



**ANL488 BUSINESS ANALYTICS APPLIED
PROJECT
Course Handbook**

CONTENTS

- 1 INTRODUCTION**
- 2 LEARNING OUTCOMES**
- 3 THE BUSINESS ANALYTICS APPLIED PROJECT**
- 4 REQUIREMENTS**
- 5 ASSESSMENT CRITERIA**
- 6 ACADEMIC HONESTY AND PLAGIARISM**
- 7 PENALTIES**
- 8 CONCLUSION**

ANNEX

- A SAMPLE COVER PAGE FOR THE PROJECT PROPOSAL**
- B SAMPLE COVER PAGE FOR THE PROJECT FINAL REPORT**
- C LETTER OF IDENTITY/INFORMATION AND DATA REQUEST FORM**
- D SAMPLE NON-DISCLOSURE AGREEMENT**
- E ELECTRONIC CONFIDENTIALITY UNDERTAKING DECLARATION BEFORE SUBMISSION OF PROJECT PROPOSAL**

1 INTRODUCTION

ANL488 Business Analytics Applied Project enables students to conceptualise and conduct a business analytics project of relevance to what is practiced in industry. It allows the students to utilise the knowledge and skills in a project environment and apply appropriate business analytics techniques for generating useful inputs for business decision making.

The Business Analytics Applied Project may involve application and implementation of one or more data mining techniques taught in the business analytics programme (e.g., association, clustering, predictive modeling, text mining etc), or combining various techniques into a data mining solution for a specific business problem.

The Business Analytics Applied Project can also involve the development of new business analytics technique(s) or algorithm(s) or investigations into existing business analytics technique(s) or algorithm(s). In this case, the student will have to work very closely with their supervisors to craft out a suitable topic.

The Business Analytics Applied Project must be proposed and carried out individually.

2 LEARNING OUTCOMES

The activities of a typical project include business problem conceptualisation and identification, project proposal writing including literature review, data understanding and preparation, modeling and evaluation (including deployment), report writing, and presentation. The candidates should be able to perform proper analysis and provide sound recommendations for the chosen project.

The Learning Outcomes (LOs) of the Business Analytics Applied Project for students can be summarised as follows:

1. Appraise relevant references to the selected business analytics project topic to form the Literature Review.
2. Evaluate the suitability of alternative business analytics methodologies for the project proposal.

3. Critique the impact of the project proposed.
4. Formulate a viable business analytics project proposal under individual supervision.
5. Apply appropriate business analytics techniques to the business analytics problem, including conducting business understanding, data understanding, data preparation, modeling, evaluation and deployment.
6. Discuss the business analytics problem.
7. Implement the project proposal.
8. Recommend courses of action through an appropriately written project report.
9. Debate the effectiveness of the proposed business analytics solution.
10. Defend project results to peers and supervisors.

3 THE BUSINESS ANALYTICS APPLIED PROJECT

As a compulsory course in the Bachelor of Science Business Analytics (BSBA) programme or the Bachelor of Science Business Analytics Major (FTBSBA) the Business Analytics Applied Project is a 10 credit-unit that is to be carried out in two semesters. However, students who make satisfactory progress as assessed by the supervisor can complete the project in a single semester. Students are strongly advised to enroll for the Business Analytics Applied Project as their last course of study. This is because the Business Analytics Applied Project will, in most cases, draw upon the material covered in the other level ANL courses taken in the BSBA or the FTBSBA programme. However, it is at the discretion of the Course Co-ordinator of ANL488 Business Analytics Applied Project, after consulting the Head of Programme (HOP), Business Analytics and Dean, School of Business, to waive this requirement on a case-by-case basis.

Students are expected to work independently and have periodic discussions with their supervisors. They will consult their supervisors as soon as the allocation of students to supervisors has been completed. Students will discuss their supervisors on at least five (5) occasions for guidance in the student's chosen project topic. This does not include the common seminar attended by all students taking ANL488 in the first week of the semester where the objective is to disseminate information about the course. The supervisor(s) will determine the time and mode of the discussions (whether face-to-face or over the phone) after discussing with the student.

It is possible under certain circumstances that more than one supervisor is allocated. However, there must only be one main supervisor who is responsible for the marking of the Project Proposal, Project Oral Presentation and Project

Final Report.

