UAB
Universitat Autònoma de Barcelona

Analysis and Design of Information Systems

Code: 101766
ECTS Credits: 6

2025/2026

Degree	Type	Year
Aeronautical Management	OB	3

Contact

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Teachers

Ramón Musach Pi

Teaching groups languages

You can view this information at the end of this document.

Prerequisites

There are no prerequisites. However, it is recommended that students had previously taken "Fundamentals of Computing" and "Advanced Computing" courses.

Objectives and Contextualisation

This course gives the guidelines to know what is an information system, how the organizations obtain continuous improvements with information systems to achieve a high level of competitiveness.

- Understand basic concepts of Information Systems.
- Understand Information Systems and their role in today's organization
- Know the Porter's value chain model.
- Understand Integrated Information Systems.
- Develop the capacity to analyze, evaluate and select Integrated Information Systems.
- Understand the implementation life cycle of information system.
- Know new trends in information systems.

Competences

- Apply specific software for solving problems in the aeronautical sector.
- Communication.
- Develop software of low or medium complexity.

- Personal work habits.
- Thinking skills.
- Use knowledge of the fundamental principles of mathematics, economics, information technologies and psychology of organisations and work to understand, develop and evaluate the management processes of the different systems in the aeronautical sector.
- Use new technologies in airline management.
- Work in teams.

Learning Outcomes

1. Accept and respect the role of the various team members and the different levels of dependence within the team.
2. Analyse and design a basic information system for a particular problem in the sector.
3. Analyse the strategic use of information systems.
4. Appreciate the multidimensional nature of relationships between a company's technology, processes and functional areas.
5. Appreciate the strategic role of technology and innovation in organisations.
6. Assessing the effect of the design and architecture of an information system on the organisational structure of a big company or organisation.
7. Communicate knowledge and findings efficiently, both orally and in writing, both in professional situations and with a non-expert audience.
8. Configure the architecture of an information system providing integrated support to an organisation.
9. Create applications to exploit the information stored in databases.
10. Detail the principal elements of the process of analysis and design of an organisation's information system.
11. Develop independent learning strategies.
12. Develop systemic thinking.
13. Develop the ability to analyse, synthesise and plan ahead.
14. Enumerate the characteristics of the principal ways of using information systems in business management.
15. Explain the use, analysis and design of information systems.
16. Identify the several types of information needs of an organisation.
17. Make a simulation of the use of information systems in companies in the aeronautical sector.
18. Make efficient use of ICT in communicating ideas and results.
19. Manage time and available resources. Work in an organised manner.
20. Study and analyse the software and hardware resources necessary for the use of information systems in the company.
21. Understand the basic methods of representing information, learning and researching in order to solve problems.
22. Understand the dynamic nature of technology.
23. Work cooperatively.
24. Work independently.

Content

Topic 1.- Introduction to information systems

Basic concepts of information systems. Types of information systems in an organization. Evolution of information systems in an organization.

Topic 2.- Transactional Processing Systems

Characteristics of the Transactional Processing System. Porter's chain value. Types of information systems: Internal Resource Management (ERP), Customer Relations Management (CRM), Supply Chain Management (SCM). Proprietary and open source solutions (Open Source). Management of implementation projects.

Topic 3. - Decision Support Systems

Characteristics of the Decision Support Systems. Concept of Business Intelligence. Components of the Business System. Data warehouse. Data Mart. ETL tools. Data Mining. Dashboards. Reporting.

Topic 4.- Strategic management of information systems

Department of information systems in an organization. Professional role. Tools support managment of ICT.

Topic 5.- Analysis and Design of information systems

Concept of software engineering. Methodologies for the development of information systems. Difference analysis and design of information systems.
Tools for analysis of information systems. Information systems design tools. Examples and practical cases.

