CODING PROJECT
HANDBOOK

Last updated: 23 May 2022

Dear Students,

The aim of the Coding 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 Coding Project, we advise you to make the most of your supervisor's guidance as well as to visit the relevant Moodle page, where you can find additional information.

IBS offers tutorial supervisory support for the Coding Project. Students are offered the opportunity to work with tutors who are experts in the field of Business Data Analytics. 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 supervisor 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
Pro-Rector (Academic)

Contents

CALENDAR OF THE CODING PROJECT WRITING PROCESS

One-page draft proposal submission	See specific date on Moodle, but in general: ● Late-July
Supervisor assigned	See specific date on Moodle, but in general: ● Mid-July
Coding Project submission	Three 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 CAPB351 page.
2. On all dates, submissions must be made by 4pm CET.

1. THE CODING PROJECT

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

The coding 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 Coding 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, and a reflective account on how you completed the project.

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 trajectory, strict requirements of out of training validation are observed, and the work should demonstrate the good command of literate programming and data visualization for conveying relevant results.

The problem to be solved will be defined by IBS and the related dataset will already be rendered available. For instance, projects may include:

- Environmental data analysis, visualisation, and model building
- Production data for ERP software introduction
- CRM information to be used, for instance, for geographical or product expansion
- Other data analysis problems

Students are assigned a supervisor at the start of the third semester by the Centre for Academic Services, based on their availability, their background, skills and competencies and their fit to the specific projects. The supervisors guide and advise students throughout the Coding 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 Coding 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, and then interpret and/or visualise the modelling results (with respect to relevant methods of performance evaluation). The deliverables of the Coding Project are Jupyter notebook(s) containing all the code of the data science solution, explanation and interpretation of results and description of the project steps and activities along with a detailed personal reflection on the process of finding a solution, decisions taken, and learning points from all these with regard to future projects.

More specifically, on completion of this project, students should be able to:
- Critically appraise problems and their proposed IT solutions.
- Systematically integrate knowledge acquired during the studies.
- Determine, refine, adapt and use appropriate methodologies and approaches to conceptualise and address, professionally and with originality, problematic situations that involve many interacting factors.
- Assess programming tasks accurately, use the relevant frameworks and processes in a time efficient fashion and create functioning and error-free code.

2. CODING PROJECT FORMAT AND CONTENT RULES

2.1 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:

- Introduction (where you describe the project at hand and specifically mention the goals you have set)
- Your approach to resolving the problem and making a case for choosing particular data science tools
- Presentation of how you cleaned and prepared the data
- Presentation of the data science tools and machine learning models used
- Interpretation and/or visualisation of the modelling results (with respect to relevant methods of performance evaluation)
- Reflections on the project
- Conclusions and recommendations for further approaches
- References
- Appendices

Your coding 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.

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 coding 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 abstract, 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.

ABSTRACT

Page heading ABSTRACT. An abstract typically covers the following issues in this order:
- Purpose (What is/are the reason(s) for writing the coding 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 coding 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 coding projects?)

The abstract **should not exceed 300 words** in length, typed in single spacing on one side of A4 paper. The abstract 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 coding 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 coding 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).

APPROACH

Provides rationale for the approach adopted for resolving the case vis-à-vis other approaches that could have been taken. Highlights the data science fit of the approach and the reasons for selecting the tools proposed.

DATA PREPARATION

Describes how you cleaned the data and prepared it for your own purposes. Highlights the choices made and provides rationale for these. Presents the final structure of the data set used.

TOOLS AND IMPLEMENTATION

Presents the data science tools and machine learning models used. Presents and describes the code used for training the models and evaluates the results. Interprets and/or visualises the modelling results with respect to relevant methods of performance evaluation.

This is a major chapter that you will likely want to break up into further smaller sections.

REFLECTIONS

At the first level, *reflection* entails thinking about how your actions impact a data science project, how your actions fit to a project and how you can make sense of these actions. This is the level of noticing problems and finding solutions, adjusting behaviour to correct previous errors. At a second, deeper level, *reflexivity* describes coming to understanding where your own actions and beliefs come from.

This is the level of understanding the reasons for our noticing only certain problems (or even more precisely noticing only certain things that we then start to think about as problems) and identifying actions we come to think about as solutions – we all have beliefs, assumptions, values, theories that we usually don't question or which are unclear and unknown to ourselves, which nevertheless influence what and how we do. Bringing these to the surface is what reflexivity is about.

