Study Guide

Business Intelligence 381

Academic Year 2025

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"Research has shown that it takes 31 days of conscious effort to make or break a habit. That means, if one practices something consistently for 31 days, on the 32nd day it does become a habit. Information has been internalized into behavioral change, which is called transformation."

Shiv Khera

Academic Year 2025

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MODULE DESCRIPTION	
Module Name	Business Intelligence 381
Module Code	BIN381
Qualification	Bachelor of Computing (Business Intelligence stream)
Module NQF Level	8
Duration (weeks)	7
Pre-requisites	DWH281, STA381

Purpose

The Business Intelligence (BI) course deals with technologies, applications and practices for the collection, integration, analysis, and presentation of business information in order to support better business decision making. Furthermore, during this module students will learn how to present actionable data to help corporates and companied also end users make informed business decisions.

Outcomes

Upon successful completion this module, the student will be able to:
- Demonstrate engaging knowledge on the use of classification models and data mining techniques as found in the field of Business Intelligence, demonstrate an appreciation of the theories, research methodologies, methods and techniques in the expanding field that is Business Intelligence and how one would apply such knowledge.
- Ability to interrogate multiple sources of knowledge systematically and analytically understanding the future of Business Intelligence and to evaluate knowledge and processes of knowledge production within this expanding field study.
- A learner is able to demonstrate an understanding of the complexities and uncertainties of selecting, applying or transferring data mining techniques along with machine learning algorithms to unfamiliar problems in Business Intelligence.
- Demonstrate the ability to use a range of models, algorithms and statistical techniques, analyse and address abstract problems within the Business Intelligence domain drawing systematically on the body of knowledge appropriate to the field.
- Producing and communicating information regarding the systematic gathering of data mining results and being able to present and communicate ideas and results effectively to a range of audiences, offering creative insights, rigorous interpretations and solutions to problems.
- Demonstrate the ability to identify and address ethical issues faced when working with information and or personal data of people critically reflecting on the suitability of different ethical value systems when working with information.

STUDENT SUPPORT

Please contact your lecturer for subject-related support. The lecturers presenting this subject are:
- Mr G. Mudare - Mudare.G@belgiumcampus.ac.za

If the lecturers were unable to assist, you can also contact the cluster head for this subject:
- Mr D. Sundire – sundire.d@belgiumcampus.ac.za

Further student support services are available via the counsellors:
- Alisha Narine - narine.a@belgiumcampus.ac.za
- Lethlabile L. Selamolela – selamolela.l@belgiumcampus.ac.za

ASSESSMENT PLAN

ASSIGNMENTS/PROJECTS

Project Milestone 1 Weight:	5%	Due Date:	2025-09-09
Project Milestone 2 Weight:	5%	Due Date:	2025-09-19
Project Milestone 3 Weight:	5%	Due Date:	2025-10-03
Project Milestone 4 Weight:	5%	Due Date:	2025-10-10
Project Milestone 5 Weight:	5%	Due Date:	2025-10-17
Project Milestone 6 Weight:	15%	Due Date:	2025-10-22

TESTS

Class Test 1 Weight:	5%	Class Test 1 Date:	2025-09-05
Class Test 2 Weight:	5%	Class Test 2 Date:	2025-09-12
Class Test 3 Weight:	5%	Class Test 3 Date:	2025-09-19
Class Test 4 Weight:	5%	Class Test 4 Date:	2025-10-03
Class Test 5 Weight:	5%	Class Test 5 Date:	2025-10-10
Class Test 6 Weight:	5%	Class Test 6 Date:	2025-10-17
Summative Test Weight:	30%	Summative Test Date:	2025-10-24

STUDENT RESOURCES
Which resources will be used during this module?

PRESCRIBED MATERIAL

Textbook 1

Han, J., Kamber, M. and Pei, J., 2011. Data Mining Concepts and Techniques 3rd edition. *The Morgan Kaufmann Series in Data Management Systems*.

Location (Library / URL / PDF)	https://learning.oreilly.com/library/view/data-mining-concepts/9780123814791/

Textbook 2

Gendron, J., 2016. *Introduction to R for Business Intelligence*. Packt Publishing Ltd.

Location (Library / URL / PDF)	https://learning.oreilly.com/library/view/introduction-to-r/9781785280252/

RECOMMENDED READING

Cirillo A., 2017. *R Data Mining: Mine Valuable Insights from Your Data Using Popular Tools and Techniques in R*. Birmingham, UK: Packt Publishing.

Location (Library / URL / PDF)	https://search.ebscohost.com/login.aspx?direct=true&db=nlebk&AN=1643003&site=ehost-live&authtype=sso&custid=ns266672

Machiraju S and Gaurav S., 2018. *Power BI Data Analysis and Visualization*. Boston: De|G Press.

Location (Library / URL / PDF)	https://search.ebscohost.com/login.aspx?direct=true&db=nlebk&AN=1893725&site=ehost-live&authtype=sso&custid=ns266672

Business Intelligence & Data Mining (O'Reilly Playlist for Books and Online Courses)

Location (Library / URL / PDF)	https://learning.oreilly.com/playlists/ceb4d4a0-2e1c-46dc-96ef-b5ea11c401ae

STUDENT MATERIAL	
Item	**Location**
Content on Moodle	The relevant Moodle course
PowerPoint slides	Distributed to students via Moodle
Exercises / Activities	Dispersed throughout the course on Moodle. Some quizzes to be hosted on Moodle.

