BUSINESS DATA ANALYTICS PROJECT HANDBOOK

Last updated: 21 January 2025

Dear Students,

The aim of the Business Data Analytics Project on the MSc in IT for Business Data Analytics programme is to integrate your business and coding knowledge and skills with your acting as a reflexive practitioner, so that the final project submission meets the 'double hurdle' of high academic quality and high relevance to the user communities for which it has been compiled.

While this Handbook is designed to provide all the information that you need to write your Business Data Analytics Project, we advise you to make the most of your supervisors' guidance as well as to visit the relevant Moodle page, where you can find additional information.

IBS offers tutorial supervisory support for the Business Data Analytics Project. Students are offered the opportunity to work with two tutors who are experts in the field of Data Analytics and Business Studies. Please note that a tutor might not have exactly the same interests as the student; they are nevertheless the ultimate source of guidance on how to succeed in compiling the Project. The role of the supervisors is to oversee your academic and professional development and to assist you in your work towards the final submission.

We recognise that for many of you undertaking such a large-scale project and its write-up can be a daunting task. For this reason, we expect you to ask questions and clarify your understanding as and when necessary. Remember that effective and successful academic writing involves asking as many questions as possible from yourselves and from the people around you.

Dr Márton Rácz
Rector

Contents

CALENDAR OF THE BUSINESS DATA ANALYTICS PROJECT WRITING PROCESS **4**

1. THE BUSINESS DATA ANALYTICS PROJECT **5**

2. BUSINESS DATA ANALYTICS PROJECT PROPOSAL **7**

3. BUSINESS DATA ANALYTICS PROJECT FORMAT AND CONTENT RULES **8**

3.1 Structure and content 8
3.2 Text formatting 12
3.3 Regulations for length and formatting 15
3.4 Requesting to change your topic 16
3.5 Requesting to change your supervisor 16

4. BUSINESS DATA ANALYTICS PROJECT ASSESSMENT **17**

4.1 Assessment criteria 17
4.2 Consultations with supervisors 17
4.3 Report on consultations 18
4.4 Retaining your data 18
4.5 Originality of work 18
4.6 Confidentiality 19
4.7 Final exam 19
4.8 Business Data Analytics Project timeframe and processing time 19

APPENDIX 1 – LETTER OF CONFIRMATION AND CONSENT **20**

APPENDIX 2 – SAMPLE TITLE PAGE **22**

APPENDIX 3 – SAMPLE DECLARATION OF ORIGINALITY **23**

APPENDIX 4 – SUPERVISOR'S REPORT **24**

APPENDIX 5 – BUSINESS DATA ANALYTICS PROJECT ASSESSMENT (MSC IN IT FOR BDA) **25**

APPENDIX 6 – STATEMENT ON ACADEMIC MISCONDUCT **27**

CALENDAR OF THE BUSINESS DATA ANALYTICS PROJECT WRITING PROCESS

One-page draft proposal submission	See specific date on Moodle, but in general the third week of the third semester: • early October (for September intakes) • early March (for February intakes)
Supervisor assigned	See specific date on Moodle, but in general the third week of the third semester: • late October (for September intakes) • late March (for February intakes)
Business Data Analytics Project submission	Two submission deadlines per academic year: ● mid-December (last day of the autumn teaching period) and ● mid-May (last day of the spring teaching period). For the exact dates check the module page on Moodle.

Notes:
1. All submissions are to be made only electronically via Moodle on the CAPB352 page.
2. On all dates, submissions must be made by 10am CET.

1. THE BUSINESS DATA ANALYTICS PROJECT

Students on the MSc in IT for Business Data Analytics programme are required to submit a major piece of work, referred to as Business Data Analytics Project, as completion of their studies.

The Business Data Analytics Project (alternatively, “dissertation” or “capstone project”) is a major piece of written work that concludes a graduate degree study programme. This does not mean however that you would be required to write a dissertation identical to the written piece of work to be submitted by students on the other MSc programmes. In effect, instead of a classic theory-based dissertation, the purpose of the Business Data Analytics Project should rather be to test your ability to resolve a problem with data analysis and data science tools based on relevant input data, with the output of the project including the relevant codes, their explanation, a reflective account on how you completed the project, and relevant business insights.

You must realise the project independently. You should demonstrate sufficient understanding of the principles governing data science activities, good capability in utilizing the standard toolset of the trade, and pay attention to detail. The project should follow an evidence-based decision-making approach, ensure strict out-of-sample validation, and demonstrate strong proficiency in literate programming, data visualization, and interpretation to effectively communicate relevant results.

Your capstone project is an individual assignment requiring you to apply business and data analytics knowledge to solve a significant problem. The report must address the following:

1. Problem Definition and Analytical Approach:
   Clearly define a substantial problem or opportunity within a chosen domain. Demonstrate a structured approach to problem identification, including an evaluation of the context, underlying causes, and broader implications. Your problem statement should be focused, relevant, and compelling.
2. Understanding and Integration of Business and Analytics Concepts:
   Integrate business knowledge and data analytics techniques effectively, producing actionable insights. Highlight how your solution addresses both technical and business challenges effectively.
3. Data Collection, Preprocessing, and Exploratory Data Analysis:
   Collect, clean, and preprocess data effectively. Conduct exploratory data analysis (EDA) to uncover patterns and relationships in the data. Summarize findings statistically but focus on the significance and depth of patterns uncovered.
4. Implementation and Optimization of Algorithms and Models:
   Use Python to implement appropriate algorithms and models. Discuss the rationale behind your choice of tools and techniques, demonstrating technical proficiency and alignment with the project objectives. Optimize these models to improve performance, accuracy, and efficiency and demonstrate iterative improvement.
5. Model Validation and Evaluation:
   Validate models using appropriate metrics and techniques. Evaluate their robustness, accuracy, and suitability for addressing the problem.
6. Interpretation, Communication, and GitHub Usage:
   Present findings using clear language and impactful visualizations. For assignments graded at 60% or higher on this criterion, provide a well-organized GitHub repository to share code and documentation.

