UNIVERSITY of OTAGO
Te Whare Wānanga o Otāgo
NEW ZEALAND
SAPERE AUDE

BUSINESS SCHOOL
Te Kura Pakihi

Department of Marketing
Te Mātauranga Tokoka

SEMESTER TWO 2023

MART448 Advanced Business Analytics

<u>Paper Description and Aims</u>

This paper aims to develop mastery in the application of advanced analytics in a business marketing context using SAS. Topics include data marts, data access and integration, predictive modelling integrating machine learning, statistical methods, honest assessment, oversampling, decision weights, text mining and experimental design. A basic knowledge of undergraduate statistics for science, engineering, business etc., including regression, is expected.

Semester Two	**0.1667 EFTS**	**20 points**

Prerequisites: BSNS112 or STAT110

<u>Teaching Staff</u>

Paper Coordinator/Lecturer

Name:	Dr Damien Mather
Office:	OBS438
Email:	Damien.mather@otago.ac.nz
Office Hours:	Mon & Wed 2:00pm to 2:50pm

You should contact Damien Mather with any administrative enquiries about the paper.
All requests for late submissions of assignments should be addressed to Dr Mathew Parackal
Email: mathew.parackal@otago.ac.nz

Expectations for Staff Response Time to Email Enquiries – 9am to 5pm, Monday to Friday, <u>email response will generally be within 48 hours.</u> Please be aware that staff are not available to respond to emails between 5pm Friday and 9am Monday.

Paper Delivery

Lecture Day/Time: Monday 10:00 am – 10:50 am
Room: OBSG14 The Bloomberg Lab, Te Taura Takata

Lecture Day/Time: Tuesday 2:00 pm – 2:50 pm
Room: Please refer to eVision timetable

Lecture Day/Time: Wednesday 9:00 am – 9:50 am
Room: OBSG14 The Bloomberg Lab, Te Taura Takata

Lab Day/Time: Tuesday 11:00 am – 11:50am
Room: OBSG14 The Bloomberg Lab, Te Taura Takata

Lab Day/Time: Tuesday 3:00 pm – 3:50 pm
Room: Reserve - Please refer to Blackboard and eVision timetable

Lab Day/Time: Wednesday 10:00am – 10:50am
Room: OBSG14 The Bloomberg Lab, Te Taura Takata

Every week students must engage in three 50 minute lectures and two 50 minute labs. Some of the lecture and tutorial material will be available online as an alternative to face-to-face delivery. A third Wednesday slot, a lab slot, will be timetabled and held in reserve for additional contact time as required so as keep up with calendar. This is noted in the paper delivery above and the Blackboard page for this course. Please check Blackboard regularly to ensure you review any online material as soon as it becomes available, usually at the start of a scheduled activity period for this course.

Lectures present the key conceptual material.

Calendar The calendar (in this outline) details scheduling information. Note that this calendar may change as the paper proceeds. Any changes will be announced at lectures and be detailed on Blackboard.

Students are expected to prepare for and attend all classes to gain full benefit from the course.

These activities should be prepared for by reviewing information detailed on Blackboard and completing any assigned readings. Students unable to attend a lecture are expected to advise the paper coordinator in advance & catch up on missed material as discussed. Unless stated otherwise, all aspects of the course are testable.

Expectations and Workload

MART448 is a 20-point paper. As a general guide, 1 point represents study in formal instruction or independent study for 12 hours, made up of a combination of lectures, laboratories, assignments and readings. As a result, you should anticipate spending approximately 240 hours on this subject over the duration of the semester, or, to put it another way, an average of 20 hours on average every teaching week. I expect you therefore to attend all scheduled sessions of lectures and labs each week and, in addition, to put in on average another 14 hours each week on self-directed study, analysis and writing reports and assignments. Students can therefore expect to spend about 1.5 hours per week preparing for lectures, 2 hours per week attending lectures, 2 hours per week attending computer labs, 3 hours per week on targeted readings, 30 minutes per week preparing participative monthly summaries and 7 hours a week writing each one of the 2 assignments or preparing for the final lab assessment. Participation in classes is an essential part of the course, in line with a peer assisted learning pedagogy. In order to encourage students to engage, participation will be assessed and rewarded. Note that class participation requires you to discuss questions posed by the lecturer amongst the class, critically evaluate your conclusions and attempt answers. You will also be expected to contribute to Blackboard blogs on relevant course topics. Lab participation includes documenting your lab work with screenshots and comments and critically answering questions about implications of your findings for the business analysis problems in the course material.

