FACULTY OF APPLIED SCIENCES
BACHELOR OF SCIENCE IN COMPUTING
LEARNING MODULE OUTLINE

Academic Year	2025/2026	Semester	1
Module Code	COMP3116		
Learning Module	Data Driven Business Management		
Pre-requisite(s)	Nil		
Medium of Instruction	English		
Credits	3	Contact Hours	45 hrs
Instructor	SI TOU CHI FAI	Email	T1847@mpu.edu.mo
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MODULE DESCRIPTION

This module is an interdisciplinary module on converting data to value through data-driven decision-making, as well as establishing strong foundation for such decision making within organizations. Covering topics like strategy, culture, analysis, and ethics, it uses diverse, and up-to-date case studies to convey action insights that can be translated into future initiatives. Simultaneously, the content bridges the gap between data specialists and business professionals. The learning module is designed for sophomore students majoring in computer sciences and/or business management, the module also provides fundamental business management principles and demonstrates how data-driven decision-making can be adapted to other business operations.

MODULE INTENDED LEARNING OUTCOMES (ILOS)

On completion of this learning module, students will be able to:

M1.	Learn the basics of data-driven decision-making which includes identifying bottlenecks and assessing process capacity; (C1, C2)
M2.	Troubleshoot various data management and discuss factors affecting sourcing decisions in operations; (C4, C5)
M3.	Recommend practical solutions for business operational challenges using data science approaches; (C7, C18)
M4.	Explain the role of data culture, data infrastructure and data ethics in supporting strategic initiatives; (C1, C2, C5)
M5.	Evaluate the importance of applying Generative Artificial Intelligence (AI) and Natural Language Generation (NLG) in professional contexts; (C16, C18)

These ILOs aims to enable students to attain the following Programme Intended Learning Outcomes (PILOs):

PILOs		M1	M2	M3	M4	M5
P1.	Select and apply proven methods, tools and techniques to the effective and efficient implementation of information systems on common platforms, including the Internet platform;	✓	✓	✓	✓	✓
P2.	Acquire essential knowledge in specific fields of computing disciplines including networking, artificial intelligence and security;	✓	✓	✓	✓	✓
P3.	Apply necessary mathematical techniques to model, analyse and devise solutions to complex problems;	✓		✓	✓	
P4.	Work independently to develop an understanding of, and the knowledge and skills associated with the general support and mitigation of security risks of computer systems and networks;	✓	✓	✓		
P5.	Design and implement relational database, with an emphasis on how to organise, maintain, retrieve and analyse information;	✓		✓	✓	
P6.	Distinguish the fundamental and operational issues of computer systems, with considerations of user, business, ethical, societal and environmental needs;	✓	✓	✓	✓	✓
P7.	Evaluate, prepare and communicate effectively on technical information to both technical and non-technical audience;	✓		✓	✓	✓
P8.	Work as an effective member of a team in the analysis, design and development of software systems, with recognition of requirement to support equality, diversity and inclusion;	✓	✓	✓	✓	
P9.	Use project planning, risk management and quality management techniques in solutions to complex problems;		✓	✓		✓
P10.	Build the capacity and desire for lifelong learning and to learn advanced and emerging technologies on one's own;	✓	✓	✓	✓	
P11.	(For Business Intelligence specialization) Gain an in-depth knowledge of technologies related to data analysis and management of information to support business processes in enterprises;	✓	✓	✓	✓	✓
P12.	(For Gaming Technology specialization) Acquire the general and advanced knowledge of current technologies and operating environment for the development of the gaming and tourism industry;					
P13.	(For Computer Education specialization) Acquire general and practical knowledge of computer education and its practicing environment in secondary education;					

MODULE SCHEDULE, COVERAGE AND STUDY LOAD

Week	Content Coverage	Contact Hours
1	1. Introduction	3
	1.1 The history of data-driven decision-making	
	1.2 Cognitive bias and decision-making styles	

	1.3 Process for data-driven decision	
2-3	2. Data strategy	6
	2.1 Classic and modern strategy frameworks	
	2.2 Data vision, mission strategy, and values	
	2.3 Implementation, where to start	
	2.4 Data needs and potential sources	
	2.5 Data governance	
	2.6 Organizing for analytics	
	2.7 The data governance program	
	2.8 Data strategy evaluation	
4-5	3. Data Products	4
	3.1 Value creation for data product definition	
	3.2 Design thinking for creating data products	
	3.3 Data product canvas	
	3.4 The INNOQ data product design board	
	3.5 Data value chain model	
	3.6 Data product portfolio management	
6-7	4. Data culture	6
	4.1 Benefits and challenges of data culture	
	4.2 Elements and characteristics of data culture	
	4.3 McKinsey's data culture model	
	4.4 Implementing holistic data culture	
	4.5 Levels and contexts of data driven	
	4.6 Diagnosing data culture gaps	
	4.7 Strategies and interventions for data culture	
	4.8 Promoting data literacy for decision-making	
	4.9 Measuring data culture value	
8	5. Data Sources	3
	5.1 Data sources	