4 REQUIREMENTS

- (a) Activities Before the First Seminar. While taking the ANL courses, the student should start to identify suitable topics to work on preferably using data from their current employers (use Annex C Letter of Identity/Information and Data Request Form if needed). At the same time, they should also start identifying one or two faculty member(s) or associate(s) who is (are) interested in working on their topics. In early Jun/Dec before the start of the semester in which the student is taking ANL488, the student will be asked to attend a briefing to formally collect information on the student's preferences for topics/supervisors. The allocation of supervisors will be made known to the student by mid Jun/Dec before the start of the semester. The student should start reading up on their topic and start writing up the literature review of their topic.
- (b) First Seminar. There is one seminar for the course in the first week of the semester. Relevant information about the course will be disseminated. There will also be a question and answer session for students to raise and clarify issues. There is no make-up session for the seminar.
- (c) Project Proposal. The Project Proposal is to be submitted in Week 4. If the student fails and did not submit the Project Proposal, the student will be asked to withdraw from the course and repeat the course when it is next offered again.
- (d) Project Oral Presentation. The Project Oral Presentation will be conducted in Week 9. All students will be informed of the dates by the start of the semester while the schedule and venue will be announced 2 weeks before the day of the Project Oral Presentation. Each student will be given a 30 minutes' slot of which 5-10 minutes will be allotted to a Question & Answer session. During the Question & Answer session, suggestions may be given by the assessors on improvements to be made to the project. The student is expected to incorporate the improvements into the Project Final Report. If the student fails the Project Oral Presentation or fail to turn up for the Project Oral Presentation, the project must be extended into the next semester to attempt the Project Oral Presentation again.

- (e) Project Final Report. The Project Final Report is to be submitted by Week 16. Failure to submit by the deadline will be automatically extended to the next semester. For example, if the student fails to submit the Project Final Report in the July semester for example, the student will be automatically extended to the January semester. The softcopy of the Project Final Report is to be submitted via Canvas/Turn-It-In. All items belonging to the following folders that are used in your Applied Project are to be zipped up into 1 zip file and must be submitted by the same deadline as the Project Final Report via Canvas CD Content Submission:
- i) Data and Modeler Streams: If your project has computer programs, keep the source codes here too. If you do not have permission to include your data, put an explanatory note here.
 - ii) Papers cited in Literature Review
 - iii) Project Oral Presentation Slides
 - iv) Miscellaneous: To keep scanned copy of your NDA (if applicable) and any other documents for archival purposes.

WEEK	ACTIVITY	ASSESSMENT WEIGHT
Prior to WEEK 1	Select topic/source for data/contact likely supervisor/prepare for project. Allocation of topic/supervisor to be completed mid Jun/Dec.	
1	Seminar Question/Answer Session	
2-3	Work on Project Proposal	
4	Submission of Project Proposal. Submission of NDA to supervisor.	Compulsory for students to submit the Project Proposal (20%).
5-8	Work on Project	Compulsory for students to participate in Project Presentation (20%).
9	Project Presentation	
10-15	Revise project based on feedback from Project Presentation. Work on Project Final Report and prepare for final submission.	
16	Submission of Project Final Report	Compulsory for students to submit the Project Final Report (60%)

- (f) Fees. For course repeats, all relevant tuition and applicable fees have to be paid.
- (g) Turn-It-In. The completed Project Final Report will have to be submitted officially through Canvas/Turn-It-In. Students are not allowed to

submit their Final Project Report directly to their supervisors as they have to use Canvas/Turn-It-In.