TECHNOLOGY (HARDWARE OR SOFTWARE) REQUIRED	
Software/Hardware	**Responsible lecturer, availability on campus, recommended versions**
R-4.5.1 for Windows or later version	Installed on Belgium Campus Azure Virtual Desktop (AVD)
RStudio Desktop	Installed on Belgium Campus Azure Virtual Desktop (AVD)
Positron IDE	
Power BI Desktop	Installed on Belgium Campus Azure Virtual Desktop (AVD)

LESSON PLAN OUTLINE	
Date	**Specific outcomes (SO) to be covered / Class Activity / Assessment**
Day 1	SO1: Data Mining Concepts
Day 2	SO1: Overview of Business Intelligence Technology SO1: Data Mining Process Models
Day 3	SO2: Getting to Know Your Data
Day 4	SO2: Data Preprocessing
Day 5	**Class Test 1**
Day 6	SO2: Data Mining Functionalities: Mining Frequent Patterns, Associations, and Correlations
Day 7	SO2: Data Mining Functionalities: Classification
Day 8	SO2: Data Mining Functionalities: Cluster Analysis
Day 9	SO2: Data Mining Functionalities: Outlier Analysis
Day 10	**Class Test 2**
Day 11	SO3: R Programming Basics
Day 12	SO3: R Data Structures
Day 13	SO3: R Data Preprocessing
Day 14	SO3: Visualizing Data in R
Day 15	**Class Test 3**
Day 16	SO3: Data Mining Algorithms in R: Association Rule Mining
Day 17	SO3: Data Mining Algorithms in R: Association Rule Mining

Day 18	SO3: Data Mining Algorithms in R: Classification
Day 19	SO3: Data Mining Algorithms in R: Classification
Day 20	**Class Test 4**
Day 21	SO3: Data Mining Algorithms in R: Clustering
Day 22	SO3: Data Mining Algorithms in R: Clustering
Day 23	SO3: Web Dashboards with R Packages
Day 24	SO4: Advanced Analytics Technology and Tools – Power BI
Day 25	**Class Test 5**
Day 26	SO4: Advanced Analytics Technology and Tools – Power BI
Day 27	SO4: Advanced Analytics Technology and Tools – Power BI
Day 28	SO4: Advanced Analytics Technology and Tools – Power BI
Day 29	SO4: Advanced Analytics Technology and Tools – Power BI
Day 30	**Class Test 6**
Day 31	SO4: Advanced Analytics Technology and Tools – Power BI
Day 32	SO4: Advanced Analytics Technology and Tools – Power BI
Day 33	SO4: Big Data Analytics – MapReduce and Hadoop
Day 34	SO5: Ethics in Data Science
Day 35	**Summative Test**

OUTCOME BREAKDOWN

Specific Outcome 1: Introduction to Business Intelligence

- Data Mining Concepts
- Data mining as a knowledge discovery process.
- Technologies used in data mining
- Applications of Data Mining
- Major Issues in Data Mining
- Overview of Business Intelligence Technology
- Discuss the meaning of Business Intelligence
- State the purpose of Business Intelligence Systems
- Construct structure of Intelligence Systems
- Discuss Areas where BI Technology is applied
- Identify Typical business intelligence architecture

- Understand the layers of the Framework for Business Intelligence Architecture
- Business Intelligence Project life cycle
- Data Mining Process Models
- Data Preprocessing: An Overview
- Data Quality
- Major Tasks in Data Preprocessing

- Data Transformation and Data Discretization

Specific Outcome 2: Data Mining Functionalities

- Mining Frequent Patterns, Associations, and Correlations
- Frequent Itemset Mining Methods
- Pattern Evaluation Methods
- Classification
- Supervised vs. Unsupervised Learning
- Classification and Prediction
- Decision Tree Induction
- Classification in Large Databases
- Cluster Analysis
- Clustering for Data Understanding and Applications
- Considerations for Cluster Analysis
- Major Clustering Approaches
- Outlier Detection and Analysis
- Types of Outliers
- Outlier Detection Methods
- Data Mining Trends and Research Frontiers

Specific Outcome 3: Data Analysis and Visualization

- Data Objects and Attribute Types
- Basic Statistical Descriptions of Data
- Measuring Data Similarity and Dissimilarity
- Data Import and Export
- Extracting Data from Vectors and Data frames
- Working with data frames
- R graphics system
- Data Visualization
- Visualizing the Data Story
- Web Dashboards with R Packages
- Implementing Data Mining Algorithms in R

Specific Outcome 4: Advanced Analytics Technology and Tools

- Power BI Introduction
- Connecting to Data Sources
- Cleaning and Transforming Data
- Data Analysis Expressions (DAX)
- Create Power BI Visuals using R
- Analytics for Unstructured Data
- The Hadoop Ecosystem
- NoSQL

Specific Outcome 5: Ethics in Data Science

- Ethical Theories
- Ethical Issues of an Information Age

- Principles of Data Ethics for Data Practitioners
- Code of Ethics for Data Practitioners
- Ethical AI and Machine Learning
- Legal Frameworks