	5.2 Data management	
	5.3 Data contracts	
	5.4 Emerging trends	
9	6. Data Visualization and Presentation	4
	6.1 Preparing for data presentation	
	6.2 Data visualization models	
	6.3 Storytelling	
10-11	7. Data analysis	5
	7.1 Descriptive and analytics	
	7.2 Ticket function	
	7.3 CRISP-DM	
	7.4 Predictive analytics	
	7.5 Project management of big data and ML projects	
12	8. Data infrastructure	4
	8.1 Where is the data	
	8.2 Data system architecture	
	8.3 Creating system requirements	
13-14	9. Data ethics	6
	9.1 Ethical risk in data usage for decision-making	
	9.2 Legal risks in data usage for decision-making	
	9.3 Social risk in data usage for decision-making	
	9.4 Policies, standards, and technologies to mitigate risks	
	9.5 Data ethics strategy and policy	
	9.6 Data ethics skills and competencies: data literacy	
	9.7 Data ethics challenges and opportunities	
15	10 Perspectives on Decision-making Using Generative AI	4
	10.1 Generative Artificial Intelligence (AI) and Natural Language Generation (NLG)	
	10.2 Case: Fictive, marketing automation, Austria	
	10.3 Conclusion	

TEACHING AND LEARNING ACTIVITIES

In this learning module, students will work towards attaining the ILOs through the following teaching and learning activities:

Teaching and Learning Activities	M1	M2	M3	M4	M5
T1. Lectures	✓	✓	✓	✓	✓
T2. In-class exercises	✓	✓	✓	✓	

ATTENDANCE

Attendance requirements are governed by the Academic Regulations Governing Bachelor's Degree Programmes of the Macao Polytechnic University. Students who do not meet the attendance requirements for the learning module shall be awarded an 'F' grade.

ASSESSMENT

In this learning module, students are required to complete the following assessment activities:

Assessment Activities	Weighting (%)	AHEP4 LOs	ILOs to be Assessed
A1. Assignment / Classwork	25%	C2, C16, C18	M1, M3, M5
A2. Tests	25%	C4, C5, C7	M2, M3, M4
A3. Examination	50%	C1, C4, C5, C7	M1, M2, M3, M4

The assessment will be conducted following the University's Assessment Strategy (see www.mpu.edu.mo/teaching_learning/en/assessment_strategy.php). Passing this learning module indicates that students will have attained the ILOs of this learning module and thus acquired its credits.

Students with an overall score of less than 35 in the coursework must take the re-sit examination even if the overall score for the module is 50 or above.

Students with a score of less than 35 in the final examination must take the re-sit examination even if the overall score for the module is 50 or above.

Students with an overall final grade of less than 35 are NOT allowed to take the re-sit examination.

REQUIRED READINGS

1. Claus Grand Bang (2025), Data-Driven Decision – Making for Business, 1st Ed. Routledge, 978-1-032-60153-3

REFERENCES

1. Frederick S. Hillier, Gerald J. Lieberman (2014), Introduction to Operations Research, 10th Ed. McGraw-Hill, 978-0073523453

2.   William J Stevenson (2017), Operations Management 13th Ed., McGraw-Hill, 978-1259667473.

3.   Sheldon Ross (2012), A First Course in Probability 9th Ed., Pearson, 978-0321794772.

4.   Steven S. Skiena (2017), The Data Science Design Manual, Springer, Stony Brook, NY.

STUDENT FEEDBACK

At the end of every semester, students are invited to provide feedback on the learning module and the teaching arrangement through questionnaires. Your feedback is valuable for instructors to enhance the module and its delivery for future students. The instructor and programme coordinators will consider all feedback and respond with actions formally in the annual programme review.

ACADEMIC INTEGRITY

The Macao Polytechnic University requires students to have full commitment to academic integrity when engaging in research and academic activities. Violations of academic integrity, which include but are not limited to plagiarism, collusion, fabrication or falsification, repeated use of assignments and cheating in examinations, are considered as serious academic offenses and may lead to disciplinary actions. Students should read the relevant regulations and guidelines in the Student Handbook which is distributed upon the admission into the University, a copy of which can also be found at www.mpu.edu.mo/student_handbook/.