Activities and Methodology

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Classes de seminaris	4	0.16	1, 7, 12, 11, 13, 18, 19, 23, 24
Practical classes	8	0.32	2, 1, 21, 7, 8, 9, 12, 13, 10, 14, 20, 18, 17, 23
Problem classes	12	0.48	2, 21, 7, 8, 12, 13, 10, 14, 15, 23
Theory classes	26	1.04	2, 21, 7, 8, 9, 12, 13, 10, 14, 20, 15, 17
Type: Supervised			
Tutoring of final work	18	0.72	1, 7, 18, 23
Type: Autonomous			
Final test preparation	25	1	12, 11, 13, 24
Personal work	25	1	12, 11, 13, 19, 24
Problems and practices preparation	25	1	8, 12, 11, 13, 19, 24

Teaching will be offered on campus or in an on-campus and remote hybrid format depending on the number of students per group and the size of the rooms at 50% capacity.

The subject consists of a theoretical part, practical part, and part of personal work of the student.

The subject consists of 6 ECTS credits. It is taught in a total of 50 classroom-based hours per student that are distributed according to the table below. Classroom hours are indicated per student.

The total dedication of the student is 150 hours total, having a non-attendance of 100 hours.
Supervised Practices and Activities (seminars) will be carried out online and synchronously way (in the interaction space to be communicated). Therefore, there will be no face-to-face in the hours of supervised Practices and Activities. If any of the sessions are changed to synchronous way, it will be communicated within the Virtual Campus.

TE Theory 26 Theoretical classes

		h	
PE	Problems	12 h	Problem solving and discussion by students on issues and cases
PL	Practices	8 h	Resolution of group cases, preparation, presentation and discussion of the practices
AS	Supervised activities	4 h	Presentation and discussion of final works.

Theory

Inthe theory sessions, the teaching staff will provide information on the basic concepts and techniques of the subject, with indications of how to expand and organize their learning.
During these sessions, theactive participation of the students will be encouraged by proposing examples or alternatives to the solutions presented, as well as gathering evidence in relation to the practical cases exposed during the session to monitor the student's learning. Among the transversal competences will be those related to personal work habits and thinking habits.

Problems

Problem sessions will be raised and discussed specific questions related to the theoretical part. The session will be resolved, put into common, and discussion of questions or exercises.
In this session, a very active participation of the students is expected. Generally, each session will be initiated by a student presenting their vision on the issues, which will be discussed later by the rest of the students with the help of the teacher. This presentation on the part of the student will constitute the evidence of main evaluation on the part of problems.

In the sessions of problems, in addition to the specific competences of the subject, the transversal competences related to personal work habits and thinking habits will be worked on.

Practices

The practical sessions will be devoted to the resolution of cases in group: during the session, cases and practical problems that students will have to consider and solve in a group will be considered. At the beginning of the course, the calendar of the sessions will be made public. The student will put into practice the knowledge that he is acquiring in the subject, and the transversal competences related to the team work.

Supervised activities

During the course the students will do a work in groups of 3 or 4 students. The work will be on extensions of the syllabus, each group will choose a topic of those proposed by theteaching team.
The work will be the preparation of a small memory following a script agreed and approved by the teaching team.
At the end of the course, each group will present a presentation of theirwork where there will bea debate with all the students.
At the beginning of the course, the calendar of thesessions will be made public. The student will put into practice the knowledge that is being acquired in the subject,
and the transversal competences related to communication and teamwork.

Transversal competences assigned to the subject

- About thinking habits:

T01.02 Develop the capacity for analysis, synthesis and prospecting
T01.04 Develop systemic thinking.

This competence will be worked on in the sessions of problems, laboratory practices and in the mentioned autonomous activities.
Specifically, in the sessions of problems in the resolution of the problems and cases proposed, in the practices of Laboratory with the approach that it makes of the real cases and the extension of subjects, and in the autonomous activities with the preparation of schemes, maps conceptual, abstract ..., and resolution of cases outside the classroom environment. This competence is assessed within the framework of these tasks, quantitatively representing 10% of each task.

- About teamwork:

T03.01 Working cooperatively
T03.02 Assume and respect the role of the various members of the team, as well as the different levels of team dependence.