Students are assigned two supervisors (one with a focus on data analytics and one on a related business field) at the start of the third semester by the Centre for Education and Research, based on their availability, their background, skills and competencies and their fit to the specific projects. The supervisors guide and advise students throughout the Business Data Analytics Project writing process. Students should direct their questions to their supervisors and will receive guidance from them; however, supervisors will not express a view on the quality of the submitted work before it is being graded (i.e. students can ask "can you help me to define the structure of my paper" but cannot ask "if I use this structure, will it be worth 75%?").

Your Business Data Analytics Project should demonstrate your ability to resolve a problem, clean and prepare the data, choose the appropriate data science tools and machine learning models, train the models, interpret and/or visualise the modelling results (with respect to relevant methods of performance evaluation), and draw actionable insights based on the findings.

Submission Requirements

1. Written Report: Submit a PDF version of your report via Moodle.
2. GitHub Repository: Include a link to your GitHub repository in your report. The repository must contain:
    - Clean and well-documented Python code.
    - Supporting documentation, such as a README.MD file, that explains the repository's structure, how to reproduce the results, and dependencies, etc.

N.B. If no GitHub Repository is created, then all code must be included in the appendix to the Business Data Analytics Project, but please note that in this case, you may not obtain a grade over 60% on the "Interpretation, Communication, and GitHub Usage" criterion.

More specifically, on completion of this project, **students should be able to**:

- demonstrate a sophisticated understanding of both business concepts and advanced data management and modelling techniques, effectively integrating them to address complex challenges in the context of data analytics.

- identify and define a substantial problem or opportunity within a given domain, applying critical thinking skills and domain-specific knowledge to formulate a clear and focused problem statement.

- collect, assess, and preprocess relevant data from diverse sources, demonstrating the ability to handle and clean data effectively for subsequent analysis.

- employ advanced coding skills to implement algorithms and models suitable for addressing the identified problem, utilizing appropriate programming languages and tools.

- demonstrate the ability to optimize models for enhanced accuracy and efficiency.

- effectively interpret and communicate the findings of the Business Data Analytics Project to both technical and non-technical audiences, using visualization techniques and clear, concise language.

2. Business Data Analytics Project Proposal

The Business Data Analytics Proposal is an essential part of the capstone project. This document will outline the approach for applying business and data analytics techniques to solve a significant problem. The proposal should cover the following key elements:

1. **Data Set Selection**: The dataset selected for the project should be clearly specified, including details regarding its source, structure, and scope. The rationale behind the selection of this dataset must be provided, along with an explanation of how it aligns with the defined problem statement.

2. **Problem Definition**: A clear definition of the business problem or opportunity to be addressed must be provided. The context and significance of the issue should be outlined, identifying key challenges and the potential impact of resolving the problem. The problem must be well-defined, relevant, and compelling, with a direct connection to the business domain.

3. **Analytical Approach**: An outline of the analytical techniques to be employed in addressing the problem is required. This should include an overview of the methods, algorithms, or models to be implemented, along with an explanation of their relevance and how they will facilitate the extraction of actionable insights.

4. **Expected Outcomes**: The anticipated results of the analysis should be described, including the type of insights or conclusions expected from the data. It should also be discussed how these findings will contribute to solving the problem and delivering value to the business.

3. BUSINESS DATA ANALYTICS PROJECT FORMAT AND CONTENT RULES

3.1 Structure and content

OVERALL STRUCTURE

While **there is no single structure prescribed** as there is an infinite range of different project solutions, it is true that certain overarching themes must be addressed in all (academic) papers submitted. We recommend that the following layout be observed and modified as deemed fit:

1. Title Page
    - Project Title
    - Student Name and ID
    - MSc Programme Title
    - Submission Date
2. Declaration
3. Acknowledgement
4. Executive Summary (500 words)
    - Brief overview of the problem, methods, key findings, and implications.
    - Written for both technical and non-technical audiences.
5. Table of Contents
    - List of all sections and sub-sections with page numbers.
6. Introduction (1,000 words)
    - Background and context of the project.
    - Business and technical significance of the chosen problem.
    - Clear problem statement and objectives of the project.
    - Scope of the study and expected contributions.
7. Literature Review (1,500 words)
    - Overview of relevant theories, frameworks, and prior studies related to the problem domain.
    - Discussion of advanced data analytics techniques relevant to the problem.
    - Identification of gaps in the literature that your project addresses.
8. Methodology (1,500 words)
    - Data Collection, Preprocessing, and Validation:
        - Description of data sources and methods of collection.
        - Preprocessing steps, including cleaning, transformation, and handling missing values.
        Validation techniques to ensure the reliability of the data.
9. Exploratory Data Analysis (1,000 words)
    - Application of EDA techniques to identify significant trends, patterns, and correlations within the dataset.
    - Inclusion of statistical summaries and insights.
10. Implementation of Algorithms and Models (2,000 words)
    - Algorithm and Model Development:
        - Description of algorithms, models, and tools used.
        - Justification for the chosen methods and Python implementation.
    - Optimization and Evaluation:
        - Process of model tuning and optimization.
        - Evaluation of model performance with metrics and benchmarks.

