

# Teaching guide

## IDENTIFICATION DETAILS

Degree:	Business Analytics
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Field of Knowledge:	Social and Legal Science
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Faculty/School:	Legal and Business Science
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Course:	DECISION SUPPORT SYSTEMS
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Type:	Compulsory
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ECTS credits:	3
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Year:	3
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Code:	5330
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Teaching period:	Fifth semester
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Area:	Business Intelligence
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Module:	Disciplinary Training
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Teaching type:	Classroom-based
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Language:	English
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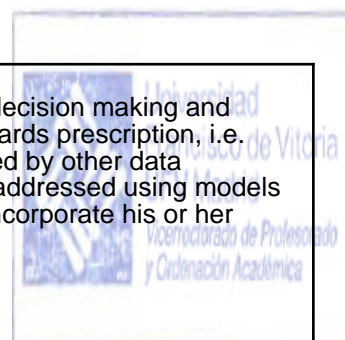
Total number of student study hours:	75
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Teaching staff	E-mail
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## SUBJECT DESCRIPTION

Decision Support Systems are computer-based systems designed to support managerial decision making and strategic planning in semistructured and unstructured environments. The orientation is towards prescription, i.e. the recommendation of a course of action, based upon intelligence or predictions developed by other data analytics fields. DSS works on targeted, partially structured management problems, to be addressed using models and allowing user interaction through an interface through which the decision-maker can incorporate his or her own managerial insights.

The area also considers group decision making, collaborative systems and AI support.



## GOAL

The student will learn to develop these support systems to address targeted, partially structured management problems using a combination of models (from simple heuristics to complex neural networks) and user interfaces through which the decision-maker can incorporate his or her own managerial insights.

The specific aims of the subject are:

The student will learn to apply a particular DSS framework based on intelligence, design, modeling, and deployment phases.

The student will learn to understand, define, and use models, particularly in the context of machine learning, to support decision making and strategic planning.

The student will learn to apply models on specific cases (city logistics, healthcare, industry 4.0, law enforcement) through case studies

The student will also reflect and learn to be more aware of DSS implementation issues like ethics, privacy and change management (within organizations and from the perspective of the broader society).

## PRIOR KNOWLEDGE

Data sources and management, Algebra, Calculus, Critical Thinking (Pensamiento Crítico).

## COURSE SYLLABUS

The course will cover a framework to analyze and deploy DSS systems, the models that support these systems and the application to specific problems through case studies.

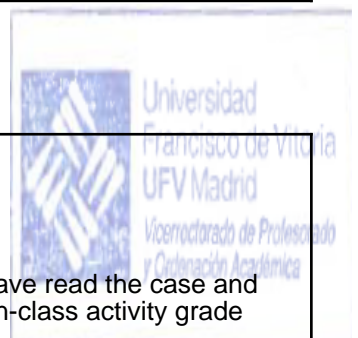
1. Framework
  - a. Intelligence
  - b. Design
  - c. Modeling
  - d. Deployment
2. Models:
  - a. Formulas and heuristics
  - b. Decision trees
  - c. Simulations
  - d. Optimizations
  - e. Machine learning
3. Cases:
  - a. Air transportation
  - b. City logistics
  - c. Healthcare
  - d. Industry 4.0
  - e. Hospitality
  - e. Shipping

## EDUCATION ACTIVITIES

The teacher will blend theory and practice.

In class activities:

- Master classes
- Cases: we will follow here Flipped Classroom methodology. The student is expected to have read the case and be prepared for active participation in class. Being not prepared for a case will impact the in-class activity grade



severely

- Problem based learning (ABL, ABP): an introductory class be structured around a particular video/game presented in class.
- Assignments and Quizzes: There will be several graded quizzes throughout the term. The quizzes will be structured as multiple-choice or essay questions and short so that they can be completed in class. Questions will refer to key concepts or cases discussed in earlier classes, or to be discussed in the following class. The idea of the quizzes to provide early feedback both to the student and the professor.

Out of class activities:

- Individual work will be required to prepare the class by reading the corresponding sections of the textbook and cases.
- Reading of articles and cases

The nature and scope of the activities, as well as their time distribution may be modified and adapted based on the scenarios and instructions prescribed by the health care authorities.

## DISTRIBUTION OF WORK TIME

CLASSROOM-BASED ACTIVITY	INDEPENDENT STUDY/OUT-OF-CLASSROOM ACTIVITY
30 hours	45 hours

## SKILLS

### Basic Skills

Students must have demonstrated knowledge and understanding in an area of study that is founded on general secondary education. Moreover, the area of study is typically at a level that includes certain aspects implying knowledge at the forefront of its field of study, albeit supported by advanced textbooks

Students must be able to apply their knowledge to their work or vocation in a professional manner and possess skills that can typically be demonstrated by coming up with and sustaining arguments and solving problems within their field of study

Students must have the ability to gather and interpret relevant data (usually within their field of study) in order to make judgments that include reflections on pertinent social, scientific or ethical issues

Students must be able to convey information, ideas, problems and solutions to both an expert and non-expert audience

Students must have developed the learning skills needed to undertake further study with a high degree of independence

### General Skills

Capacity for achieving objectives, problem-solving and decision-making in the environment of quantitative and qualitative mass data.

