project's fictional company).*
    1.5. Conclusion: *does the Group also provide concluding points to their organizational project? In other words, and in an opposing perspective to the previous "critical assessment", we now want to understand what the fictional company from the project thinks of the BI project – what business value is now available to them, and how is this important (or not)?*

2. Semantic Model – the design, implementation and testing of the SM is worth **6 points** (out of 20), as below:
    2.1. Data Warehouse: *did the group make available the data warehouse utilized? Is it documented in the report? (feel free to reuse your work from BI I)*
    2.2. Measures: *are the native (implicit) measures adequate and documented?*
    2.3. Hierarchies: *do the dimensions demonstrate a set of properly-configured hierarchies meeting minimum criteria of 5 hierarchies? Are these properly developed and well-utilized, making business-sense?*
    2.4. Calculated Measures: *have the requirements of 6 calculated measures been met? Are they correctly developed? Have they been documented in the report?*
    2.5. Key Performance Indicators*: have the requirements of 2 KPIs been met? Are they correctly developed? Have they been documented in the report?*
    2.6. Simple use of DAX expressions and other model developments*: have these capabilities been used correctly (albeit in simple and direct) fashion? Are they properly developed? Are they documented? Follow best practices as per Labs?*
    2.7. Alignment with organizational context (Business Needs): *are all of the Semantic Model developments in line with the Group's organizational context?*

Does the project demonstrate the development of analytical measures and indicators that provide answers to the Group's outlined Business Needs?

3. Reporting & Dashboarding – the reporting and dashboarding components of the project are worth 8 points (out of 20), as detailed below:

   3.1. Creation and proper configuration of simple (Fabric) paginated reports (at least 2 of this type).

   3.2. Creation and proper configuration of at least one Fabric (Power BI-type) Report, dealing with specific themes and/or domains of the original business problem.

   3.3. Are all Fabric Reports properly documented and explained, and do they tie in properly with the initial organization's business needs? Is the development and methodological choices of these reports fully explained in the final report? Each has between 3-9 pages, sharing a common theme/analytical domain?

   3.4. Proper and adequate application and adherence to data visualization principles and best practices, so that all reports and dashboards evidence an appropriate level of care, professional appearance, a coherent and unified theme, maximizing the readability, usability and understandability of their analytical results.

   3.5. Original Fabric (Power BI) developments: is there evidence and documentation of extra developments through the use of Fabric / Power BI tool, going beyond strictly what was shown in class? These reporting / dashboarding / "Fabric" developments are worth up to a maximum of 2 points (out of 20).

6. Report Structure

As already mentioned in previous sections – and as repeatedly pointed out in the Lectures and Lab classes – your Project Report should ONLY address the specific project decisions, work and results made by your Group; we don't need – nor do we want – the Report to include generic and largely "theoretical" text about BI or any of the subjects covered in this semester.

In other words, the text that should appear in your Report is text that ONLY your Group could have written – because it is specifically about your unique context and situation. Do not place "filler" text (general opinions and considerations) in your project: just get right to the point and tell us what is really important, which is "what did you do and why did you do it that way?".

Please note the Report will contain some material from last semester, so the evaluating teachers are better able to understand the full context of your organizational/business context; however, this part IS NOT GRADED again (it is not evaluated at all).

The structure of the project report should follow, as much as possible, this one:

<NOT SUBJECT TO EVALUATION; ONLY FOR CONTEXT, CAN BE REUSED FROM BI I>

i. Presentation of business / organization / problem scenario
    a. Presentation of the organization, making use of statistical data and descriptive aspects
    b. Presentation and explanation of the business / organization problem; what informational difficulty or challenge is faced by this company?
ii. Data Warehouse
    a. Description of the structure and data in the Data Warehouse

<SUBJECT TO EVALUATION; THIS IS REQUIRED AND GRADED IN BI II>

iii. Identification and explanation of Business Needs (business questions)
iv. Semantic Model
    a. Explanation of the Group's Semantic Model and its major components, as well as describing and explaining how it was developed by the Group
v. Reporting & Dashboarding (covering all the reporting and dashboarding tools)
    a. Presentation and explanation of the reports developed, including objectives and purpose of each report's principal components, as well as how it serves to meet the business needs.
    b. Original Fabric (Power BI) Developments (must be clearly identified and explained, in its own section, if Group wants these graded)
vi. Critical Assessment (lessons learned by the Group, by doing a BI project)
vii. Conclusions (company's business perspective)

7. Delivery Guide

Your Project will be evaluated across **two (2) partial but cumulative deliveries**.

This both encourages each group to start working on the BI project as soon as possible, but also ensures that you have some means of responding to feedback and (partially) correct and realign your BI journey, in future deliveries.

In each delivery, you MUST BOTH submit part of your Project Report (in pdf format) in the respective Moodle submission section, as well as make available (by sharing with all Lab teachers) your Project Fabric Workspace, containing the work to be delivered:

- **Delivery #1 – due at 23h59 of Sunday, 20th of April of 2025**:
  - In this delivery, you must submit all the work referred to in sections 1 and 2 of the Detailed Evaluation Criteria (in essence, the Semantic Model).
  - You must also submit your Project Report, which should – at this stage – contain sections (i) though to (iv) referred to in the Report Structure.
  - At this stage, your Report's presentation and other global aspects (structure, conclusions, etc.) will NOT yet be evaluated; however, the content mentioned above will be GRADED, representing the definitive partial grade for this delivery requirements.
- **Delivery #2 (FINAL) – due at 23h59 of Saturday, 7th of June of 2025**:
  - In this delivery, you must submit all the work referred to in section 3 of the Detailed Evaluation Criteria; in essence, all the reporting and dashboarding work, finishing off your project.
  - You must also submit your Project Report, which should – at this stage – add sections (v), (vi) and (vii) referred to in the Report Structure, to previous delivery. Basically, the Report must now be fully complete.
  - At this stage, ALL of your Report's presentation and other global aspects (structure, conclusions, etc.) WILL be evaluated.

We will provide more specific and technical instruction on how you will be delivering your work (what filenames, what Fabric folders to use, etc.) in Moodle, as we get closer to delivery dates.

Please note that there is no REGRADING of Intermediate delivery parts; in other words, the criteria that counts for Intermediate evaluation are only graded once; you can, of course, change and improve your project after Intermediate delivery, but those parts are NOT REGRADED.

Applicable for ALL deliveries, in cumulative fashion:

- Failure to deliver on time will incur a 0.5 point penalty for each late day (for example, 4 late days will accrue a 2.0 point penalty), across any of the deliveries (in cumulative fashion).

- Failure to comply with Moodle and/or Fabric delivery instructions (missing student identification, no proper naming of objects, duplicated or unclear files, improper folder configuration, etc.) will meet with a 0.5 point penalty at each delivery where this failure is present and detected.

Questions and Clarifications

Should it be necessary, we will provide further clarifications and answers to questions from students, updating the respective Moodle project forum as appropriate.

Good luck with your project!