- (h) Late Submission. No late submission for Project Proposal and Project Final Report will be entertained unless approval has been given by the Head of Programme (Business Analytics) and Dean, School of Business.
- (i) Student's Role. Students are themselves responsible for the final outcome of their own projects. All citations, references and fieldwork as well as the project are the sole responsibility of the student. It is the student's responsibility to ensure that all copyrights are properly observed and where necessary, appropriate permissions are granted. This includes seeking permission from any authorised person(s) or organisation for the use of data. Please note that students will need to make an electronic declaration of the Confidentiality Undertaking that they have obtained the permission for the use of data in their project before they are allowed to submit the Project Proposal in Canvas. The wording of the declaration is found in Annex E. Please see Annex D for a sample Non-Disclosure Agreement (NDA) that can be used for the organisation that is releasing the data. This NDA must be submitted to the supervisor by Week 4 of the semester. The student must not, in the course of his or her project, bring the university or its officers, into ill-repute under any circumstances. Students must understand that the rigours of academic discipline require adherence to deadlines.
- (j) Supervisors Role. The role of the supervisor is to provide academic guidance and direction. The supervisor's role is not to enforce English or grammar standards. The supervisor can extend advice to the student but it is up to the student to accept such advice. The students should consider the supervisor's advice seriously.
- (k) Business Analytics Applied Project Final Report. The formal requirements of the Business Analytics Applied Project Final Report are:
 - (i) be no more than 10,000 words (40 pages at 250 words per page).
 - (ii) be double-spaced.
 - (iii) use Times New Roman font at 12 cpi.
 - (iv) include all references and sources.
 - (v) have the total number of words written in (brackets) at the bottom of the last paragraph of the last chapter, but before the References.
 - (vi) have the paragraphs justified.

- (vii) number each page.
- (viii) use American Psychological Association (APA) referencing style (refer to Study Unit 1 in ANL311 Selected Topics in Business Analytics Study Guide)
- (ix) number each table and figure.

Anything that goes beyond the maximum word limit will not be graded.

- (l) Images, Tables, Charts, Maps, And Graphs. These are not included in the word-count. However, students should not “cut-and-paste” from the Internet or any other sources without proper acknowledgement and referencing. Proper permissions and citations are required when citing or quoting original material, copyrighted images, tables, charts, maps, graphs, and all other forms of data.

5 ASSESSMENT CRITERIA

- (a) The assessment is divided into three components:

Component	Weightage	Assessor	Assessment Criteria
Project Proposal	20%	Supervisor	The 4 assessment criteria are clear description of business/research problem including project title, clear description of data to be used and literature review (see 5(d) for details), proposed methodology & its appropriateness and overall presentation.
Project Oral Presentation	20%	Supervisor and examiner	The 3 assessment criteria are preparation, actual delivery and effectiveness. Preparation includes (i) quality and organization of the slides, (ii) the amount of information contained in each slide (eg explanation and discussion rather than mere “cut-and-paste” output, (iii) the effort put into appearing as professional as possible. Quality of actual delivery depends on (i)

			the confidence and flow of the delivery (including eye contact, posture and vocalization), (ii) the student's ability to provide a good understanding of the problem within the time limit (so exceeding the time limit by too much should incur a penalty), (iii) the student's ability to understand, interpret and respond to queries.
Project Final Report	60%	Supervisor and examiner	The 7 assessment criteria are data understanding and preparation, literature review/development (see 5(d) for details), methodology, results/evaluation, recommendations/conclusion, presentation and progress.

- (b) To gain at least a PASS (or credit) students have to:
- (i) Achieve at least 40% for the Project Proposal [OCAS]
 - (ii) Achieve at least 40% for Project Presentation (attended in person) and Project Final Report [OES]
- (c) All marks contribute to a single final rank score, from which a Letter Grade will be awarded as the Course Result.
- (d) Literature Review Without a proper literature survey that covers an appropriate selection of RELEVANT articles, a report (whether it refers to the Project Proposal or Project Final Report) would not make the grade. A good report would be able to clarify if any contribution has been made that exceeds the prevailing state of research in the chosen area. Since it is not a graduate thesis, a report does not need to contain path-breaking research. However, a good report should be clear about what is achieved rather than leave it up to the readers to discover the literature themselves. So, the Project Proposal and Project Final Report should, in all cases, specify clearly where else (i.e. in which other published articles) similar work has already been done. Explain modeling details and results if appropriate, so that a comparison can be made with the results obtained from the project. If this is not done, then the Project Proposal and Project Final Report would be fundamentally incomplete and could only get a poor passing grade at best.

6 COMMUNICATION WITH SUSS

- (a). All students must use their SUSS email service to communicate with their supervisors and staff of the University.
- (b). The University and supervisor(s) will communicate with their respective students via Canvas, without providing students with a paper copy. Any changes to the Course, its outline and project submission deadlines will be posted on Canvas. It is the student's responsibility to be aware of the information. Students should take note of all announcements made in Canvas, emails and in the first seminar. The students are expected to spend at least 15 hours per week on this course.