Capacity for critical, self-critical, analytical and reflexive thought.

### Specific skills

Know and understand the basic principles of business analytics and its essential concepts and tools, geared towards identifying and assessing opportunities in all the functional areas of the business: general and strategic management, human resources, finance, marketing, production and operations.



Know how to identify and resolve real business problems through advanced data analysis and the selection of the correct techniques for decision-making.

Know how to manage quantitative and computer tools for decision-making.

## LEARNING RESULTS

Understand representations of complex business environments

Capacity to understand, develop and use models to support managerial decision making and strategic planning.

Understand and be aware of the DSS implementation issues like ethics, privacy and change management (within organizations and from the perspective of the broader society).

Understand how a decision-maker can incorporate his or her own managerial insights to the result of models to identify and evaluate business opportunities.

## LEARNING APPRAISAL SYSTEM

Evaluation items:

- Assignments (case work) and class quizzes (40%)
- Written exam covering theory and practice (50% of final grade)
- Participation (10%)

For students unable to attend classes (Erasmus, etc) or students repeating this course, grading will be done as follows:

- Assignments (case work) and class quizzes (50%)
- Written exam covering theory and practice (50% of final grade)

Please contact the professor if you are in this group.

Criteria to pass:

- Obtain at least a 5 in the written exam
- Obtain an average of at least of 5 in the class assignments.
- Assignments will have a due date. Students can submit late after this due date and up to two weeks before the last class of the term, but the grade of the late assignments will be reduced by 30% as a penalty. No submissions will be allowed after.
- Presenting all assignments and class quizzes is not a requirement, but the grade of a missed assignment will be zero and will be averaged with the rest of the submissions.

The appraisal system will in any case be subordinated to the appraisal norms established by the University.

Plagiarism and other forms of academic dishonesty are unacceptable and will make the students liable according to paragraphs 7 and 9 of the UFV Coexistence Regulations (Normativa de Convivencia).

In case new health care regulation results in changes that requires part of the in-class activity to be arranged remotely, the Professor will arrange synchronous classes during the same time and days. Assistance and active participation to these classes is compulsory and will be evaluated as described above, with the same weights.

Exams will be on-site, if health care regulations allow it, but may be modified if need be to comply with the requirements of health care authorities. Class quizzes and the written exam may be arranged using online tools available in Virtual Classroom. Weights don't change.

## BIBLIOGRAPHY AND OTHER RESOURCES

### Basic



Ramesh Sharda, Dursun Delen and Efraim Turban (2020), *Analytics, Data Science, & Artificial Intelligence: Systems for Decision Support*. Pearson Education Limited; 11 ed (March 6, 2020) ISBN-10: 1292341556, ISBN-13: 978-129234155

## Additional

Sauter, V. L. (2011). *Decision Support Systems for Business Intelligence: 2nd Edition*. John Wiley & Sons, Inc. ISBN 978-0-470-43374-4. <https://doi.org/10.1002/9780470634431>

Turban, E., E. Aronson, J., & Liang, T.-P. (2007). *Decision Support Systems and Business Intelligence*. 7th edition . Prentice-Hal, Inc. <https://doi.org/10.1017/CBO9781107415324.004>

Artículo: Castrellon, Juan & Chaparro, José & Barrera, Néstor & Torres-Acosta, Jairo & Jaimes, Wilson. (2018). *Information Technology in City Logistics: A Decision Support System for Off-Hour Delivery Programs*. 10.1007/978-3-319-74002-7\_11.

Artículo: Zolbanin, H. M., Delen, D., Crosby, D., & Wright, D. (2019). *A Predictive Analytics-Based Decision Support System for Drug Courts*. *Information Systems Frontiers*. <https://doi.org/10.1007/s10796-019-09934-w>

Artículo: Caricato, Pierpaolo & Gianfreda, Doriana. (2016). *Birth and Evolution of a Decision Support System in the Textile Manufacturing Field*. 10.1007/978-3-319-43916-7\_5.

Artículo: Grieco, A., Caricato, P., Gianfreda, D., Pesce, M., Rigon, V., Tregnaghi, L., & Voglino, A. (2017). *An Industry 4.0 Case Study in Fashion Manufacturing*. *Procedia Manufacturing*, 11, 871–877. <https://doi.org/https://doi.org/10.1016/j.promfg.2017.07.190>

Artículo: Sharaf, T., & Tsokos, C. P. (2015). *Two Artificial Neural Networks for Modeling Discrete Survival Time of Censored Data*. *Advances in Artificial Intelligence*, 2015. <https://doi.org/10.1155/2015/270165>

