



Universidad de Jaén
School of Engineering of Linares

Management of telecommunication networks

2024-2025

Grado en Ingeniería Telemática

Doble Grado Ingeniería de Tecnologías de la Telecomunicación e Ingeniería Telemática



GRATIA



Guías docentes UJA

Horarios de tutorías

Llamamientos PAU

Syllabus 2024-25 - 14512005 - Management of Telecommunication Networks (Gestión de redes de telecomunicación)

Caption

- Level 1: Tutorial support sessions, materials and exams in this language
- Level 2: Tutorial support sessions, materials, exams and seminars in this language
- Level 3: Tutorial support sessions, materials, exams, seminars and regular lectures in this language

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Full version (Spanish)

English

DEGREE: Grado en Ingeniería telemática (14512005)
 FACULTY: SCHOOL OF ENGINEERING OF LINARES
 DEGREE: Doble Grado Ing. de tecnologías de la telecomunicación e Ing. telemática (15212031)
 FACULTY: SCHOOL OF ENGINEERING OF LINARES
 ACADEMIC YEAR: 2024-25
 COURSE: Management of Telecommunication Networks

SYLLABUS

1. COURSE BASIC INFORMATION

NAME: Management of Telecommunication Networks
 CODE: 14512005 (*) ACADEMIC YEAR: 2024-25
 LANGUAGE: English LEVEL: 2
 ECTS CREDITS: 6.0 YEAR: 4 SEMESTER: PC

2. LECTURER BASIC INFORMATION

NAME: MUÑOZ MONTORO, ANTONIO JESUS
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 FIELD OF STUDY: 560 - INGENIERÍA TELEMÁTICA
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 ORCID: -
 LANGUAGE: - LEVEL: 2

3. CONTENT DESCRIPTION

Theoretical Contents

Among the application protocols to be studied will be, among others, those that support network management. The functional areas of network management and management models will be studied. Likewise, an approach to management in virtualized networks will be carried out.

In this subject, students will be provided with the ability to keep up to date with the latest developments in science and technology, especially in this type of subject, so closely linked to such a dynamic environment as telecommunications, and specifically Telematics Engineering.

The theoretical block program is made up of three topics, with the structure that appears below.

Lesson 1. Introduction to network management.

- Concept of network management.
- Objective of network management.
- Organizational structure of a network management center.
- Evolution suffered by network management.
- Resources used in network management.
- Network management methods.
- Architecture of a network management system.
- Functional areas of network management.
- Distributed network management.

Lesson 2. Internet network management.

- Introduction to Internet network management.

- Evolution of Internet network management.
- Internet network management framework.
- Structure of management information.
- Management Information Bases (MIB).
- Simple Network Management Protocol (SNMP).
- Administrative framework.
- Conclusions about SNMP.
- SNMPv2.
- SNMPv3.
- Remote Network Monitoring (RMON).
- Other models: Netflow, NETCONF, IPFIX

Lesson 3. Technologies and trends in network management.

- Network management technologies
- Trends in network management
- Software-defined networks (SDN).
- Network Functions Virtualization (NFV)

Practical Contents

The practical block of the course consists of laboratory sessions and is mandatory.

The aim of the proposed practical sessions is to achieve the established competencies. Additionally, these sessions will develop skills in communicating information, ideas, problems, and solutions within the field of engineering and to society at large through the processes of documentation delivery or oral presentations.

Regarding work organization, collaboration and teamwork will be encouraged through the very design of the practical sessions.

- Practical 1: Familiarization with a network manager.
- Practical 2: Familiarization with the SNMP protocol, standard MIBs, and private MIBs.
- Practical 3: Network management service.
- Practical 4: NetFlow.
- Practical 5: NETCONF.
- Practical 6: Real-time network monitoring.
- Practical 7: Management in software-defined networks.

Seminars

- Seminar 1: Concept of virtualization. Docker software containers.
- Seminar 2: Kubernetes.
- Seminar 3: Python programming language in network management.

4. COURSE DESCRIPTION AND TEACHING METHODOLOGY

The development of expository classes in large groups, as well as in small groups, will be focused on promoting quality teaching, prioritizing activities that promote inclusive and equitable learning (SDG-4).