11. Results and Analysis (1,000 words)
    - Presentation of results from models and analyses.
    - Use of visualizations (e.g., graphs, charts, tables) to communicate findings.
    - Discussion of how results address the problem statement and align with objectives.
12. Business Insights and Recommendations (1,000 words)
    - Integration of Business and Analytics Concepts:
        - Discussion of actionable insights derived from the results.
        - Analysis of implications for the business or domain context.
    - Recommendations for stakeholders based on findings.
13. Conclusion (500 words)
    - Summary of the project, key findings, and their relevance.
    - Limitations of the study and suggestions for future work.
14. References
    - Properly formatted citations for all sources used in the report, following the Harvard Style Referencing System.
15. Appendices
    - Additional materials such as detailed tables, code snippets, or extended figures.
    - Link to GitHub repository for full code and documentation.

Your Business Data Analytics Project **may take a variety of forms** but a structure along the lines outlined above is probably the most common. Presentation within this format may not necessarily improve quality of content but it does ensure that your work is presented in an orderly and professional manner.

The three major parts of any dissertation are preliminary material, main body (including tables and figures), and reference material and appendices.

Tips for Each Section

- Consistency: Maintain a logical flow between sections. For example, ensure the problem defined in the introduction aligns with the methods and results discussed later.
- Clarity: Use headings and sub-headings to structure your report clearly.
- Technical Depth: Demonstrate advanced knowledge of data analytics techniques in the methodology and results sections.
- Communication: Demonstrate advanced knowledge of data analytics techniques in the methodology and results section.

PRELIMINARY MATERIAL

The pages comprising the preliminary material should be numbered in lower case Roman numerals (e.g. iii). The position of the pagination should be consistent throughout the work.

TITLE PAGE

This page is not numbered but it counts as Page i. The exact title of the Business Data Analytics Project and any subtitle (in upper case), the author's name, and the date, e.g. September 2022 (in upper and lower case) should be centred and spaced on the page (see Appendix 2). Near the foot of the page the following statement should be inserted:

Dissertation submitted to International Business School for the partial fulfilment of the requirement for the degree of MASTER OF SCIENCE IN IT FOR BUSINESS DATA ANALYTICS.

The title should be specific and brief, consistent with giving information about the subject of the capstone project.

DECLARATION

Page ii. The word DECLARATION should be typed, in upper case, centred towards the top of the page. Beneath this should be typed, in lower case, the statement:

> *This dissertation is a product of my own work and is not the result of anything done in collaboration.*
>
> *I consent to the University's free use including online reproduction, including electronically, and including adaptation for teaching and education activities of any whole or part item of this dissertation.*

The full name of the author should be typed below the declaration leaving sufficient space for the signature of the author in ink (see sample in Appendix 3).

At the bottom of this page the word length (excluding executive summary, contents and other tables, diagrams, list of references and appendices) should be recorded.

ACKNOWLEDGEMENTS

Acknowledgements are optional. If included they should appear on page iii. The word ACKNOWLEDGEMENTS should be typed, in upper case, centred towards the top of the page. Beneath this should be typed, in lower case, your acknowledgements.

EXECUTIVE SUMMARY

Page heading EXECUTIVE SUMMARY. An executive summary typically covers the following issues in this order:

- Purpose (What is/are the reason(s) for writing the Business Data Analytics Project or the aims fulfilled by it?);
- Design/methodology/approach (How are the objectives achieved? Include the main method(s) used. What is the approach to devising a solution and what is the theoretical or subject scope of the Business Data Analytics Project?);
- Solution (How was the problem solved? This could refer to analysis, theoretical approach, and technical solutions);
- Limitations/implications (What elements that still require a solution or further projects? What changes to practice should be made as a result of this project?);
- Reflections (What did you learn as a future data analyst during the project? How does it impact on your future work in teams and on data analytics projects?)

The executive summary **should not exceed 500 words** in length, typed in single spacing on one side of A4 paper. The executive summary must be headed with the title and the author's name.

TABLE OF CONTENTS

Page heading CONTENTS. The chapter numbers are shown in Arabic numerals (e.g. 1, 2, 3) on the left-hand side, the chapter headings in upper case throughout, with a line of spaced dots running from the

last letter of the chapter heading to the page numbers on the right-hand side. The words 'chapter' and 'page', in lower case, are placed above the columns of chapter and page numbers. Page numbers should be shown in both Roman numerals (e.g. i, ii, iii) for the preliminary material and Arabic numerals (e.g. 1, 2, 3) for the text and reference material.

LIST OF TABLES

Page heading LIST OF TABLES. Table numbers in upper case Roman numerals to the left and page number to the right and full title of the table in between. The words 'table' and 'page', in lower case, should be positioned above the columns of table and page numbers.

LIST OF FIGURES

Page heading LIST OF FIGURES. Figures includes all illustrations, photographs and maps, which should be numbered consecutively in Arabic numerals in the order which they are referred to in the text. The same format should be adopted as for the List of Tables.

MAIN BODY

The general structure for the main body of your Business Data Analytics Project may slightly vary according to the topic and the methodology applied, however it is likely to include the following chapters in the order indicated below.

INTRODUCTION

States the aim of the Business Data Analytics Project, a more detailed specification of the topic(s), as well as describes the objective(s). If necessary, it refers to the fact that you did not touch upon certain areas otherwise naturally related to the topic because of limitations in length or other reasons (and what those are).

LITERATURE REVIEW

The Literature Review should provide a comprehensive overview of the key theories, conceptual frameworks, and previous studies pertinent to the problem domain. This section must critically engage with advanced data analytics techniques that are directly relevant to your research topic, demonstrating a solid understanding of their application in addressing the identified problem. Additionally, the review should highlight existing gaps in the literature, clearly explaining how your project aims to fill these gaps and contribute new insights to the field.