We are asking you to identify key points of learning that took you by surprise, which went better than expected, failed partly or completely, and were very emotional. You may also discuss instances of excitement, confusion, fear, anger, happiness, etc. Reflect on and question your experiences: focus on ideas, events, moments, remarks, etc. you were 'struck by', why these instances are important (what questions, dilemmas, or possibilities they raised), the (tacit or wrong) assumptions you made that were brought into question, and their impact on your future actions as well as key skills you need to develop further.

CONCLUSIONS AND RECOMMENDATIONS

This final part of the main body summarises the results of the coding project and highlights to what extent you have achieved the objectives specified in the introduction. As the Coding Project is an experience-based study, you should also make actionable recommendations to the project organization in question that are adequately thought through and supported by your findings and analysis. Finally, you need to refer to the possible courses of further tasks on the basis of the findings of the Coding Project, which could extend or better embed the results of your solution and lift some of its limitations.

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

2.2 Text formatting

TEXT

The text should be using the Markdown syntax. 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 coding 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.

FOOTNOTES

Use of the Harvard system of referencing with a properly constructed bibliography 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:

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

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, lists of company names, or computer programmes used in the capstone project. 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.

2.3 Regulations for length and formatting

LENGTH

The normal length of a Coding Project is 13,000 words (excluding abstract, contents and other tables, diagrams, references and bibliography). This means that while work must be written concisely codes and explanations must also be included within the written work. 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. 2,000 words below or above the normal 13,000). 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 Coding Project via Moodle on the Moodle page of the CAPB351 Coding 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 coding project without appendices on Moodle.

3. CODING PROJECT ASSESSMENT

3.1 Assessment criteria

The Coding Project will be assessed against the following attributes:

- *Approach adopted*: including how data were handled, the rationale for various decisions, and discussion of selecting particular approach and tools.
- *Coding*: purposefulness, quality, and elegance of the codes used.
- *Data science methodology*: appropriate techniques, exploratory and modelling steps, validation and conclusion.
- *Reflexivity*: clarity of linkages between actions and outcomes, depth of reflections, identification of learning points for the future.
- *Communication and presentation:* language and grammar, clear formatting, adept use of Jupyter.

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

The Coding Project will normally be assessed in the form of a written report by the student's supervisor and another tutor appointed by IBS. The tutors shall reach agreement in their assessment; or, if needed, a third tutor will be involved in the assessment procedure, whose mark will be considered final.

The form used to assess Coding Projects is shown in Appendix 5.

3.2 Consultations with supervisors

Students must in the first instance establish a working relationship with their supervisor and together set deadlines for the completion of the various tasks and draft chapters. Students should communicate regularly with their supervisor 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 coding 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. Due to the limited number of potential supervisors also versed in data analysis and coding, it is not possible to change your supervisor.

3.3 Report on consultations

Before the Coding 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.

3.4 Originality of work

As is the case with all assignments submitted to IBS, the Coding Project is automatically checked for plagiarism by Turnitin. 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 the submission date does not contain inappropriately referenced text. Please note that IBS follows a zero tolerance policy of plagiarism, however that, in most cases, does not equate to zero percent as shown in the Turnitin similarity report.

For more detail about academic misconduct see Appendix 6 and the document entitled "Academic Conduct Policy" on the left hand side of each Moodle-page.

3.5 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.

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.

3.6 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 Coding Project. The Coding Project will only be assessed if the final exam questions have also been answered.

3.7 Coding Project Timeframe

The key dates of the Coding 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
Sep – Nov	Dec (last day of the teaching period)	Dec – Jan	Feb
Feb – May	May (last day of the teaching period)	May – Jun	Jul

Appendix 1 – Letter of Confirmation and Consent

LETTER CONFIRMATION AND CONSENT

<div align="right">23 March 2021</div>

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 coding 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 coding project, which will only be accessible by tutors affiliated to International Business School and The University of Buckingham who evaluate my coding 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 coding 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

(Coding 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

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 – Coding Project Assessment (MSc in IT for BDA)