Expositive classes in large group

The methodology to be followed in the large group expository classes will be a mixture of introductory activities, master classes and the presentation of theory and general examples in the classroom designated for the subject by the center. In addition to exposing the theoretical contents of the subject, the ability to collect and interpret data and manage complex concepts within Telematics Engineering will be developed and enhanced, in order to make judgments that imply reflection on ethical and social issues.

The student must follow the teacher's presentation with the material delivered for this purpose, whether they are notes or a slide presentation, which must be completed with their own notes and with the subsequent review of the basic and/or recommended bibliography.

Attendance, as well as active, respectful and responsible participation, either to raise doubts or to respond to the teacher's requirements or questions, will be evaluated positively in its corresponding factor.

The student's autonomous work should focus on reviewing the concepts and theoretical aspects seen in class, carrying out exercises, as well as studying them with the material provided by the teacher, student notes and bibliography.

Small group classes

The small group classes will be implemented through work sessions in the laboratory that will focus on the development of the applications, or learning tasks designated by the teacher, which culminate with the completion of the client or server applications, the objective of the practice, which will follow, throughout the course, a project-based learning methodology.

Thus, during the practical sessions, the work of design and implementation of the applications marked by the different practices must be carried out, in order to be able to count on the supervision of the teacher. In addition, work in a collaborative environment will be encouraged, as well as mixing with the communication of results

Attendance, as well as active, respectful and responsible participation, either to raise doubts or to respond to the teacher's requirements or questions, will be evaluated positively in its corresponding factor.

Regarding the autonomous work, it will focus on the preparation of the documentation to be delivered for each practice, as well as on completing the work started in the laboratory and that could not be finished in the corresponding session. Special emphasis will be placed on the need for their own continuous training and to undertake this activity independently throughout their professional life, as well as on the ability to keep up to date with the latest in science and technology, especially in this type of field. of subjects, so linked to an environment as dynamic as telecommunications, and specifically Telematics Engineering.

In addition, work in a collaborative environment will be encouraged, as well as the mix with the communication of results, with special emphasis on the need for continuous training typical of activities related to telecommunications throughout their professional life independently.

Collective tutorials

The collective tutorials will be used in the resolution of doubts, monitoring and supervision of the work and exercises, as well as in the attendance and participation in the different seminars planned in the subject, as well as talks, conferences, workshops and/or conferences, designated by the teacher, in order to complete and update the training and obtain general, transversal and/or specific competences defined for this activity, such as the value of continuous training, entrepreneurship or the review of technological innovations in the matter.

The attendance, as well as the active, respectful and responsible participation, in the aforementioned activities, will be evaluated according to the provisions of the evaluation system of this guide.

Students with special educational needs should contact the Student Attention Service (Servicio de Atención y Ayudas al Estudiante) in order to receive the appropriate academic support

5. ASSESSMENT METHODOLOGY

Overall evaluation

The global evaluation will be carried out according to the activities described in the "Methodology and activities" section, in addition to those described in the "Detailed description of the Global Evaluation" section, following the weights of each aspect detailed in the previous table.

The global evaluation modality is divided into two parts:

The evaluation of the work during the school period, according to the tasks defined for this purpose. Carrying out a FINAL TEST on the day set for the subject within the exam period.

The distribution of the weights for each evaluable aspect of the two aforementioned parts, and taking into account the activities described in the previous table, is as follows:

Aspecto	Periodo lectivo	Prueba final	Total por aspecto
S1 Asistencia y participación	10 %	-	10 %
S2 Conceptos teóricos de la materia	15 %	15 %	30 %
S3 Realización de trabajos, casos o ejercicios	15 %	15 %	30 %
S4 Prácticas de laboratorio/ordenador	30%		30 %
Total asignatura	70 %	30%	100%

The qualifications obtained in an aspect during the academic period in the GLOBAL evaluation will be maintained until the end of the course.