METHODOLOGY

The methodology section should provide a detailed description of the data sources and the methods used to collect the data required for your project. It should also outline the key preprocessing steps undertaken, such as data cleaning, transformation, and handling of any missing values, to ensure the dataset is prepared for analysis. Furthermore, this section must explain the validation techniques employed to assess and enhance the reliability and accuracy of the data, ensuring that the results derived from your analysis are robust and trustworthy.

EXPLORATORY DATA ANALYSIS

The exploratory data analysis (EDA) section should detail the application of EDA techniques to uncover significant trends, patterns, and correlations within the dataset. This includes generating statistical summaries to provide an overview of key metrics and drawing relevant insights from them.

IMPLEMENTATION OF ALGORITHMS AND MODELS

The implementation section should provide a concise description of the algorithms, models, and tools utilized, along with a rationale for selecting these methods and their Python-based execution. It should also outline the model tuning and optimization process, followed by an evaluation of the model's performance using appropriate metrics and benchmarks.

RESULTS AND ANALYSIS

Showcases the outcomes of the models and analyses through visual representations and narrative interpretation. Explains how these findings address the problem statement and align with the project objectives.

BUSINESS INSIGHTS AND RECOMMENDATIONS

Presents actionable insights derived from analytical results and their alignment with business objectives. Explores the implications for the business or domain, highlighting risks, opportunities, and benefits. Provides evidence-based recommendations tailored to stakeholder needs, ensuring feasibility and measurable impact.

CONCLUSION

The conclusion, limited to 500 words, should provide a concise summary of the project, highlighting key findings and their significance. It should also acknowledge any limitations encountered during the study and offer suggestions for future research directions.

These sections are normally used as chapter headings, however they should not inhibit you (following discussion with your supervisor) from adopting something slightly different.

3.2 Text formatting

TEXT

There should be an introduction and a series of numbered and headed chapters, the last of which should be the conclusion. All chapters, including the introduction, are numbered consecutively. The introduction should clearly define the objectives of your study and summarise the way you achieved them. If conclusions are drawn in several distinct sections of the dissertation, the summary of all the conclusions should be provided in the concluding chapter. Starting with the first page of the introduction the pages should be marked consecutively in Arabic numerals (e.g. 1, 2, 3).

HEADINGS AND SUB-HEADINGS

On the first page of each chapter, the word **CHAPTER** (in bold) and the appropriate number should be centred. The title of the chapter should be centred below this in bold. A hierarchy of sub-headings can be used to divide the chapter into sections. For example, if three ranks of sub-headings are required, the following scheme would be appropriate:

7.1 FIRST ORDER HEADING
(to the left-hand margin, text continues below)

7.1.1 Second order heading
(to the left-hand margin, text continues below)

Third order heading (to the left-hand margin, text continues on the same line)

Sub-headings should reflect the importance of themes within the chapter(s).

QUOTATIONS

Short prose quotations should be incorporated into the text of the Business Data Analytics Project in support of a given argument and should be enclosed in single quotation marks. However, when a quotation runs for more than 40 words, it should be set off from the text in single spacing and indented in its entirety 1cm from the left-hand margin line with no quotation marks. When quoting from a publication, the author, date and page number(s) should be quoted. Remember that a maximum of 10% of your dissertation can be direct quotation.

CODE BLOCKS

Utilize a monospaced font, such as Courier New or Menlo (the latter one the default when you copy-and-paste from VS Code), to maintain code formatting. Include line numbers for reference and ensure consistent indentation. Use syntax highlighting to differentiate elements and improve readability. Insert code snippets judiciously, opting for relevant excerpts rather than extensive blocks.

For example:

```
def greet(name):
    return f"Hello, {name}!"
```

FOOTNOTES

Use of the Harvard system of referencing with a properly constructed list of references should obviate the need for footnotes as references. It may be necessary, however, to use footnotes to elucidate or expand a particular point in a way that would otherwise complicate or hinder the textual argument. In this case, reference to footnotes is made by superscript numerals. Footnotes should be indicated in the text by placing the appropriate superscript Arabic numeral one-half space above the list of text. The footnote, typed in single spacing, should be placed at the foot of the page.

ILLUSTRATIONS

Diagrams, photographs and maps should show clearly and simply what cannot be economically described in the text. They are all known as 'Figures' and are numbered consecutively using Arabic numerals (e.g. see above Figure 3). Figures should not be marginal to the text but a crucial illustration of it. Figure numbers and figure titles (also called captions) should, where possible, be placed at the bottom of the illustration with the word FIGURE # in upper case followed by the appropriate number and title in upper case. If illustrations are based upon other publications or are the result of compilation of extant source material, that source or sources must be cited in the bottom left-hand corner of the figure. Figures should be placed as closely as possible to the initial reference to them in the text.

TABLES

Tables should be accurately and neatly compiled. Short tables may be inserted at the appropriate place in the text. Long tables should be on a separate page. Table numbers and table titles should, where possible, be placed at the top of the table with the word TABLE in upper case followed by the appropriate number in Roman numerals upper case (e.g. I, II, III, IV). The heading TABLE # should be centred on a line by itself. The title should be centred in upper case below. If tables are based upon other publications or are the result of compilation of extant source material, that source or sources must be cited under the title. Tables should come immediately following initial reference to them in the text.

NOTATION

As far as possible, the metric system and S.I. units should be used throughout.