6 ACADEMIC HONESTY AND PLAGIARISM

- (a) University Plagiarism Statement Candidates are expected to observe the University's rules and regulations concerning student conduct, especially in areas such as academic integrity, honesty and plagiarism. The details are found in the relevant sections of the Student Handbook.
- (b) Academic Misconduct The following are some examples of academic misconduct practices that are prohibited:
 - Falsification of results from the data mining software used.
 - Ghost-writing, where a second or third party authors the project or undertakes, in whole or in part, that is presented as the candidate's own.
 - Recycling work which has been previously done as part of studies in another course and presenting it for assessment again as if it was done solely for the particular course of study currently being taken, without the permission of the supervisor(s).
 - Making contact with another person during the Project Oral Presentation contrary to instructions.
 - Using data for the project without formal permission from the owners.
 - Plagiarism refers to the practice of using of another person's intellectual output and presenting it as one's own without appropriate acknowledgment. Examples include word-for-word copying of sentences/paragraphs without acknowledgement or with insufficient or improper acknowledgment.
 - Downloading essays from the web and presenting those for assessment/examination.

- Copying out parts of any text or using images without acknowledging the sources.

7 PENALTIES FOR PLAGIARISM

The University has four levels of penalties for plagiarism:

- (a) 1st offence: Warning letter with or without mark deduction for the assignment
- (b) 2nd offence: Zero marks for the assignment
- (c) 3rd offence: Zero marks for the course
- (d) 4th offence: Expulsion from the University.

More details are found in the relevant sections of the Student Handbook.

8 CONCLUSION

This Course Handbook is designed as a student aid for the Business Analytics Applied Project. Students should read this Handbook together with the prescribed text(s) and all other information and reading materials disseminated throughout the semester. Students are advised to refer to it whenever necessary and pay attention to Canvas for updates. If there are any queries on any part of this Course Handbook, they should be directed to the Course Co-ordinator of ANL488 Business Analytics Applied Project.

ANNEX A
SAMPLE COVER PAGE FOR THE PROJECT PROPOSAL

ANL 488 PROJECT PROPOSAL

PROJECT TITLE



Submitted by
STUDENT'S NAME

SCHOOL OF BUSINESS
Singapore University of
Social Sciences

Presented to Singapore University of Social
Sciences in partial fulfillment of the
requirements for the
Degree of Bachelor of Science
in Business Analytics

2017

TABLE OF CONTENTS *(Sample)*

Chapter One	Introduction	1
Chapter Two	Literature Review	5
Chapter Three	Data Understanding and Preparation	10
Chapter Four	Proposed Modelling and Evaluation	15
Chapter Five	Proposed Schedule	38
References		41

** note that the Title Page (i) will have no Page Number and is only numbered in the Contents page

EXPLANATION OF TERMS IN ANNEX A

Project Title: This refers to the title of the Project Proposal. While there is no limit to the length of the Project title, it is not common for the entire title to be more than a single sentence of 50 words (maximum).

Introduction: One must be able to adequately describe the business problem at hand as well as translate that into clear business analytics problem. In cases where the content of this chapter is not substantive, one could combine both Introduction and Literature Review into a single chapter so that the Literature Review could serve as the starting point of the project.

Literature Review: A proper literature survey covers an appropriate selection of relevant references that could be in the form of journal articles or books.

The Literature Review should also adequately summarise each of these references and there should be a minimum of three of these references in the Project Proposal. Such summaries could include details of the analysis done so that a comparison could be made with the results obtained.

References: Students are to use the following guidelines for their references (APA style):

Book:

Vercellis C. (2009). *Business Intelligence*. Chichester: Wiley.

Journal Article:

Winkler, R. & Makridakis, S. (1983). The combination of forecasts. *Journal of the Royal Statistical Society, A*, 145: 150-157.

