1. BASIC INFORMATION

Course	Networking Fundamentals
Degree program	Bachelor's Degree in Computer Engineering
School	School of Architecture, Engineering and Design
Year	First
ECTS	6
Credit type	Basic
Language(s)	Spanish / English
Delivery mode	Campus-based / Virtual
Semester	S1
Academic year	2025-2026
Coordinating professor	Silvia Abad

2. PRESENTATION

Networking Fundamentals is the basic course that precedes Computer Networks that is afterwards taught in the third year of the degree. The combination of the two courses provides the student with the necessary knowledge to play the role of Network Administrator and to understand the fundamentals of computer networks and the Internet, thus being able to design and implement applications based on them.

3. COMPETENCIES AND LEARNING OUTCOMES

Knowledges

- CON07: Knowledge of the structure, organization, functioning, and interconnection of computer systems, the foundations of programming, and their application to solving engineering problems.
- CON13: Knowledge and application of the characteristics, functionalities, and structure of distributed systems, computer networks, and the Internet, and the design and implementation of applications based on them.

Skills

- HAB06: Knowledge, administration, and maintenance of computer systems, services, and applications.

Competences

- CP06: Ability to conceive and develop centralized or distributed computer systems or architectures, integrating hardware, software, and networks according to the knowledge acquired as specified in the specific competences of the degree.

4. CONTENTS AND LEARNING OUTCOMES

Specific learning outcomes for the subject

Subject-Specific Knowledge

- Define the basic concepts related to computer networks.
- Argue for layered communication in data networks using network reference models.
- Explain the fundamentals of routing algorithms and understanding the differences between them.

Subject-Specific Skills

- Analyze the operations and basic characteristics of network and transport layer protocols and services, advancing in the analysis of the IP protocol.
- Resolve IP addressing issues.
- Perform basic configuration and verification of network devices.

Contents

- Network Software and Reference Models. Introduction to networks, reference models (OSI/TCP-IP), protocols, and basic configuration of switches and terminals.
- Physical and Data Link Layers. Study of the Physical and Data Link layers (Ethernet, switching). FHRP.
- The Network Layer (IP, IPv4/IPv6, addressing, and basic router configuration). Routing concepts (static routing, algorithms) and routing tables.
- Transport Layer (TCP/UDP). Address translation (NAT).
- Application Layer. Common protocols, DHCP, SLAAC.

5. TEACHING-LEARNING METHODOLOGIES

The types of teaching-learning methodologies used are indicated below:

Campus-based mode:

- Masterclass
- Problem-Based Learning
- Workshop/Lab-based learning

Virtual mode:

- Technology aided Masterclass
- Active methodologies
- Virtual Workshop/Lab-based learning
- Self-learning

6. LEARNING ACTIVITIES

Listed below are the types of learning activities and the number of hours the student will spend on each one:

Campus-based mode:

Learning activity	Number of hours - total	Number of hours - campus based	Use of AI
Masterclass	12	12	Allowed
Practical application master classes	18	18	Allowed
Problem solving	31	9	Forbidden (*)
Workshop or lab activities	15	15	Forbidden
Self study	68	0	Allowed
Debates and colloquiums	4	4	Suggested
In-person evaluation activities	2	2	Forbidden (*)
TOTAL	**150 hours**	**60 hours**	

Virtual mode:

Learning activity	Number of hours - total	Number of hours - synchronous	Use of AI
Multimedia teaching resources	12	0	Allowed
Synchronous virtual classes	18	18	Allowed
Problem solving	31	0	Forbidden (*)
Virtual Workshop or lab synchronous activities	15	15	Forbidden
Self study	68	0	Allowed
Virtual forum	4	0	Suggested
Virtual evaluation activities	2	2	Forbidden (*)
TOTAL	**150 hours**	**35 hours**	

(*) The teacher will inform in advance in which particular activities AI tools can be used

7. ASSESSMENT

Listed below are the assessment systems used and the weight each one carries towards the final course grade:

Campus-based mode:

Assessment system	Weight
In-person evaluation activities	50
Case/problem solving	10
Performance evaluation	10
Research and projects	10
Laboratory/workshop notebook	20

Virtual mode:

Assessment system	Weight
Virtual evaluation activities	50
Case/problem solving	10
Performance evaluation	10
Projects	10
Virtual Laboratory/workshop notebook	20

When you access the course on the *Campus Virtual*, you'll find a description of the assessment activities you have to complete, as well as the delivery deadline and assessment procedure for each one.

7.1. First exam period (Ordinary)

Campus-based mode:

To pass the course in the first examination period you must obtain a grade greater or equal to 5.0 out of 10.0 in the final grade (weighted average of all assessment items as per table above).

The course will be divided into two blocks, which will be assessed independently: a first block that will be assessed in the middle of the course with a first mid-term exam, and a second block that will be assessed at the end of the course. If the first mid-term exam is not passed, there will be a new attempt at the end, which will be taken along with the second block exam. In any case, it will also be compulsory to have a grade greater than or equal to 5.0 in each of the two partial exams.

Likewise, it will be necessary to obtain a grade greater or equal to 5.0 out of 10.0 in each of the laboratories.

In addition, you need to attend at least 50% of the classes to pass the course in this exam period.

In the event that any of the theoretical partial exams or any of the laboratories is not passed (grade under 5), the final grade of the course may not exceed 4.0, and the course will not be passed on this first examination period.