EQUATIONS

Equations should be centred in the text on separate lines and should be serially numbered on the right-hand side of the page as follows:

$$y = a + bx \qquad (3)$$

This should be referred in the text as follows:

'...as shown in equation (3)…'

ABBREVIATIONS

Abbreviations unknown to the reader are an irritant. If there is any doubt, the words should be spelled out in full the first time they are used, with the abbreviations shown in brackets immediately afterwards. For example, 'Sex Discrimination Act (SDA)'.

REFERENCE MATERIAL INCLUDING APPENDICES

This comprises the list of references, an appendix or more appendices.

REFERENCES

The references list all the references included in the text. They should be listed (using the **Harvard system of referencing**) in a single alphabetical list. Normal page numbering (Arabic numerals) applies to the bibliography, which does not count towards the word total.

APPENDICES

The appendices provide an outlet for material that would otherwise be too lengthy or bulky to place in the text, or material that is not absolutely necessary for full comprehension of the text. An appendix or appendices might include for example lengthy tables of raw data, or lists of company names used in the capstone project. **The Appendix for the Business Data Analytics Project must include a Link to GitHub repository for full code and documentation**. In the absence of the GitHub repository, the Appendix should also include all code. Appendices should be kept to a minimum. Appendix numbers and appendix titles should, where possible, be placed at the top of the appendix with the word APPENDIX in upper case followed by the appropriate letter in upper case (e.g. A, B, C). The heading APPENDIX should be centred on a line by itself. An explanatory title should be centred in upper case below. If appendices are based upon other publications or are the result of compilation of extant source material, that source or sources must be cited under the title. Normal page numbering, i.e. Arabic numerals, applies to the pagination of appendices. Appendices do not count towards the word totals.

3.3 Regulations for length and formatting

LENGTH

The normal length of a Business Data Analytics Project is 10,000 words (excluding code, executive summary, contents and other tables, diagrams, references and bibliography). All papers should have the word length on the declaration page (see Sample).

The normal tolerance without a penalty for word limit will be +/- 15% (i.e. 1,500 words below or above the normal 10,000). Students will be advised that this indicative word limit should be observed but it is recognized that some topics may require a larger number of words. The indicative word limit may only be exceeded normally by up to 25% without penalty with the prior written approval of your Supervisor. Approval must be requested by the student in written form addressed to the supervisor in due time (at least 20 days) before the final work is submitted. Please note that approval is not automatically given.

FORMATTING

When producing your paper, you need to ensure both that the content is satisfactory and that it is presented in the required format.

For the final document, which will be kept by International Business School, pages shall be numbered consecutively, through the main text including figures and/or diagrams which are included as whole pages.

Please note the deadline for submission of the Business Data Analytics Project via Moodle on the Moodle page of the CAPB352 Business Data Analytics Project module. Only electronic submission is required.

There is a 10MB file size limit on Moodle. If the file is larger than that, effort must be made to move illustrative material (i.e. pictures, graphs, etc.) into appendices, and then upload the Business Data Analytics Project without appendices on Moodle and include the appendices in the Github repository.

3.4 Requesting to change your topic

Changing the topic for the project is only possible after failing the dissertation. A topic change must first be discussed with the student's supervisor and consequently a request sent to request@ibs-b.hu describing all relevant details.

A major change to the student's topic might result in the need for submitting an amended, or in certain cases completely new, proposal. The new proposal will be evaluated according to the assessment scheme used for proposals by the student's supervisors.

A major change to the student's topic might also result in the need for new supervisors to be appointed.

3.5 Requesting to change your supervisor

Supervisors can only be changed after a student receives a failing mark for their dissertation. Even in this case, changing supervisors is not recommended, as building a new supervisory relationship takes time, and the new supervisor may not be as familiar with the student's topic as the original one. The student must ensure that communication about the request to change supervisors is open and the previous supervisor approves of the change.

A request to change supervisors must be submitted in email to request@ibs-b.hu, with the original supervisors copied in to the email and describing the reasons. If granted, a new supervisors will be appointed by the Centre for Education and Research.

4. BUSINESS DATA ANALYTICS PROJECT ASSESSMENT

4.1 Assessment criteria

The Business Data Analytics Project will be assessed against the following attributes:

- Problem Definition and Analytical Approach: Clarity and focus in defining a substantial problem or opportunity. A structured approach to problem identification, including context evaluation, underlying causes, and broader implications. The problem statement should be compelling and relevant.
- Understanding and Integration of Business and Analytics Concepts: Effective integration of business knowledge and data analytics techniques. The ability to generate actionable insights while addressing both technical and business challenges.
- Data Collection, Preprocessing, and Exploratory Data Analysis: Competence in collecting, cleaning, and preprocessing data. Effective application of exploratory data analysis (EDA) techniques to uncover meaningful patterns and relationships, supported by statistical summaries and insights.
- Implementation and Optimization of Algorithms and Models: Proficiency in implementing relevant algorithms and models using Python. Clear rationale for the choice of tools and techniques, and evidence of iterative optimization to enhance model performance, accuracy, and efficiency.
- Model Validation and Evaluation: Rigorous validation of models using appropriate metrics. Evaluation of the model's robustness, accuracy, and alignment with the project's objectives.
- Interpretation, Communication, and GitHub Usage: Clear and concise communication of findings, supported by impactful visualizations. For projects graded 60% or higher, a well-organized GitHub repository with code and documentation is required.

The Business Data Analytics Project should be an in-depth rigorous piece that satisfies the QAA criteria for assessing critical thinking and writing in master's qualifications.

The Business Data Analytics Project will normally be assessed in the form of a written report by the student's two supervisors.

The form used to assess Business Data Analytics Projects is shown in Appendix 5.

