

Analytical Skills for Business (WS 2025/26)

Business Administration (M. A.)

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This document holds the course material for the Analytical Skills for Business course in the Master of Business Administration program. It discusses version control systems such as Git and GitHub for efficient team collaboration, offers an overview of no-code and low-code tools for data analytics including Tableau, Power BI, QlikView, makeML, PyCaret, RapidMiner, and KNIME, and introduces key programming languages such as R, Python, and SQL alongside essential programming concepts like syntax, libraries, variables, functions, objects, conditions, and loops. In addition, it covers working with modern development environments, including Unix-like systems, containers, APIs, Jupyter, and RStudio, and sets expectations for project submissions and evaluation.

Table of contents

1	Introduction	3
1.1	Implementing version control systems like git and GitHub for efficient team collaboration.	3
1.2	Overview on no-code and low-code tools for data analytics: Tableau, Power BI, QlikView, makeML, PyCaret, Rapidminer, KNIME,	3
1.3	Overview on Programming languages: R, Python, SQL	3
1.4	Elements of programming languages: Syntax, libraries, variables, functions, objects, conditions, loops	3
1.5	Development environments: Unix-like systems, containers, APIs, Jupyter, RStudio	3
2	Descriptive statistics	3
2.1	Measures of centrality, dispersion, and concentration.	3
2.2	Descriptive analytics for univariate, bivariate, and multivariate data.	3
2.3	Techniques for constructing, interpreting, and evaluating scores, rankings, metrics, and composite indicators.	3
2.4	Visualizing and exploring categorical, numerical, and time series data.	4
2.5	Techniques for handling messy data.	4
2.6	Techniques for measuring the association of variables, including correlation and regression.	4
2.7	Implement applications in the programming language R for practical data analysis.	4
3	Inferential statistics	4
3.1	Basic concepts of statistical inference.	4
3.2	Quantification of probability through random variables.	4

3.3	Hypothesis testing.	4
3.4	Understanding confidence intervals, p-values, and the power of statistical tests. .	4
3.5	Apply inferential statistics in the programming language R, translating theoretical knowledge into practical applications.	4
4	Predictive analytics	5
4.1	Overview of data mining techniques.	5
4.2	Applications of regression analysis.	5
4.3	Applications of forecasting in predicting future business outcomes.	5
5	Literature	5
5.1	Essential Readings	5
5.2	Further Readings	5

1 Introduction

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1.1 Implementing version control systems like git and GitHub for efficient team collaboration.

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1.3 Overview on Programming languages: R, Python, SQL

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1.4 Elements of programming languages: Syntax, libraries, variables, functions, objects, conditions, loops

xy

1.5 Development environments: Unix-like systems, containers, APIs, Jupyter, RStudio

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2 Descriptive statistics

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2.1 Measures of centrality, dispersion, and concentration.

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xy

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xy

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xy

2.7 Implement applications in the programming language R for practical data analysis.

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3 Inferential statistics

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3.1 Basic concepts of statistical inference.

xy

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xy

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xy

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xy

3.5 Apply inferential statistics in the programming language R, translating theoretical knowledge into practical applications.

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4 Predictive analytics

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4.1 Overview of data mining techniques.

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4.2 Applications of regression analysis.

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4.3 Applications of forecasting in predicting future business outcomes.

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5 Literature

All references for this course.

5.1 Essential Readings

Bruce, P. and A. Bruce (2020). *Practical Statistics for Data Scientists, 2nd Edition*. <https://learning.oreilly.com/library/view/practical-statistics-for/9781492072935/preface01.html>.

Çetinkaya-Rundel, M. and J. Hardin (2021). *Introduction to Modern Statistics*. <https://www.openintro.org/book/>
https://github.com/DrBenjaminAnalytical-Skills-for-Business/blob/491a9a84dd0227aab44e0a6db7e6330830a05a6b/literature/Introduction_to_Modern_Statistics_2e.pdf?raw=true.

Stephenson, P. (2023). *Data Science Practice*. <https://datasciencepractice.study/>.

5.2 Further Readings

Békés, G. and G. Kézdi (2021). *Resources for Data Analysis for Business, Economics, and Policy*. Instructor resources: <https://www-cambridge-org.eux.idm.oclc.org/highereducation/books/data-analysis-for-business-economics-and-policy/D67A1B0B56176D6D6A92E27F3F82AA20/>.
https://github.com/DrBenjaminAnalytical-Skills-for-Business/blob/c2ec1b2061c7dc36200977cfd58daf6020c1c774/literature/B%C3%A9k%C3%A9s_Data%20Analysis%20for%20Business%2C%20Economics%2C%20and%20Policy_2021_First%20Day%20of%20Class%20Slides.pdf?raw=true.

Dougherty, J. and I. Ilyankou (2025). *Hands-On Data Visualization*. <https://handsondataviz.org/>.

Evans, J. R. (2020). “Business Analytics”.

Illowsky, B. and S. L. Dean (2018). *Introductory Statistics*. OpenStax, Rice University, p. 905. ISBN: 1938168208. <https://github.com/DrBenjaminAnalytical-Skills-for-Business/blob/c2ec>

1b2061c7dc36200977cfd58daf6020c1c774/literature/Introductory%20Statistics.pdf/?raw=true.}

Irizarry, R. A. (2024). “Advanced Data Science: Statistics and Prediction Algorithms Through Case Studies’”.

<http://rafalab.dfci.harvard.edu/dsbook-part-2>.

Kumar, U. D. (2017). “Business Analytics: The Science of Data-Driven Decision Making’”.

Pochiraju, B. and S. Seshadri, ed. (2019). *Essentials of Business Analytics*. Vol. 264. <https://link.springer.com/10.1007/978-3-319-68837-4>. Cham: Springer International Publishing. ISBN: 978-3-319-68836-7. DOI: 10.1007/978-3-319-68837-4. <https://github.com/DrBenjaminAnalytical-Skills-for-Business/blob/c2ec1b2061c7dc36200977cfd58daf6020c1c774/literature/Essentials%20of%20Business%20Analytics.pdf/?raw=true>.}

Vaughan, D. (2020). “Analytical Skills for AI and Data Science’”.

<https://learning.oreilly.com/library/view/analytical-skills-for/9781492060932/preface01.html#idm46388898852872>.