This competence will be worked on in the sessions of laboratory practices and in the mentioned autonomous activities.
Specifically, in the laboratory practices with the cooperative work that is carried out in each one of the practices that areposed (of a group nature), and in the autonomous activities with the resolution in small groups of problems and cases, outside the about the classroom The practices carried out are validated with questions to the members of each group once the activity has been delivered, and it allows to evaluate the cooperative work that has been carried out, as regards, inter alia, aspects such as: interaction, planning and organization , information management, attitudes... This evaluation of cooperative work corresponds to 10% of the qualification of each task.

- About communication strategies:

T04.01 Communicate efficiently, orally and / or written, knowledge, results and skills, both in professional environments and in non-expert audiences.
T04.02 Efficient use of ICT in the communication and transmission of ideas and results.

This competence will be worked on in the sessions of practices, problems and seminars. In concrete, in the practices and the problems with the exhibition of the realized work that is carried out in each one of the activities that are posed, and in the exhibition of the final work realized in the seminaries.
This evaluation of the communication strategy corresponds to 10% of the qualification of each task.
The proposed teaching methodology may undergo some modifications according to the restrictions imposed by the health authorities on on-campus courses.

Annotation: Within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

Assessment

Continous Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Assessment Continous / Assessment Activities	40%	2	0.08	2, 3, 5, 4, 1, 6, 7, 12, 13, 20, 18, 17, 19, 23
Final work	10%	1	0.04	2, 3, 5, 1, 7, 12, 11, 13, 20, 18, 17, 19, 16, 23, 24
Practices	20%	2	0.08	2, 3, 5, 4, 1, 6, 21, 22, 7, 8, 9, 13, 10, 14, 20, 15,

				18, 17, 19, 16, 23
Problems	30%	2	0.08	2, 3, 5, 4, 6, 21, 22, 11, 14, 20, 15, 16, 24

The proposed evaluation activities may undergo some changes according to the restrictions imposed by the health authorities on on-campus courses.

Continuous-assessment dates, delivery of problems, practices or work will be published on Campus Virtual (https://cv.uab.cat) and on the presentation slides, specific programming may change when necessary. Any such modification will always be communicated to students through Campus Virtual, which is the usual communication platform between lecturers and students.

a) Process and evaluation activities programmed

The assessment will be continuous and formative based on the development of the following evaluation activities:

- Problems: resolution and delivery of problems and exercises proposed specifically for each session of problems, as well as the active participation in the sessions of problems.
- Practices: completion of the practice reports and participation in the practical sessions. The correction of the delivered practices and their presentation will be evaluated. Although the practices will be in group, the qualifications will be individual, with questions to validate the practices delivered. In addition, the acquisition of the cross-cutting competence of working cooperatively with aspects such as the coordination and the distribution of tasks among the members of the group will be evaluated.
- Seminar: group elaboration of a final work. The teaching staff will propose a series of subjects related to the subject. A student from each group will have to communicate the selected topic and the teacher will have to validate the selection. The memory of the work and the oral presentation will be evaluated. Althoughthe work will end in a group, the qualifications will be individual.
- Partial validation tests: of individual knowledge. This part will be composed of two tests, a first partial test performed in the middle of the course and a second partial test in the month of January. The specific dates will be communicated at the beginning of the course. Both tests are free of charge in case they are overcome with a grade greater than or equal to 4.

The PPV will contain questions of the theory classes and a problem or exercise related to the part of problems that will be taken into account for the qualification of the part of problems.

Each evaluation activity will have a final grade that will be obtained if the following requirements are met:

- Final qualification of Partial Tests (NProv): In the event that the qualification from each of the two partials reaches 4 or more, the NProv will be the simple average of the two grades. Otherwise, the calculation will not be made and the student will have to submit to the recovery exam only for the part or parts suspended.
- Final problem qualification (NProb): The final grade will be obtained from the average of all the notes of problems and the qualifications of the problem question in each of the partial validation tests. Those students with a NProb of less than 4 will be able to take a review of this part.
- Final qualification of practices (NPract): The final grade will be obtained from the average of all practice notes. In the firstclass of practices, the weight of each practice will be reported in the NPract. Those students who have NPract less than 4 can not perform a recovery practice, the part of the practice is not recoverable.
- Final work qualification (NT): The final work will have two grades, the group work memorandum and the individual mark of each student based on the oral presentation and the questions posed during the exhibition. Those students who have the final suspended work will be able to do the work of a new subject proposed by the teaching staff.