Textbook Information

The required text is Advanced Business Analytics, volumes 1 and 2, SAS Institute, 2012. A PDF of the text is available for download from the Blackboard Course Documents page for this course and printed volumes are available for semester loan upon application to the course coordinator.

Calendar

Week	Week Commencing*	Topic	Reading
1	10 July	Overview of business analytics, data marts, data access & integration Basics of business analytics: thinking analytically, and introduction to terminology. SAS OnDemand for academic's practical introduction	Course notes vol. 1 Chapters 1 & 2. SAS OnDemand for Academics web materials All lectures online this week
2	17 July	Classical statistics vs. business analytics, overview of techniques, data management, case studies (a financial institution, exploring data, descriptive reporting, visual exploration)	Course notes vol. 1 Chapter 2
3	24 July	Data difficulties, SAS Enterprise Miner, the primer: Mail order catalog campaign case study: data source, defining column metadata, changing sampling defaults	Course notes vol. 1 Chapter 2
4	31 July	Honest Assessment, Project analytics methodology, RFM analysis on the Catalog case study data, graphical RFM analysis	Course notes vol. 1 Chapter 2

5	7 August	Honest Assessment, Project analytics methodology, RFM analysis on the Catalog case study data, graphical RFM analysis	Course notes vol. 1 Chapter 2
6	14 August	Predictive Modelling: Decision trees, binary logistic regression, Catalog case study – logit regression	Course notes vol. 1 Chapter 4
7	21 August	Predictive Modelling: Model management, Churn case study, model management	Course notes vol. 1 Chapter 4
		28th August to 1st September Mid Semester Break	
8	4 September	Text Mining: introduction, concepts, tools, example marketing applications	See SAS documentation and Blackboard. **Assignment 1 due Monday the 4th. Of September at 9:00am**
9	11 September	Multinomial Logit models as extension of binary logit. UK Coy House big data driven insolvency consultancy client sales prospecting example. Contains an advanced use of text mining to optimally adapt to big missing data problems.	See Blackboard for details.
10	18 September	Motivation for experimentation, introducing experiments, multifactor experiments	Course notes vol. 1 Chapter 5
11	25 September	Experimental design in a modern business context, orthogonality, case study: credit card case study, blocking designs, designs for interval/ratio target responses. Case study – battery life	Course notes vol. 1 Chapter 5. **Assignment 2 due Monday the 25th. September at 9:00am**
12	2 October	Survival models 1: introduction, concepts, tools, simpler example applications	See Blackboard for details.
13	9 October	Survival models 2: introduction, concepts, tools, more realistic example applications	See Blackboard for details. **The in-lab practical test starts at 9:00am Wednesday the 11th. October**

* First week of Semester 2 is ACADEMIC WEEK 28
Lectures end Friday 13 Oct

Assessment

All material presented is examinable (except where stated otherwise) by assignments and the final examination. All-important assessment information such as due dates and times, content, guidelines and so on will be discussed at lectures and, where appropriate, detailed on Blackboard. *Students are responsible for ensuring that they are aware of this information, keeping track of their own progress, and catching up on any missed classes.*

Assessment	Due date	% of final grade
Assignment 1 topics: Part 1, the practical report: Generate screen snapshots of project process flow and charts as shown in the example text ch 2, pp 147-155 and as demonstrated in labs for the study exercise ch 2 pp 160-161. Part 2 essay topic: Research, discuss and debate: "Everyone will need analytics eventually. Proactively analytical people will be more marketable and more successful in their work" OR, if you prefer: Research, discuss and debate: What we have learnt from AI from the perspectives of business ethics, wellbeing, sustainable business models, and advanced predictive analytics? OR see any additional Assignment topics on Blackboard	Monday the 4th of September	29
Assignment 2 topic: Part1: Practical Report: Conduct a Predictive Modelling exercise using regression: Start a new project called ORGANICS_3. Follow the steps in the textbook in Ch. 4 pp 75 and 76 up to step (d) adding a partition node). Then follow the steps in the textbook in Ch. 4 p 130. Remember to document the important steps in the practical exercise using screenshots and explanatory paragraphs to inform the reader. Explain your answers to the questions. Part 2 essay topic: Either: Research, discuss and debate: "What we have learnt about AI from the perspectives of business ethics, wellbeing, sustainable business models, and advanced predictive analytics?" OR "Research and debate the ethics of algorithms in the context of equity. Use a topical algorithm example and your knowledge of predictive model structures to recommend a way to make that algorithm more equitable." The first topic is not available if the student has already chosen the AI topic above for Assignment 1. OR see any additional Assignment topics on Blackboard	Monday the 25th of September	29