4.2 Consultations with supervisors

Students must in the first instance establish a working relationship with their supervisors and together set deadlines for the completion of the various tasks and draft chapters. Students should communicate regularly with their supervisors throughout the preparation of the capstone project. The purpose of supervisory meetings is to report on progress of work, to ask for guidance/ possible sources/ recommendations, and to submit sections of the dissertation for review. Supervisors must be sent draft chapters for review and feedback, and allowed ample time to do so as worked out by you and your Supervisor at the beginning of the writing process.

Supervisors are not required to read and comment on a full draft of the Business Data Analytics Project during the two weeks before the final submission deadline; send your full drafts to your supervisor in due course. The consultations can take place in person or via an online communication tool (recommended), or by email. Consultations may happen individually or in a group as well as ad hoc or

in pre-announced time slots. Students are advised to attend the consultations prepared with questions and queries, otherwise the supervisor can be of less help than ideal.

4.3 Report on consultations

Before the Business Data Analytics Project is assessed, supervisors will complete a report about the process of supervision. This report details the frequency of consultations, and includes a preliminary assessment of the work. Should a supervisor deem a project as falling below master's standard, the piece of writing will be referred for review. See the Supervisor's Report form in Appendix 4.

4.4 Retaining your data

Your examiners may wish to see your data while assessing and marking your work. Such data might also be requested in cases of suspected academic misconduct (see Section 3.5). Therefore, you must retain a complete set of your raw data, including questionnaires (papers completed by hand or records downloaded from the online survey platform you use), recordings and/or transcripts of interviews, secondary data that you used, etc., as well as data analysis files and documents. You must keep these, and must be able to present these if requested, at least until you are awarded your degree.

The different documents listed above, including transcripts of interviews, do *not* need to be added to the dissertation itself, not even as an appendix.

Throughout every stage of the writing and research process, it is essential to regularly save and back up your work (including data, files, documents, chapters, etc.) on a secure external drive or cloud storage. This practice not only ensures compliance with data retention requirements but also safeguards against losing all or part of your work. Please note that IT equipment failures typically do not qualify for mitigating circumstances, so taking these precautions is crucial to protecting your progress.

4.5 Originality of work

As is the case with all assignment submitted to IBS, the Dissertation is automatically checked for signs of academic misconduct by the Academic Conduct Officer and, specifically, for plagiarism by Turnitin. Dissertation markers can also report alleged cases of academic misconduct. Moodle opens for all assignments 7 days prior to the submission date, and students are responsible for making sure that the version that is accessible on that date does not contain inappropriately referenced text. Please note that IBS follows a zero-tolerance policy of academic misconduct; however, regarding plagiarism, that does not normally equate to zero percent as shown in the Turnitin similarity report.

Artificial intelligence (AI) tools must not be used for the Dissertation for purposes other than idea generation. However, AI can be used for the coding parts, with properly indicating what is AI generated material (see Appendix 6 on permitted level of AI use). That is, the submission of work that contains copied or paraphrased text generated by AI tools, whether appropriately referenced or not, constitutes a case of academic misconduct.

For more detail about academic misconduct see Appendix 6 and the documents titled "Academic Conduct Policy" and "AI Policy" on the Moodle-page of the module.

4.6 Confidentiality

All the work produced by students on the IBS graduate programmes is confidential. It is marked by the tutor concerned and as part of the quality monitoring process it is reviewed by another member of staff at IBS or at University of Buckingham, and the External Examiner. Those involved in assessment are required to respect confidentiality.

In order to link theory to practice you may be required to undertake some projects/assignments which involve sponsoring organisations outside IBS. Where this is the case all information and data gathered should be treated as confidential and must not be shared with anyone other than the sponsoring organisation and agreed School staff involved in the assessment process. If students prefer to keep a GitHub repository non-public for confidentiality reasons, they must ensure access is provided to the two assigned readers for assessment purposes.

Students can request IBS to sign the confidentiality documents provided by the company/companies they are in contact with through their research. If no such document/template exists, the IBS Confidentiality Agreement, which is available on the module page in Moodle, can also be used.

4.7 Final exam

Students must defend their project work in writing. They must submit their answers to the final exam questions (approx. 500 words) in defence of their project work directly on Moodle. The answers to final exam questions must be submitted together with the final Business Data Analytics Project. The Business Data Analytics Project will only be assessed if the final exam questions have also been answered.

4.8 Business Data Analytics Project timeframe and processing time

The key dates of the Business Data Analytics Project writing and marking process are outlined in the table below. Marks are released to students after the exam board meeting. Normally, the dissertation should be submitted within 1.5 years of starting the programme, but at the latest before the end of the maximum registration time allowed for master's programmes (3 years).

Writing Period (Supervised)	**Possible Submission Dates**	**Marking Period**	**Marks and Feedback Published**
October – December	Dec (last day of the teaching period)	Dec – Jan	Feb
March – May	May (last day of the teaching period)	May – Jun	Jul

Appendix 1 – Letter of Confirmation and Consent

LETTER CONFIRMATION AND CONSENT

23 March 2024

Dear Mr Jones,

I am a student on the Master of Science in IT for Business Data Analytics programme at International Business School, Budapest and The University of Buckingham. As part of my course, I am completing a Business Data Analytics Project entitled: *The role of surplus product donation in poverty alleviation*. The study aims to analyse how surplus products donated by big manufacturing firms to an NGO can be registered, categorized, and their best use identified coupled with a measurement of their impact in poverty alleviation.