The teacher reserves the right to request an additional individual assessment for any of the assessment items in the event of doubts about the student's authorship.

Virtual mode:

To pass the course in the first examination period you must obtain a grade greater or equal to 5.0 out of 10.0 in the final grade (weighted average of all assessment items as per table above).

In any case, it will be necessary for you to obtain a grade greater than or equal to 5.0 in the virtual evaluation activities (exams and tests), so that it can average with the rest of the activities.

The course will form a single block that will be evaluated in a knowledge test (practical or simulation exams, together with theoretical knowledge tests).

The teacher reserves the right to request an additional individual assessment for any of the assessment items in the event of doubts about the student's authorship.

7.2. Second examination period (Extraordinary)

Campus-based mode:

To pass the course in the extraordinary exam period you must obtain a grade greater or equal to 5.0 out of 10.0 in the final grade (weighted average of all assessment items as per table above).

Activity type and weights will be the same as those described for the ordinary exam period. In any case, it will also be compulsory to have a grade greater than or equal to 5.0 in the final exam.

The final exam on the extraordinary period will **cover the full course content**: if only one of the block exams was passed during the ordinary period, this grade will be disregarded. The grade for all other assessment activities that might have been passed during the ordinary period will be kept.

In this exam period, the student will also be allowed to re-submit all other activities (labs, simulations and Final network troubleshooting exam) that have not been passed.

Virtual mode:

To pass the course in the extraordinary exam period you must obtain a grade greater or equal to 5.0 out of 10.0 in the final grade (weighted average of all assessment items as per table above).

Activity type and weights will be the same as those described for the ordinary exam period. In any case, it will also be compulsory to have a grade greater than or equal to 5.0 in the final exam.

The final exam on the extraordinary period **will cover the full course content:**

The grade for all other assessment activities that might have been passed during the ordinary period will be kept.

In this exam period, the student will also be allowed to re-submit all other activities (labs, simulations and Final network troubleshooting exam) that have not been passed.

8. TIMELINE

This section indicates the timeline with delivery dates of assessment activities:

Assessment activities	Date
Case/problem solving	After each unit
Laboratory/workshop notebook	After each block
In-person evaluation activities- Theory	Course end
In-person evaluation activities- Practice	Course end

This timeline may be subject to changes for logistical reasons relating to the activities. The student will be informed of any changes in due time and course.

9. BIBLIOGRAPHY

The main recommended bibliography is indicated below:

- Cisco Network Academy. (2020). Introduction to Networks Companion Guide (CCNAv7) (English Edition). Cisco Press
- Cisco Network Academy. (2020). Switching, Routing, and Wireless Essentials Companion Guide (CCNAv7). Cisco Press
- Cisco Network Academy. (2020). Enterprise Networking, Security, and Automation Companion Guide (CCNAv7). Cisco Press

Additional recommended bibliography:

- Tanenbaum,Andrew S. , AU - Wetherall,David J., Computer networks (2011) Boston Pearson Prentice Hall
- Kurose,James F, Ross,Keith W. “Computer Networking: A Top-down Approach” 2013 Harlow (England) Pearson Education
- Sequeira,Anthony “Interconnecting Cisco Network devices: Foundation learning guide Certification self-study series” (2013) Indianapolis, Cisco Press

10. DIVERSITY AWARENESS UNIT

From the Educational Guidance and Diversity Unit we offer support to our students throughout their university life to help them reach their academic achievements. Other main actions are the students inclusions with specific educational needs, universal accessibility on the different campuses of the university and equal opportunities. From this unit we offer to our students:

1.Accompaniment and followup by means of counselling and personalized plans for students w ho need to improve their academic performance.

2.In terms of attention to diversity, non-significant curricular adjustments are made in terms of methodology and assessment for those students with specific educational needs, pursuing an equal opportunities for all students.

3. We offer students different extracurricular resources to develop different competences that will encourage their personal and professional development.

4. Vocational guidance through the provision of tools and counselling to students with vocational doubts or who believe they have made a mistake in their choice of degree.

Students in need of educational support can write to us at:
orientacioneducativa@universidadeuropea.es

11. ONLINE SURVEYS

Your opinion matters!

The Universidad Europea encourages you to participate in several surveys which help identify the streng ths and areas we need to improve regarding professors, degree programs and the teaching-learning process.
The surveys will be made available in the “surveys” section in virtual campus or via e-mail.
Your assessment is necessary for us to improve.
Thank you very much for your participation.

12. PLAGIARISM REGULATIONS

In accordance with the disciplinary regulations of students of the European University:

- Plagiarism, in whole or in part, of intellectual works of any kind is considered a very serious offence.
- Very serious offenses related to plagiarism and the use of fraudulent means to pass any of the assessment activities will result in the loss of the corresponding examination period, as well as the reflection of the offense and its reason in the student’s academic record.

13. REGULATION FOR THE USE OF AI

- The student must be the author of his or her works/activities.
- The use of Artificial Intelligence (AI) tools must be authorized by the teacher in each work/activity, indicating how their use is permitted. The teacher will inform in advance in which situations AI tools can be used to improve spelling, grammar and editing in general. The student is responsible for specifying the information given by the tool and duly declaring the use of any AI tool, based on the guidelines set by the teacher. The final decision on the authorship of the work and the appropriateness of the reported use of an AI tool rests with the teacher and those responsible for the degree.