Final test: At the end of the semester, on the day set for the subject within the exam period, there will be a final test of the theoretical part and exercises of the subject (aspects S2 and S3), in which the student must demonstrate who has acquired the competencies and learning outcomes established for these aspects. The weight of this test in the final grade will be 30% of the total for the subject, as reflected in the table "Global Assessment Weight Distribution", 15% corresponding to the S2 aspect and the other 15% to the S3 aspect. . The specific conditions, as well as the material and/or documentation that may be used in the final test will be those established by the person responsible for the subject.

Final evaluation

To pass the subject, the student body must obtain a grade equal to or greater than 5.0 out of 10 in the total calculation of the evaluated aspects, as long as a grade equal to or greater than 4.0 has been obtained in the final test and in the part of laboratory/computer practices (S4).

The student body will have the option to waive the GLOBAL evaluation, not being possible to return to it once the waiver has been made.

Single test

In the SINGLE TEST modality, an exam will be carried out on the day set for the subject within the exam period, which will cover all the contents of the subject, ensuring that the student body has acquired the skills and learning outcomes established for the exam. same. The weight that will be assigned to each of its two parts will be the following:

- Part 1. Attendance and participation, theoretical concepts of the subject and completion of work, cases or exercises (S1, S2 and S3): 70%.
- Part 2. Laboratory/computer practices (S4): 30%.

The specific conditions, as well as the material and/or documentation that may be used in the Single Test will be those established by the person in charge of the subject.

To pass the subject, the student body must obtain a grade equal to or greater than 5.0 out of 10 in each of the two parts of this test.

Students who have passed aspect S4 of laboratory/computer practices of the subject through GLOBAL evaluation, with a grade equal to or greater than 5.0 out of 10, will not have to take Part 2 corresponding to this aspect in the exam, applying the same qualification obtained in the GLOBAL evaluation to said part.

The parts passed in each call will be kept until the end of the course

Detailed description of the Global Assessment.

For those students whose evaluation is carried out globally, it will be based on monitoring and carrying out the activities included in the four categories presented in the Evaluation System, which make up the total of the evaluable elements of the subject:

- S1. Attendance and participation: 10%.
- S2. Theoretical concepts of the subject: 30%.
- S3. Carrying out work, cases or exercises: 30%.
- S4. Laboratory/computer practices: 30%.

Each of these blocks will be detailed in the following sections.

S1 - Attendance and Participation (10%)

In this section, the following competencies will be assessed: CB2, CB4, CB5, CG4, and CG9.

A positive evaluation in this section will indicate that the student has achieved the following competencies or learning outcomes: 27, 34, and 35.

This aspect will be evaluated based on attendance and participation in large group lectures, small group sessions (laboratory practices), and collective tutorials, including attendance at seminars or other activities organized by the Department of Telecommunications Engineering, the E.P.S. of Linares, or the University of Jaén, as recommended by the course instructor.

Given that S1 accounts for 10% of the total course grade, equivalent to one point of the total score, the evaluation is divided into two parts: attendance and participation. Thus, 0.5 points are assigned for attendance and 0.5 points for participation.

Initially, each student will receive the full score (0.5 points) for attendance, which will be reduced in the following situations (this score will never be less than 0):

- Absence from more than 33% of large group lectures without a justified reason will result in a penalty of 0.2 points from the total S1 score.
- Absence from more than 33% of small group sessions without a justified reason will result in a penalty of 0.2 points from the total S1 score.
- Absence from more than 50% of either large or small group sessions without a justified reason will result in the total loss of the attendance score in S1 (0.5 points).

Similarly, each student will receive the full score (0.5 points) for participation, which will be adjusted for the following reasons:

- Hindering work in class and/or laboratory, whether for the instructor or peers, will result in a penalty ranging from 0.1 to 0.5 points from the participation score in S1 (the participation score will never be less than 0).
- Failure to attend programmed activities within collective tutorials (such as seminars, etc.) will result in a penalty of 0.1 to 0.3 points from the participation score in S1 (the participation score will never be less than 0).
- Failure to submit any assigned tasks during the semester will result in a penalty of 0.1 points from the participation score in S1 (the participation score will never be less than 0).

S2 - Theoretical Concepts of the Subject (30%)

In this section, the following competencies will be assessed: CB2, CB3, CB4, CB5, CG4, TEL1, TEL2, and TEL3.