ANL488 FINAL PROJECT REPORT

PROJECT TITLE



Submitted by
STUDENT'S NAME

SCHOOL OF BUSINESS
Singapore University of
Social Sciences

Presented to Singapore University of Social
Sciences in partial fulfillment of the
requirements for the
Degree of Bachelor of Science
in Business Analytics

2017

ABSTRACT (*Sample*)

TABLE OF CONTENTS *(Sample)*

Abstract		i
Chapter One	Introduction	1
Chapter Two	Literature Review	5
Chapter Three	Data Understanding and Preparation	10
Chapter Four	Modelling and Evaluation/Discussion	15
Chapter Five	Recommendations/Conclusion	38
References		41

** note that the Title Page (i) will have no Page Number and is only numbered in the Contents page

EXPLANATION OF TERMS IN ANNEX B

Abstract: This is a short summary of your Project Proposal. While there is no limit to the length, it to be more than a single page (maximum). The short summary should include key points of the entire report, including the modeling details, whether the modeling has been successful, and if so, what the key result(s) is.

ANNEX C

**LETTER OF IDENTITY/INFORMATION
AND DATA REQUEST FORM**



School of Business

Date :

Ref : SBIZ/ANL488 MMY-SN (e.g., SBIZ/ANL488 0510-08)

Dear Sir/Madam

This is to confirm that the following person is a student of the School of Business,
Singapore University of Social Sciences, undertaking a project on "
.....".

Name of Student NRIC No.

.....

The faculty member supervising this project is

This project is part of the final year curriculum leading to the degree of Bachelor of Science in Business Analytics. In order to carry out their project, certain kinds of information are required from your organisation, as indicated in the attached request from the students. Any assistance which your organisation may render the students will be greatly appreciated.

Yours sincerely

Head of Programme,
Business Analytics

SAMPLE NON-DISCLOSURE AGREEMENT

(To print on Discloser's letterhead)

Non Disclosure Agreement

This Agreement is entered into on [•] by and between <Name, IC number> (hereinafter "Recipient") and **Company's Name** (Company Registration No.), of [Company Address] (hereinafter "Discloser").

WHEREAS Recipient is a student of the Business Analytics Programme with Singapore University of Social Sciences and is required to undertake a student project known as [•] (hereinafter "Student Project");

WHEREAS Discloser possesses certain confidential and/or proprietary data, material and information (hereinafter "Confidential Information") that is relevant to the Recipient's Student Project; and

WHEREAS the Discloser is willing to disclose and Recipient is willing to receive the Confidential Information pursuant to the terms of this Agreement for the purpose of the Student Project;

NOW THEREFORE, in consideration for the mutual undertakings of the Discloser and the Recipient under this Agreement, the parties agree as follows:

1. Disclosure. Discloser agrees to disclose to Receiver the Confidential Information solely for purposes of the Student Project. Receiver agrees and undertakes that the Confidential Information shall only be used, reproduced, transmitted or distributed solely for purposes of the Student Project and for no other purpose.
2. Confidentiality.
 - 2.1 No Unauthorised Use. Recipient agrees not to use, reproduce, transmit or distribute the Confidential Information in any way, or to manufacture or test any product embodying Confidential Information, except for the purpose set forth above.
 - 2.2 No Disclosure. Recipient agrees to use its best efforts to prevent and protect the Confidential Information, or any part thereof, from disclosure to any person other than person(s) having a need for disclosure in connection with Recipient's Student Project.

- 2.3 Protection of Secrecy. Recipient agrees to take all steps reasonably necessary to protect the secrecy of the Confidential Information, and to prevent the Confidential Information from falling into the public domain or into the possession of unauthorized persons.
3. Limits on Confidential Information. The obligations of confidentiality under clause 2 shall not apply to information that:
- 3.1 Was known to Recipient prior to receiving any of the Confidential Information from Discloser;
 - 3.2 Has become publicly known, after disclosure by Discloser, through no wrongful act of Recipient;
 - 3.3 Was received by Recipient from a third party who is not subject to any restriction as to the use and disclosure of the information; or
 - 3.4 Was independently developed by Recipient without use of the Confidential Information.
4. Ownership of Confidential Information. Recipient agrees that all Confidential Information shall remain the property of Discloser. Nothing contained herein shall be construed as granting or implying any transfer of rights to Recipient in the Confidential Information, or any patents or other intellectual property protecting or relating to the Confidential Information.
5. Term and Termination. The obligations of this Agreement shall be continuing subject to the provisions of clause 3.
6. Survival of Rights and Obligations. This Agreement shall be binding upon, inure to the benefit of, and be enforceable by (a) Discloser, its successors, and assigns; and (b) Recipient, its successors and assigns.

IN WITNESS WHEREOF, the parties have executed this agreement effective as of the date first written above.