Prior to undertaking the study, I need your confirmation and consent to use the data provided by your organisation for this project and to approach members of your staff who were involved in the recent thinking about this topic. I will recruit people to the study by email, and then ask them to complete a short self-administered survey, and be available for an interview. I hope to recruit six participants altogether.

I can assure you that I will make every effort to ensure that I handle the data provided by you in confidence and observing the required security guidelines. I will also take care that the research does not disrupt the working environment in any way and any data collected will remain confidential. The findings will be used to form part of my Business Data Analytics Project, which will only be accessible by tutors affiliated to International Business School and The University of Buckingham who evaluate my Business Data Analytics Project.

Your permission to conduct this study will be greatly appreciated.

Yours sincerely,

Jane Jack Doe
jjdoe@ibs-b.hu

I confirm that I have freely agreed to the use of data provided by my organisation by Jane Jack Doe for the Business Data Analytics Project described above. I have been briefed on what this involves and I agree to the use of the findings as described above.

Signature:	_____
Name:	Mr Jack Jones
Position:	Senior Data Specialist
Company:	Dondow Ltd.
Date:	12 April 2021

* Please modify the greyed out parts to match your research.

Appendix 2 – Sample Title Page

(Business Data Analytics Project title in 24 pt font)

(Student's full name in 24 pt font)

Dissertation submitted to International Business School
for the partial fulfilment of the requirement for the degree of
MASTER OF SCIENCE IN IT FOR BUSINESS DATA ANALYTICS

<month and year>

Appendix 3 – Sample Declaration of Originality

DECLARATION

This dissertation is a product of my own work and is the result of nothing done in collaboration.

I consent to International Business School's free use including/excluding online reproduction, including/excluding electronically, and including/excluding adaptation for teaching and education activities of any whole or part item of this dissertation.

(Student signature)

(Typed student name)

Word length: ##,### words

Appendix 4 – Supervisor's Report

SUPERVISOR'S REPORT
All IBS Graduate Programmes

Student's name:
Programme:
Dissertation title:
Supervisor:

Supervisor's comments:

1. ***Consultations*:**
   Please describe regularity and timing of face-to-face, skype or email consultations, and assess the student's progress in the period.

Date	Channel (F2F, skype, email, etc.)	Contents (issues, tasks, drafts, etc.)

2. ***Academic Misconduct***:
   a. Do you have any reason to suspect that the student committed academic misconduct*****?

      Yes/No

   b. If the answer is "yes", please specify:

3. ***Preliminary assessment***
   a. Is the submitted dissertation worthy of assessment? **Yes/No**
   b. Did you share your opinion with your supervisee?
      Yes/No

*****According to the Academic Conduct Policy, academic misconduct includes plagiarism, collusion, duplication, falsification, submitting the work of someone else, etc.

Appendix 5 – Business Data Analytics Project Assessment (MSc in IT for BDA)

Criteria	0%	25%	50% (Pass)	60% (Good/Merit)	70% (Distinction)	80%	100%
Problem Definition and Analytical Approach. Clarity and relevance of the problem statement; depth and quality of the analytical approach used to explore and define the problem. **[15%]**	No problem defined; no evidence of logical reasoning or structured thought.	Problem loosely defined and lacks relevance; approach demonstrates minimal effort to identify underlying causes or explore the problem context.	Problem defined with basic relevance; the approach demonstrates a straightforward but shallow effort to frame the problem and its context.	Clear and relevant problem definition; demonstrates a structured approach with some exploration of underlying causes and broader implications.	Problem defined with excellent focus and relevance; approach includes thoughtful evaluation of multiple perspectives and well-articulated rationale for the chosen focus.	Problem definition is insightful and original; approach demonstrates an advanced ability to synthesize information, identify nuances, and articulate a compelling rationale.	Problem definition is groundbreaking and transformative; approach demonstrates exceptional innovation, deep exploration of complexities, and synthesis of diverse ideas to define the problem in a novel way.
Understanding and Integration of Business and Analytics Concepts. Depth of understanding of business concepts and analytics techniques; successful integration of both domains to address complex challenges, including actionable insights. **[25%]**	No understanding or integration evident.	Basic concepts discussed but poorly integrated, no actionable insights.	Adequate understanding and basic integration; limited actionable insights.	Good integration of concepts, applied appropriately, with reasonable actionable insights.	Strong integration of concepts, with relevant and impactful actionable insights.	Exceptional integration, highly innovative actionable insights.	Flawless integration with groundbreaking actionable insights that redefine understanding.
Data Collection, Preprocessing, and Exploratory Data Analysis. Quality of data sources identified; effectiveness and	No data collected or processed.	Minimal data collection with errors in preprocessing or superficial EDA.	Data collected and processed with some issues; EDA lacks depth or rigor.	Data collection and preprocessing are well-executed; EDA uncovers	Thorough and effective data handling; EDA provides deep insights into	Exceptional data handling; EDA reveals complex patterns and relationships with	Data handling and EDA are flawless; insights from EDA are transformative