A positive evaluation in this section will indicate that the student has achieved the following competencies or learning outcomes: 5, 26, 27, 33, 34, and 35.

The evaluation of theoretical concepts will be carried out through theory assessment tests completed via the virtual teaching platform or by answering questions posed in class by the instructor.

Both types of tests are designed to demonstrate that the student has assimilated the knowledge imparted in the course.

Theory Assessment Tests

These tests will be individual and conducted through the virtual teaching platform. Their format and content to be evaluated will be communicated to the students beforehand and may be adjusted according to the course progress, syllabus, classroom availability, etc.

These tests will be conducted after the last topic to be evaluated has been completed, and at least one week has passed since the last theory session of that topic. This will be modified for the final test, which will be held, if possible, during the last teaching week.

Each test will be evaluated separately, and the student can obtain a score between 0 and 10 points. The weight of each test in the final evaluation will vary.

The evaluation result will be the weighted average of each score with its corresponding factor. The factors for each test are listed below:

- Topic 1: factor 30%
- Topic 2: factor 35%
- Topic 3: factor 35%

The score will range from 0 to 10, corresponding proportionally to the range between 0% and 15%, matching the total evaluation of the theoretical concepts section. The remaining 15% will be evaluated through theoretical questions posed in the Final Exam.

S3 - Completion of Assignments, Cases, or Exercises (30%)

In this section, the following competencies will be assessed: CB2, CB3, CG4, CG9, TEL1, TEL2, and TEL3.

A positive evaluation in this section will indicate that the student has achieved the following competencies or learning outcomes: 5, 26, 27, 33, 34, and 35.

The evaluation of assignments, cases, or exercises will be conducted through assessment tests completed via the virtual teaching platform or by answering questions posed in class by the instructor.

These tests will be individual. Their format and content will be communicated to the students beforehand and may be adjusted according to the course progress, syllabus, classroom availability, etc.

Before conducting the tests, a list of the exercise, case, or practical assignment statements to be completed by the student will be published on the virtual teaching platform. These exercises will be of similar difficulty to others previously solved in class and will preferably be exercises that appeared in recent exam sessions.

Each test will evaluate aspects such as:

- Mastery of operational knowledge of the subject.
- Structure in problem presentation and resolution.
- Resolution: type of solution, justification, and correctness.
- Originality: no exercise that has been solved in the same or very similar way in another course, in class, or by other students will be valued.
- Spelling, format, and presentation of the document.

Each test will be evaluated separately, and the student can obtain a score between 0 and 10 points. The weight of each test in the final evaluation will be the same.

The score in this section will range from 0 to 10, with the latter representing 50% of the evaluation of the completion of assignments, cases, or exercises section.

S4 - Laboratory/Computer Practices (30%)

In this section, the following competencies will be assessed: CB2, CB3, CB4, CB5, CG4, CG9, TEL1, TEL2, and TEL3.

A positive evaluation in this section will indicate that the student has achieved the following competencies or learning outcomes: 5, 26, 27, 33, 34, and 35.

Practices are mandatory for students (which does not necessarily imply attendance, as this is evaluated in another section).

Practices can be carried out individually or in pairs (preferably). Working in pairs does not necessarily result in the same grade for both students.

As a result of each practice, each student group (pair or individual student) must prepare a report describing:

- Processes carried out.
- Results obtained.
- Analysis of the results obtained.

The evaluation of laboratory practices will be conducted through:

- Assessment tests completed via the virtual teaching platform and/or in writing.
- Evaluation of the practical work and the report prepared.

These tests will be individual and conducted via the virtual teaching platform or in writing. Their format and content will be communicated to the students beforehand and may be adjusted according to the course progress. The score in this section (a. Assessment tests) will range from 0 to 10, with the latter representing 50% of the evaluation of the laboratory/computer practices section.

The criteria for evaluating practical work and the report prepared will include:

- Attitude and effort demonstrated throughout the work.
- Application of specific knowledge to the practice.
- Accuracy of the results obtained.
- Capacity for analysis/synthesis.
- Ability to draw conclusions.
- General quality of the work and the report prepared.
- Technical rigor.
- Originality.
- Presentation, organization, grammatical accuracy, spelling, and cleanliness of the report.