Test	Participation	Minimum rating	Weighting
Partial tests/ Recoverty tests	Individual	4	40%
Problems	Individual	4	30%
Practices	Group	4	20%
Seminar (Final work)	Group	5	10%

b) Programming of evaluation activities

The scheduling of the assessment activities will be given on the first day of the subject and will be made public through the Virtual Campusand on the website of the School of Engineering, in the exam section.

c) Recovery process

Each part of the partial tests, problems and practices will have to be exceeded with a score of 4 or more and the final work with a score of 5 to be able to calculate the final mark of the subject. Otherwise, the student will have to perform the corresponding recovery tests:

- Proof of recovery of partial exams: of individual knowledge. Only students that have not obtained the minimum mark in one of the partial exams or in the two partial examinations will be presented to this test. The partial will be recovered that does not reach the minimum mark; If both are partial will be presented to the examination of recovery of both partial.
- Problem recovery test: of individual knowledge. The students who do not obtain the minimum mark in the final note of problems will be presented to the examination of recovery of this part.
- Test of recovery of the final work: of individual knowledge. The students who do not obtain the minimum mark of the final work will do an individual work of the subject proposed by the teaching staff, as a recovery of this part.

The practical part of the subject is not recoverable. Students who do not obtain the minimum mark in this part will besuspended the subject.

The recovery test will also apply the minimum required for each of the parts to which the student must present. Also, within this test, each part must be exceeded with a mark greater than or equal to 4 to be able to ponder the final grade of the subject.

To pass the subject it is necessary that the evaluation of each one of the parts exceeds the minimum required and that the total evaluation exceeds the 5 points.
If you do not pass the subject for some of the two previous conditions, the numerical note of the file will be the lowest value between 4,5 and the weighted average of the notes.
Therefore, aftercompleting the recovery test, if the calculation ofthe final mark of the subject is equal to or greater than 5, but the minimum required in one of the assessmentactivities has not been obtained, the numerical note of The file will be the lowest value between 4,5 and the weighted average of the notes.

d) Procedure for the review of qualifications

For each assessment activity, a place, date and time of review will be indicated allowing students to review the activity with the lecturer. In this context, students may discuss the activity grade awarded by the lecturers responsible for the subject.
If students do not take part in this review, no further opportunity will be made available.

e) Special qualifications

Students who have to submit to the recovery test (to suspend one of the two partial tests or both or problems), do not submit to the recovery, they will have a "Non-Valuable" ratingon their file.
In order to pass the course with honours, the final grade must be a 9.0 or higher. Because the numberof

students with this distinction cannot exceed 5% of the number of students enrolled in the course, this distinction will be awarded to whoever has the highest final grade.

f) Irregularities by the student, copy and plagiarism

Withou prejudice to other disciplinary measures deemed appropriate, and in accordance with current academic regulations, irregularities committed by a student that may lead to a grade variation in an evaluable activity will be graded zero (0). Evaluation activities qualified in this way and by this procedure will not be recoverable. If it is necessary to pass any of these evaluation activities to pass the subject, this subject will be suspended directly, with no opportunity to recover it in the same course.

These irregularities include, among others:

- the total or partial copy ofa practice, report, or any other evaluation activity;
- let copy;
- present a group work not done entirely by the members of the group (applied to all members, not only to those who have not worked);
- unauthorized use ofAI (eg Copilot, ChatGPT or equivalent) to solve exercises, practices and/or any other evaluable activity;
- Submit as your own materials prepared by a third party, even if they are translations or adaptations, and in general works with non-original and exclusive elements of the student;
- have communication devices (such as mobile phones, smartwatches, camera pens, etc.) accessible during individual theoretical-practical assessment tests (exams);
- talk with classmates during the individual theoretical-practical evaluation tests (exams);
- copy or try to copy other students during the theoretical and practical evaluation tests (exams);
- Use or attempt to use writings related to the subject during the theoretical-practical evaluation tests (exams), when these have not been explicitly allowed.