Criteria to grade	0-25% (Fail)	26-49% (Fail)	50-59% (Pass)	60-69% (Merit)	70-79% (Distinction)	80-100% (Distinction)
Approach (10%)	No evidence of an understanding of the basics of the subject. Difficult to relate the rationale to the particular approach adopted.	A superficial understanding of the subject. Data is not prepared suitably. The tools selected are not appropriate. Hardly any rationale is offered for selecting them.	A reasonable understanding of the subject. Data is suitably if not fully correctly prepared. The tools selected are appropriate. Some rationale is offered for selecting them.	A sound understanding of the subject. Data is suitably and correctly prepared. The tools selected are very appropriate. Sound rationale is offered for selecting them.	A deep understanding of the complexities of the subject. Data is prepared correctly and suitably. The tools selected are the most appropriate. The rationale for selection critically considers alternative options.	An innovative presentation of the subject displays a deep understanding of the complexities of the subject. Data is prepared most suitably. Innovative tools are selected and critically appraised.
Coding (30%)	The codes used are wrong and do not serve the aims.	The codes used contain too many mistakes to be executable. Coding does not fulfil the aims of the project.	The codes used are simple but functional with minor mistakes. Coding adequately fits the aims of the project.	The codes used are well thought through and contain only very minor mistakes. Coding adequately fits the aims of the project.	Coding is done appropriately and without mistakes. The code used represents the best choice for the project.	The code is elegant and contains no mistakes. Some innovative solutions are used to deliver on the project aims.
Data science methodology (30%)	The task is ill posed and misunderstood, non-appropriate techniques are utilized or basic techniques are omitted. Conclusions about exploratory and modelling steps are wrong. Validation of out of training performance is not carried out. Overview and discussion of final result is lacking.	The task is well posed and understood, appropriate techniques are utilized but some basic techniques may be omitted. Conclusions about exploratory and modelling steps are wrong. Validation of out of training performance is not carried out. Overview and discussion of final result is lacking.	The task is well posed and understood, appropriate techniques are utilized and a reasonable number of basic techniques are included. Conclusions about exploratory and modelling steps are acceptable. Minimal validation of out of training performance is carried out. Overview and discussion of final result is lacking.	The task is well posed and understood, appropriate techniques are utilized, sufficient amounts of basic and advanced techniques are included. Conclusions about exploratory and modelling steps are acceptable. Satisfactory validation of out of training performance is carried out. Overview and discussion of final result is minimal.	The task is well posed and understood, appropriate techniques are utilized, sufficient amounts of basic and advanced techniques are included. Conclusions about exploratory and modelling steps are well reasoned. Thorough validation of out of training performance is carried out. In depth overview and discussion of final result is present.	High level of sophistication in modelling, accompanied by deep reasoning for the steps taken, exceptional care and thoroughness in validation, forward looking analysis of possible future steps.

Reflexivity (20%)	Reflection is not present or does not extend beyond a simple description of events.	Reflection is simplistic with inadequate linkages drawn between individual actions and outcomes. Learning points for the future are not identified. Own thinking is not challenged.	Reflection provides some linkages between individual actions and outcomes. Insights demonstrated at the level of reflection. Basic key learning points for the future are identified.	Reflection provides adequate linkages between individual actions and outcomes. Insights are mostly reflective with elements of reflexivity. Several important learning points for the future are identified.	Reflection provides excellent linkages between individual actions and outcomes. Insights exhibit reflexivity. Detailed learning is shown to bear on future individual practice.	Reflection provides innovative linkages between individual actions and outcomes. Reflexive insights fully consider underlying characteristics. Learning identified to bear on future individual and general practice.
Communication and presentation (10%)	Some notable deviations from the format specified in the Coding Project Handbook, no illustration / visual representation is used, exploratory steps and outcomes are not presented in a concise and intelligible manner, Grammar and vocabulary often hinder understanding. Jupyter notebook format is disorganized and not in an executable state.	Some notable deviations from the format specified in the Coding Project Handbook, illustration / visual representation is used, exploratory steps and outcomes are not presented in a concise and intelligible manner, Jupyter notebook format is disorganized and not in an executable state.	Illustration / visual representation is used, exploratory steps and outcomes are not presented in a concise and intelligible manner, Jupyter notebook format is disorganized but in an executable state.	Exploratory steps and outcomes are not presented in a concise and intelligible manner, Jupyter notebook format is organized and in an executable state, with well-illustrated methods.	Exploratory steps and outcomes are presented in an intelligible manner, Jupyter notebook format is organized and code is accompanied by comments, markdown cells with sections and formatting are used in a consistent way. Excellently illustrated visuals are used.	Especially insightful and appealing form of presentation, high, publication quality material with deep and outstandingly illustrated visuals.

* 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.

** Coding Projects below 11,000 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.

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.