To achieve the evaluation of each practice, the following requirements must be met:

- Approval from the instructor for the work carried out. A practice without the instructor's approval will not be evaluated, and its score will be 0.
- Submission of the practice report: late submission will result in a penalty in the evaluation of that practice, ranging from one point for works submitted less than a week late to five points for those submitted more than a month late. Works not submitted will receive a score of 0.
- Achievement of all functional objectives of the practice.
- Correctly answering the questions posed by the instructor about the practice.
- Implementing all modifications proposed by the instructor to verify that the necessary skills for the practice have been acquired.

Failure to meet any of these requirements will result in a reduction in the practice score, which will be evaluated from 0 to 10.

The overall evaluation of the practical work and report section (b.) will be the weighted average of these scores, with each practice contributing equally.

The score in this section will range from 0 to 10, with the latter representing 50% of the evaluation of the laboratory/computer practices section.

6. BOOKLIST ([Access the bibliography in the Library catalog](#))

MAIN BOOKLIST:

- SNMP,SNMPv2, SNMPv3, and RMON 1 and 2. Edition: 3rd ed. Author: Stallings, William. Publisher: Addison-Wesley.
 - **Notes:** Temas 1,2 Practicas 1,2,3,4,7
([Library](#))
- Guide to Security in SDN and NFV Challenges, Opportunities, and Applications . Edition: 1st ed. 2017.. Author: Zhu, Shao Ying. editor.. Publisher: Springer International Publishing.
 - **Notes:** Lesson 3, prac 7
([Library](#))
- Network programmability with YANG : the structure of network automation with YANG, NETCONF, RESTCONF, and gNMI . Edition: 1st edition. Author: Claise, Benoit, author.. Publisher: Addison-Wesley.
 - **Notes:** Prac 5
([Library](#))
- Network security with NetFlow and IPFIX : big data analytics for information security . Edition: 1st edition. Author: Santos, Omar, author.. Publisher: Cisco Press.
 - **Notes:** Lesson 3, prac 4
([Library](#))
- SNMP,SNMPv2, SNMPv3, and RMON 1 and 2. Edition: 3rd ed. Author: Stallings, William. Publisher: Addison-Wesley.
 - **Notes:** Lessons 1,2. Prac 1, 2, 3, 4, 7
([Library](#))

7. SUSTAINABLE DEVELOPMENT GOALS

Educación de calidad

Industria, innovación e infraestructura

Producción y consumo responsables

DETAILED INFORMATION

Goal 4. Quality education

Throughout all the activities of the subject, fundamental aspects in relation to inclusion and equity will be addressed, which will also be part of the evaluation of the participation aspects. Thus, it will be promoted, both in large group expository classes, as well as in small groups, to use inclusive language both at the written and oral level and to attend to activities of various kinds focused on being equitable with the different learning capacities of the student.

Furthermore, on the one hand, in large group classes the ability to collect and interpret data and handle complex concepts in the field of telecommunications will be developed and enhanced, to make judgments that involve reflection on ethical and social issues. On the other hand, in small group classes special emphasis will be placed on the need for continuous training and undertaking this activity independently throughout one's professional life, as well as the ability to stay up to date with new developments. in the field of telecommunications, taking a more technical approach.

Goal 9: Build resilient infrastructure, promote sustainable industrialization and foster innovation

Through the activities of this subject in large and small group classes, special emphasis is placed on the fact that telecommunication systems and services must be developed, implemented and maintained in a way that achieves resilient and robust industrialization, as well as as sustainable.

Furthermore, both with the training of content, abilities, skills and abilities, and with the development of the activities proposed to the students, personal initiative and the ability to solve problems autonomously are promoted in order to encourage innovation as a driving force for industrial development, especially in the field of telecommunications, as well as a wealth-generating element of a society.

Goal 12: Ensure sustainable consumption and production patterns

In this subject, through the activities designed for large and small group classes, we will seek to raise awareness among students about the reasonable use of resources, given that telecommunication services are generally very demanding in energy and raw materials, and likewise in the search for greater durability of products and services, pursuing a longer-term use of the resources used. Therefore, emphasis will be placed on achieving robust, efficient, long-lasting services and/or products with the lowest possible environmental impact, always taking into account the techniques that facilitate this, such as the correct specification of needs, designs that use new, clean and advanced technologies, carrying out tests and using, as far as possible, renewable energies.