Practical Test Final Practical lab test in class. You will be given instructions at the beginning of the lab practical test.	Practical Lab Test during last two scheduled contact hours of course, 9:00 am to 10:50 am Wednesday the 11th. October	29
Class participation: Assessed by lecturer based on depth and quality of questions and contributions both in class and online in Blackboard discussion threads, and monthly learning summaries, assessed by the depth, quality, structure, organisation and grammar evident in the written reflections.	Continuous (participation,) Wed 26th. July, Wed. 23rd. August, and Wed. 27th. September (learning summaries)	13

Paper Requirements
There are no terms requirements.

Assessment Format
Practical reports should include sufficient screenshots to demonstrate or show evidence of the results of key decisions students make regarding inclusion or sequencing of analytic nodes and any changes to default node properties. Essays should be well-written in good academic English, with arguments, critiques and conclusions supported by citations and a bibliography that draws equally from both scholarly academic articles and proceedings as well as non-peer-reviewed industry sector periodicals and newspaper articles wherever possible. Submit all assignments via email to damien.mather@otago.ac.nz

Referencing Style
For this paper the referencing style is *APA 7th.* Style guides are available on the University Library website: https://www.otago.ac.nz/library/quicklinks/citation/index.html

Late Assignments
The standard late penalty shall be 5% of the maximum mark per day late or part thereof.
For example, assignments received up to 24 hours after the deadline will have 5% deducted from the available grade for the piece of assessment (i.e. a 78% becomes a 73%). Assignments received between 24 - 48 hours after the deadline will have 10% marks deducted from the available grade (i.e 78% becomes 68%). An additional 5% penalty will be applied for every day late. Assignments submitted after seven days of the deadline, or after feedback is returned if this is less than seven days, will not be marked.
All penalty timeframes are inclusive of weekends, public holidays and university semester breaks and closure times.

Learning Outcomes

Learning Outcome	Assessment	Assessment	Assessment	Exam	Total
Understand modern data analytics in the context of typical business problems, data environments, business structures, ethical and sustainable business and customer contexts.	Y	Y	N/A	Y	
Reliably select and specify useful analysis steps in a given data mining / predictive modelling problem approach.	Y	Y	Y	Y	
Apply analytical tools to typical business problems and data	Y	Y	Y	Y	
Apply analytical tools to typical business problems and data Critically evaluate data preparation and techniques to become effective analysts of typically messy, flawed business data.	Y	Y	N/A	Y	
Total	29	29	29	13	100

Academic Integrity

Students should ensure that all submitted work is their own. Plagiarism is a form of academic misconduct (cheating). It is defined as copying or paraphrasing another's work and presenting it as one's own. Any student found responsible for academic misconduct in any piece of work submitted for assessment shall be subject to the University's dishonest practice regulations, which may result in serious penalties, including forfeiture of marks for the piece of work submitted, a zero grade for the paper, or in extreme cases, exclusion from the University. The University of Otago reserves the right to use plagiarism detection tools.

Students are advised to inform themselves about University policies concerning dishonest practice and take up opportunities to improve their academic and information literacy. If necessary, seek advice from academic staff, or the Student Learning Centre. The guideline for students is available at this link: https://www.otago.ac.nz/study/academicintegrity/index.html

Further information about the Academic Integrity Policy, the Student Academic Misconduct Procedures and the Academic Integrity can be found through the links below. The Academic Integrity website in particular has a number of useful inks and suggestions as to where students can get help with referencing issues.

https://www.otago.ac.nz/administration/policies/otago116838.html

https://www.otago.ac.nz/administration/policies/otago116850.html

Concerns about the Paper

We hope you will feel comfortable coming to talk to us if you have a concern about the paper. The Paper Co-ordinator will be happy to discuss any concerns you may have. Alternatively, you can report

your concerns to the Class Representative who will follow up with departmental staff. If, after making approaches via these channels, you do not feel that your concerns have been addressed, there are University channels that may aid resolution. For further advice or more information on these, contact the departmental administrator or head of department.

<u>Disclaimer</u>

While every effort is made to ensure that the information contained in this document is accurate, it is subject to change. Changes will be notified in class and via Blackboard. Students are encouraged to check Blackboard regularly. It is the student's responsibility to be informed.