

Syllabus Business Intelligence

A. General Information

1. Academic Unit	Facultad de Ingeniería					
2. Program	Ingeniería Civil Industrial					
3. Code	IIB415A					
4. Location in the curriculum	First Quarterly, Fourth Year					
5. Credits	UDD	8	SCT	5		
6. Type of course	Mandatory	X	Elective		Optional	
7. Duration	Bimonthly		Quarterly	X	Annual	
8. Modules per week	Theoretical	2	Practical	1	T.A.	
9. Class hours	Classes	72	Teaching Assistance			
10. Prerequisites	Análisis de Datos Inglés Nivel B1					

B. Contribution to the Graduate's Profile

The **Business Intelligence** course belongs to the Bachelor's Cycle. It trains students in the use and mastery of statistical and analytical tools applied to solving real business problems and supporting decision-making.

It consists of four units: Fundamentals of Business Intelligence, Data Preparation and Predictive Models, Advanced Analytics and Machine Learning Models, and Ethical Communication for Decision Making.

This course belongs to the **Information Technologies training** area and contributes to the UDD generic competencies: **Global Vision** and **Digital Transformation**, as well as specific competencies: **Problem Solving under a Systemic Approach**, **Mastery of Digital Technologies and Computational Thinking**, and **Analytical Thinking and Inquiry**, as declared in the program's graduate profile.

C. Competencies and Learning Outcomes from the Course

Generic Competencies	General Learning Outcomes
Global Vision	Analyzes complex business problems and formulates solutions by integrating information from different areas of the organization.
Digital Transformation	
Specific Competencies	
Problem Solving under a Systemic Approach	Uses digital technologies and computational techniques to process, model, and represent data in different organizational contexts.
Mastery of Digital Technologies and Computational Thinking	
Analytical Thinking and Inquiry	
	Interprets patterns, trends, and relationships in data to support informed decision-making.

D. Units, Content and Learning Outcomes

Units and Content	Competency	Learning Outcomes
UNIT I: Fundamentals of Business Intelligence. - What is Business Intelligence (BI)? - The Data Cycle - Key Stages of Data Flow - The "Five Cs" of Data	<i>Analytical Thinking and Inquiry</i> <i>Problem Solving under a systemic approach</i> <i>Global Vision</i>	Recognizes the key concepts of the data cycle and their relevance in business management. Explains the stages of data flow and their integration into different organizational processes.
Unit II: Data Preparation and Predictive Models. - Data Exploration and Profiling - Data Cleaning - Introduction to Machine Learning (ML) in BI - Regression Models - A/B Testing - One-hot encoding - Confusion Matrix - Performance Metrics - Cross Validation - Feature Engineering	<i>Mastery of Digital Technologies and Computational Thinking</i> <i>Digital Transformation</i> <i>Analytical Thinking and Inquiry</i>	Applies data exploration, cleaning, and transformation techniques to ensure quality and relevance. Builds and validates simple predictive models using digital analytics tools.
Unit III: Advanced Analytics and Machine Learning Models. - Supervised Learning: - Decision Trees and Ensemble Methods: algorithms such as Decision Trees, Random Forest - Unsupervised Learning:	<i>Mastery of Digital Technologies and Computational Thinking</i> <i>Digital Transformation</i>	Implements basic supervised and unsupervised algorithms to identify patterns and classify information in business environments. Evaluates the performance of machine learning models and

Cluster Analysis: use of data mining to find patterns and group records	<i>Analytical Thinking and Inquiry</i> <i>Problem Solving under a systemic approach</i>	their applicability to different organizational problems
Unit IV: Ethical Communication for Decision Making. • Communication with Stakeholders • Ethical Data Management: Bias and Privacy • Case Studies	<i>Global Vision</i> <i>Digital Transformation</i> <i>Analytical Thinking and Inquiry</i>	Designs effective visualizations that clearly and precisely communicate relevant findings for decision-making. Analyzes ethics in data management and the importance of communicating results in a transparent and responsible manner.

E. Teaching Methods

During the course, the theoretical content of the subject will be delivered in face-to-face classes. These sessions will be mainly based on expository lectures, where fundamental concepts will be presented and explained, illustrated with examples, exploring their implications, and demonstrating their applications. Subsequently, this knowledge will be complemented with practical activities and workshops in the computer laboratory.

F. Evaluation

For the different evaluation instances, there will be a correction rubric with clear criteria known to students. The professor will be consistent with the requirements set by the rubric. The evaluations are as follows:

- **Quizzes:** These are individual evaluations and can take various forms: assignments, written tests, oral exams, or other formats.
- **Exams:** 2 exams will be held during the weeks established by the faculty.
- **Workshops:** These are face-to-face activities, generally group-based, conducted in computer laboratories.
- **Final Exam:** at the end of the semester, on the date established by the faculty, requiring a minimum grade of 3.0 for all students, according to the R.A.A.R.

G. Learning Resources

Required Bibliography:

- [BIG] Sherman, R. (2014). Business Intelligence Guidebook: From Data Integration to Analytics.
- [ISL] James, G., Witten, D., Hastie, T., & Tibshirani, R. (2021). An Introduction to Statistical Learning: with Applications in R.



Supplementary Bibliography:

- [BIADS] Sharda, R., Delen, D., & Turban, E. (2017). Business Intelligence, Analytics, and Data Science: A Managerial Perspective (4th ed.). Pearson Education, Inc.
- [BITSMSG] Loshin, D. (2012). Business Intelligence: The Savvy Manager's Guide. Elsevier Science & Technology.