8. VIRTUAL / CLASSROOM TEACHING SCENARIO

Teaching methodology and learning activities

Actividades Formativas	Formato	Metodología docente Descripción
A1. Lectures with big group of students	100% in person class	Participatory master class sessions, lasting one or two hours each, held in the classroom .
A2. Lectures with practical groups	100% in person class	Development of practical sessions, lasting two hours each, in laboratories.
A3. Tutorial lessons	100% in person class and online	Tutorial sessions, both collective and individual, will be carried out preferably online (synchronous and/or asynchronous). The face-to-face tutoring sessions will be agreed between the person responsible for the subject / group and the students.

Schedule

The schedule can vary mainly due to the change from multi-modal scenario to the online one.

Evaluation system

There are no changes in the evaluation format (weights of each section) or in what is specified in the detailed evaluation.

With Global Assessment

As a summary, the following tables are added, detailing the weight and format of the final test in Global Assessment:

Ordinary Call

Evaluation test	Format	Description	Percentage
Global assessment End exam	On-site	At the end of the semester there will be a final test of the theoretical part of the subject (S2 and S3), in which the student must demonstrate that they have acquired the skills and learning results established for these aspects. The weight of this test in the final grade will be 50% of each aspect evaluated. The material and / or documentation that can be used in the final test will be authorized by the teacher.	30% (15% S2 and 15% S3)
Single test	On-site	In the SINGLE TEST modality, there will be an exam that will cover all the contents of the subject, ensuring that the student has acquired the skills and learning results established for it.	S1, S2 and S3: 70% S4: 30%

Evaluation test	Format (on-site/ synchronous or asynchronous online)	Description	Percentage
Global assessment End exam	On-site	At the end of the semester there will be a final test of the theoretical part of the subject (S2 and S3), in which the student must demonstrate that they have acquired the skills and learning results established for these aspects. The weight of this test in the final grade will be 50% of each aspect evaluated. The material and / or documentation that can be used in the final test will be authorized by the teacher.	30% (15% S2 and 15% S3)
Single test	On-site	In the SINGLE TEST modality, there will be an exam that will cover all the contents of the subject, ensuring that the student has acquired the skills and learning results established for it.	S1, S2 and S3: 70% S4: 30%

Resources

Expository classes in large groups or practice groups at 50%

Technical means in the classroom:

- Videoconference infrastructure in the classroom or laboratory consisting of a video and audio capture system for use in a videoconference system or virtual classroom such as Google Meet or BigBlueButton.

Individual media (students in non-face-to-face format)

- PC equipment or similar.
- Videoconference system or virtual classroom such as Google Meet or BigBlueButton.

Common means (teachers and students):

- Use of interactive tools: screen sharing to use comments as a virtual whiteboard in PDF presentations.
- Use of the teaching platform of the University of Jaén: messaging, forums, tasks, activities and means of evaluation.

9. VIRTUAL TEACHING SCENARIO

Teaching methodology and activities

Actividades Formativas	Formato	Metodología docente Descripción
A1 - Lectures in large group.	Online	The sessions of participative face-to-face classes, of one or two hours each, are replaced by other activities carried out through the Internet such as:

- Asynchronous lectures based on videos and / or audiovisual content, forums, interactive material, etc.		- Visualization of videos with explanation of the theoretical contents. - Review of interactive material on the subject. - Review of content on the Internet (forums, - specialized websites)
A2 - Practical lectures	Online	Practical sessions are replaced by online training activities, lasting two hours each, by other activities carried out through the Internet such as: - Virtualized or simulation activities. - Visualization of videos with explanation of the practical contents. - Review of interactive material about practices. - Online content review (forums, specialized websites, etc.)
A3 - Collective tutoring	Online	The tutoring sessions, both collective and individual, will be carried out completely in person through online media synchronously and / or asynchronously.

Schedule

The schedule can vary mainly due to the change from multi-modal scenario to the online one.