rigor in data cleaning, preprocessing, and exploratory data analysis (EDA). **[15%]**				basic patterns and relationships.	patterns and relationships.	meaningful analysis.	and set a new standard.
Implementation and Optimization of Algorithms and Models. Complexity and appropriateness of coding techniques used; use of Python to implement and optimize suitable algorithms and models to address the problem. **[20%]**	No models or algorithms used; Python not employed.	Simplistic implementation with major flaws; Python used minimally or incorrectly.	Implementation is functional but lacks sophistication; limited optimization; Python employed appropriately.	Solid implementation of suitable models; effective optimization improves model performance.	Advanced models implemented with strong optimization; demonstrates excellent command of Python.	Complex models implemented with advanced techniques and significant optimization; showcases mastery of Python.	Models and optimization techniques are cutting-edge; exemplary and innovative use of Python for transformative results.
Model Validation and Evaluation. Effort and success in validating and evaluating models; evidence of accuracy, robustness, and appropriateness for the problem. **[15%]**	No validation or evaluation conducted.	Basic validation attempted with minimal or superficial metrics.	Limited evaluation with moderate insights; validation methods are basic.	Validation is effective with robust metrics; evaluation provides clear insights into model performance.	High-quality validation using multiple metrics; evaluation is thorough and well-documented.	Sophisticated validation techniques; evaluation demonstrates mastery of model performance assessment.	Validation and evaluation set a benchmark for rigor, depth, and innovation.
Interpretation, Communication, and GitHub Usage. Clarity in presenting findings and insights to different audiences; effective use of visualizations; effective use of GitHub to share code and documentation (60%+). **[10%]**	No findings communicated.	Findings poorly communicated; visualizations unclear or absent.	Insights communicated but lack depth or clarity; visualizations are basic or poorly executed.	Findings well-communicated with effective and appropriate visualizations; GitHub repository is well-organized and documents code appropriately.	Clear, impactful communication to all audiences; visualizations are polished and enhance understanding; GitHub repository is detailed and professional.	Communication is exemplary; visualizations are compelling and provide significant insights; GitHub repository is highly professional with excellent documentation.	Communication sets a benchmark for clarity and impact; visualizations and GitHub repository are exemplary and set a new standard.

* If the score is below 50% on any of the above criteria, the capstone project is a fail even if the total score reaches 50%. In such cases a technical mark of 49% will be result.

** Business Data Analytics Projects below 8,000 words will not be marked and receive a zero grade.

Appendix 6 – Statement on Academic Misconduct

All assessments are intended to determine the skills, abilities, understanding and knowledge of each of the individual students undertaking the assessment. Cheating is defined as obtaining an unfair academic advantage and any student found using any form of cheating, attempting to cheat or assisting someone else to cheat may be subject to disciplinary action in accordance with the school's disciplinary procedure. The school takes this issue very seriously and students have been expelled or had their degrees withheld for cheating in assessments. If you are having difficulty with your work it is important to seek help from your teacher rather than be tempted to use unfair means to gain marks. Do not risk losing your degree and all the work you have done.

The regulations define a number of different forms of cheating, and any form of cheating is strictly forbidden. As regards the dissertation, the most important forms of misconduct are the following:

- Submitting other people's work as your own – either with or without their knowledge.
- Plagiarism – taking or using another person's thoughts, writings or inventions as your own. To avoid plagiarism you must make sure that quotations from whatever source must be clearly identified and attributed at the point where they occur in the text of your work by using Harvard Style of Referencing. It is not enough just to list sources in a bibliography at the end of your essay or dissertation if you do not acknowledge the actual quotations in the text. Neither is it acceptable to change some of the words or the order of sentences if, by failing to acknowledge the source properly, you give the impression that it is your own work;
- Collusion – except where written instructions specify that work for assessment may be produced jointly and submitted as the work of more than one student, students must not collude with others to produce a piece of work jointly, copy or share another student's work or lend their work to another student in the reasonable knowledge that some or all of it will be copied;
- Duplication – submitting work for assessment that is the same as, or broadly similar to, work submitted earlier for academic credit, in IBS or elsewhere, without acknowledgement of the previous submission;
- Falsification – the invention of data, their alteration, their copying from any other source, or otherwise obtaining them by unfair means, or inventing quotations and/or references.
- Unauthorised use of AI – tools built on large language models (ChatGPT, Gemini, etc.), commonly referred to as artificial intelligence, must not be used unless their use is specifically allowed for the given module. Unless the specific assessment guidance states otherwise, it is definitely not acceptable to use these tools to write an essay or short written answer from start to finish.

If it is suspected that you have committed any of the above, you will undergo a disciplinary procedure, which is aimed at establishing whether the breach of regulations has indeed been committed, and if so, it will be decided what consequences this will have. These may include, among others, the resubmission of the dissertation for a capped mark and a viva voce examination.

Further information is available in the document "Academic Conduct Policy", which can be accessed at the left hand-side of each Moodle-page.

Permitted level of AI use:

For the text of the Business Data Analytics Project

- **Level 2: AI-Assisted Idea-Generation and Structuring**
  - students can use AI to brainstorm themes and create an outline for an essay
  - Permissible Use: The student can use AI to generate ideas and structure the essay but must write the final content independently.
  - Documentation: The student must keep records of the AI prompts and generated outputs.
  - Disclosure: The use of ChatGPT for idea generation and structuring must be disclosed.
    - Example Disclosure: "ChatGPT 4.0 was used to brainstorm themes and structure for this essay on international terrorism. Prompt: 'Suggest themes and an outline for an essay on international terrorism.' No AI-generated text is included in the final submission. Accessed: [Date]. Available at: https://chat.openai.com/."
      - Appendix

For generating the codes:

- **Level 4: AI-supported Task Completion**
  - students can use AI freely leverage AI for coding.
  - Documentation: The student must maintain comprehensive records of all AI interactions, including coding instructions and refinement.
  - Disclosure: All AI use must be thoroughly documented and disclosed, detailing each step of the AI's contribution.
    - Example Disclosure: "Throughout the preparation of this report, AI tools were extensively used in the coding process. ChatGPT 4.0 was employed to generate the codes for (...). Prompts included: '...' All AI-generated contributions were critically evaluated and integrated. Accessed: [Various Dates]. Available at: https://chat.openai.com/."
      - appendix