In future editions of this subject, students who have committed irregularities in an evaluation act will not have any of the evaluation activities carried out validated. In summary: copying, allowing copying or plagiarism (or the attempt to) in any of the evaluation activities is equivalent to a FAIL, not compensable and without validation of these parts of the subject in subsequent courses.

g) Evaluation of repeating students

Regarding the repeating students, in the case of having passed thepractices, the final work or the problems,will save the qualification obtained from the previous course in these parts.
The repeating students will not have differential treatment in the parts that they must take.

h) Single assessment

This course does not provide for the single assessment system.

i) Restricted Use of AI

For this course,the use of Artificial Intelligence (AI) technologies is permittedexclusively for support tasks, such as searching for bibliography orinformation, or gathering ideas about tools and systems. Students must clearly identify in each submitted assignment which parts have been generated using AI technology, specify the tools used (including the prompts), and include a critical reflection on how these tools have influenced both the process and the final outcome of the activity.

Failure to transparently disclose the use of AI in this graded activity will be considered a breach of academic integrity and may result in partial or total penalties on the assignment grade, or more severe sanctions in serious cases.

Bibliography

Basic bibliography:

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- K.C. Laudon, J.P. Laudon (2019, 16ª). Management Information Systems: Managing the digital firm. Pearson Prentice Hall.
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- G. Booch, J. Rumbaugh, I. Jacobson (1999). UML. El lenguaje unificado de modelado. Guía del usuario. Addison-Wesley.

Further reading:

- Davenport, T. H. (2000). Mission critical: realizing the promise of enterprise systems. Harvard Business Press.
- Davenport, T. H. (2006). Competing on analytics. Harvard Business review, 84(1), 98.
- Larman, Craig (2005). Applyng UML and patterns: an introduction to object-oriented analysis and design and iterative development, Upper Saddle Rvier, N.J. Prentice HallPTR.
- Leon, A. (2014). *Enterprise resource planning*. McGraw-Hill Education.
- O'Leary, D. E. (2000). *Enterprise resource planning systems: systems, life cycle, electronic commerce, and risk*. Cambridge university press.
- Valcárcel, I. G. (2001). *CRM: gestión de la relación con los clientes*. FC Editorial.
- Goddard, M. G. J., Raab, G., Ajami, R. A., & Gargeya, V. B. (2012). *Customer relationship management: a global perspective*. Gower Publishing, Ltd.
- Kumar, V., & Reinartz, W. (2018). *Customer relationship management: Concept, strategy, and tools*. Springer.
- Stadtler, H. (2005). Supply chain management and advanced planning--basics, overview and challenges. *European journal of operational research*, *163*(3), 575-588.
- Christopher, M. (2016). *Logistics & supply chainmanagement*. Pearson UK.
- Turban, E., Sharda, R., & Delen, D. (2010). *Decision Support and Business Intelligence Systems (required)*. Prentice Hall Learning.
- Eckerson, W. W. (2010). Performance dashboards: measuring, monitoring, and managing your business. John Wiley & Sons.

Software

The software used in the course is open source (information systems - ERPs as ODOO, BI systems, ...)

Groups and Languages

Please note that this information is provisional until 30 November 2025. You can check it through this link. To consult the language you will need to enter the CODE of the subject.

Name	Group	Language	Semester	Turn
(PAUL) Classroom practices	11	Catalan	first semester	afternoon
(PAUL) Classroom practices	12	Catalan	first semester	afternoon

(PLAB) Practical laboratories	21	Catalan	first semester	afternoon
(PLAB) Practical laboratories	22	Catalan	first semester	afternoon
(PLAB) Practical laboratories	23	Catalan	first semester	afternoon
(SEM) Seminars	21	Catalan	first semester	afternoon
(SEM) Seminars	22	Catalan	first semester	afternoon
(SEM) Seminars	23	Catalan	first semester	afternoon
(TE) Theory	11	Catalan	first semester	afternoon