Evaluation system

There are no changes in the evaluation format (weights of each section) or in what is specified in the detailed evaluation.

With Global Assessment

As a summary, the following tables are added, detailing the weight and format of the final test in Global Assessment:

Ordinary Call

Evaluation test	Format (on-site/synchronous or asynchronous online)	Description	Percentage
Global assessment End exam	Synchronous online	At the end of the semester there will be a final test of the theoretical part of the subject (S2 and S3), in which the student must demonstrate that they have acquired the skills and learning results established for these aspects. The weight of this test in the final grade will be 50% of each aspect evaluated. The material and / or documentation that can be used in the final test will be authorized by the teacher.	30% (15% S2 and 15% S3)
Single test	Synchronous online	In the SINGLE TEST modality, there will be an exam that will cover all the contents of the subject, ensuring that the student has acquired the skills and learning results established for it.	S1, S2 and S3: 70% S4: 30%

Extraordinary call

Evaluation test	Format	Description	Percentage
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Global assessment End exam	Synchronous online	At the end of the semester there will be a final test of the theoretical part of the subject (S2 and S3), in which the student must demonstrate that they have acquired the skills and learning results established for these aspects. The weight of this test in the final grade will be 50% of each aspect evaluated. (S3) The material and / or documentation that can be used in the final test will be authorized by the teacher.	30% (15% S2 15% S3)
Single test	Synchronous online	In the SINGLE TEST modality, there will be an exam that will cover all the contents of the subject, ensuring that the student has acquired the skills and learning results established for it.	S1, S2 and S3: 70% S4: 30%

Resources

Since all the teaching, either in the exposition lectures in large groups or in the lectures in practical groups, will be taught in a non-face-to-face way or on-site, the following resources will need to be used:

Common telematics means (teachers and students):

- PC equipment or similar.
- Videoconference system or virtual classroom, such as Google Meet or BigBlueButton.
- Use of interactive tools: screen sharing to use comments as a virtual whiteboard in PDF presentations.
- Use of the teaching platform of the University of Jaén: messaging, forums, tasks, activities and means of evaluation.

DATA PROTECTION CLAUSE (on line exams)

Institution in charge of data processing: Universidad de Jaén, Campus Las Lagunillas, s/n, 23071 Jaén

Data Protection Delegate: dpo@ujaen.es

Purpose: In accordance with the Universities Law and other national and regional regulations in force, carrying out exams and assessment tests corresponding to the courses students are registered in. In order to avoid frauds while sitting the exam, the exam will be answered using a videoconference system, being able the academic staff of the University of Jaén to compare and contrast the image of the person who is answering the exam with the student's photographic files. Likewise, in order to provide the exam with evidential content for revisions or claims, in accordance with current regulation frameworks, the exam will be recorded and stored.

Legitimacy: compliance with legal obligations (Universities Law) and other national and regional regulations currently in force.

Addressees: service providers who are the owners of the platforms where the exams are carried out and with whom the University of Jaén has signed the corresponding data access contracts.

Storage periods: those established in current in force regulations. In the specific case of exam videoconference recordings, not before the examination records and transcripts are closed or the exam can still be reviewed or challenged.

Rights: you can exercise your right of access, amendment, cancellation, opposition, suppression, limitation and portability by sending a letter to the postal or electronic address indicated above. In the event that you consider that your rights have been violated, you may submit a complaint to the Andalusian Council for Transparency and Data Protection www.ctpdandalucia.es

CLASS RECORDING CLAUSE PERSONAL DATA PROTECTION

Person in charge: Universidad de Jaén, Paraje Las Lagunillas, s/n; Tel.953 212121; www.ujaen.es

Data protection delegate (DPO): TELEFÓNICA, S.A.U. ; Email: dpo@ujaen.es

Procedure aim: To manage proper recordings of teaching sessions with the aim of facilitating learning process under a multimodal and/or online teaching

Period for record storage: Images will be kept during legal term according to regulations in force

Legitimacy: Data will be managed according to legal regulations (Organic Law 6/2001, December 21, on Universities) and given consent provided by selecting corresponding box in legal admission documents

Data recipients (transfers or assignments): Any person allowed to get access to every teaching modality

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