Name and Signature of Recipient

Name and Signature of Discloser
Designation
Company Stamp

ANNEX E

**ELECTRONIC CONFIDENTIALITY UNDERTAKING
DECLARATION BEFORE SUBMISSION OF
PROJECT PROPOSAL**

CONFIDENTIALITY UNDERTAKING

1. Definition

For the purposes of this Undertaking, the following definitions apply:

'Placement' means a clinical or work placement, fieldwork, internship, practicum, study mission, applied project or other professional placement that is undertaken as part of your course requirements with the University.

'Agency' means a hospital, company, community centre or other institution, organization or entity including one within the University at which you will be undertaking the Placement.

'Confidential information' means (a) any and all personal information (including medical condition, history and course of treatment), other information or opinion about an individual that would identify such individual or the Agency or whose identity is apparent or can be reasonably ascertained from the information or opinion whether true or not; and (b) any information that is by its very nature is confidential or which the Agency specifies as confidential; and (c) any information not in the public domain that allows an individual or the Agency to be identified; and (d) any information not in the public domain that belongs to the University. Confidential information is not limited to written or electronic records or information conveyed verbally. It can appear in any form and be recorded on any medium. It may include such things as photographs, video recordings, x-rays or finger prints.

'Placement Coordinator' means the University staff member nominated to coordinate your Placement activities.

2. Background

The protection of confidential information and personal data is a serious issue which you need to be aware when undertaking a Placement. Failure to do so can have serious legal ramifications. Your obligation of confidentiality continues to apply even after the Placement has been completed. Confidential information obtained by you whilst on Placement shall not be divulged at any time without the prior written consent of the owner of such Confidential Information.

Students are required to abide by the procedures for ensuring security of Confidential Information of the Agency at which the Placement is being undertaken. You shall also observe and adhere to all prevailing applicable laws, rules, regulations and codes pertaining to medical confidentiality and ethics and personal data protection.

3. Purpose

This Undertaking has been developed as a means by which the University may ensure that you understand your responsibilities. If you do not understand any part of this document or if you have uncertainties about its interpretation or application during the Placement, you should discuss the matter with your Placement Coordinator. Please read the Confidentiality Undertakings carefully.

CONFIDENTIALITY UNDERTAKING

I hereby confirm that I :

1. comply with the rules, regulations, procedures and policies of the Agency relating to confidentiality.
2. treat the Confidential Information as secret and confidential and not disclose it to any person without the prior written permission of the Agency. This includes not disclosing Confidential Information through use of any social media sites.
3. only use the Confidential Information for the purpose of my Placement and not for any other purpose unless advised by my Placement Coordinator that ethics approval has been obtained for specified uses.
4. not remove original files, test booklets, forms or other confidential documents from the Agency without the prior written permission of the Agency and to delete all Confidential Information from all of my records before leaving the Placement, including from my informal notes, transcripts of sessions, videos, audio recordings and any other material in any form recorded on any medium or other electronic storage sites, including smart phones or MP3s.
5. not copy, memorise or reproduce any of the Confidential Information other than for the purpose of the Placement. I shall first obtain the written consent of the Agency before making copies of the Confidential Information for the purpose of the Placement.
6. remove all Confidential Information before transmitting information via electronic means such as facsimile, internet and email transmissions. I understand that Confidential Information may only be transmitted after obtaining prior written permission from the Agency.
7. obtain prior written permission from my Placement Coordinator to forward documents containing Confidential Information only via registered mail.
8. indemnify University from and against all claims, damages, judgments, losses and costs of any nature (including legal costs) which University may suffer or incur in respect of a breach by me of my confidentiality obligations herein.

I acknowledge that:

- (a) my obligations in this Undertaking shall continue to have full force and effect after I have completed my Placement and even when I am no longer an enrolled student of the University.
- (b) I understand that there can be no adequate remedy at law for any breach of my obligations of confidentiality herein, which breach may result in irreparable harm to the Agency and/or the University, and therefore, upon any such breach or any threatened breach, the Agency and/or the University shall be entitled to appropriate equitable relief as may be necessary to restrain any continuing or further breach by me, without showing or proving any actual

damages sustained by the Agency and/or the University, in addition to whatever remedies it might have at law. I may also be subject to disciplinary action by the University.