Syllabus
2025 - 2026

TECHNICAL SHEET OF THE SUBJECT

Data of the subject

Subject name	Networks, Communication Systems and Cybersecurity
Subject code	E000011652
Mainprogram	Official Master's Degree in Business Administration - MBA
Involved programs	Máster Universitario en Administración de Empresas (MBA) [First year]
Level	Postgrado Oficial Master
Quarter	Semestral
Credits	3,0 ECTS
Type	Optativa
Department	Department of Telematics and Computer Sciencies
Coordinator	Germán Martín Boizas
Office hours	Appointment with teacher vie e-mail
Course overview	Understanding of network technologies and systems that form the basis of current information systems and the technological revolution. The course provides a brief introduction to computer systems, software and different elements of data communication networks, together with basic concepts of risk management and cybersecurity, which will allow future business decisions with technological implications to be approached with sufficient elements of judgment. Without being a technology specialist, today's manager has to know the key factors and the technological consequences of their decisions, so the course makes an introduction to the IT strategy and how it should be aligned with the business, the management of information security in the company and how to ensure business continuity. The course ends with a brief introduction to some of the current technology trends.

Teacher Information

SPECIFIC DATA OF THE SUBJECT

Contextualization of the subject

Contribution to the professional profile of the degree

The dynamics of today's society are driven by the presence of technology in the personal and business domains. Understanding the foundations that enable this technological era allows for informed decision making and the ability to upgrade to future paradigms. This course provides an introduction to the concepts, terminology and approaches used in data processing and communication systems, with a special focus on the safeguarding and security of data.
The modern executive must have a solid foundation of the different technological trends and their applications, in order to make decisions based not on fancy fashions, but on gaining a competitive advantage.

Objectives:

- To introduce the student to a firm foundation of basic current technological concepts.
- To create in the student a rigorous vision of the challenges of cybersecurity posed by the use of new technologies in the company and assess their risks in decision making.
- To provide the student with elements of judgment at the time of approaching technological decisions that make possible the

competitiveness and continuity of the business.

- To introduce an overview of the main current technological trends: IoT, Blockchain, Artificial Intelligence, etc.

Competencies - Objectives

Competences

GENERALES	
CG01	Analytic and synthesis cognitive capacities applied to business situations and managing and organisation problems.
CG02	Management of data and information as key elements for decision-making and for identification, formulation and resolution of business problems.
CG03	Problem-solving and decision-making skills at a strategic, tactic and operational level with regard to a business, considering the interrelationship between the different functional and business areas.
CG04	Interpersonal skills such as listening, negotiating, persuading, working in multidisciplinary teams, in order to effectively address different tasks, and, when appropriate, capacity to exert leadership in the corresponding business organization.
CG05	Ethical commitment with a behaviour based in moral principles and those principles of the organisation when facing moral dilemmas and corporate social responsibility issues.
CG06	Time management capacity with the purpose of improving personal and team efficiency within business organizations, its environment and its management.
CG09	Knowledge, understanding and handling of tools for diagnosis of the competitive position of a company, and designing and executing the company's strategic plan.

THEMATIC BLOCKS AND CONTENTS

Contents - Thematic Blocks

Block I: Basic technology knowledge

1. Computer fundamentals & System Architecture
    - Definition of Computing.
    - Computing History
    - Main Components
    - Data representation. Bits & Bytes.
    - Storage types. File Systems, Partition & Disks.
    - Operating Systems
    - Application Software
    - Systems Evolution
    - Virtual Servers & Containers
    - Cloud: IaaS, PaaS, SaaS.
    - Information Technology Concepts

2. Software
    - Programming & Programming Languages
    - Software Engineering
    - Software Development frameworks: Waterfall, Agile, DevOps,...
    - Bugs. Bug-Free/Secure SW Development need & challenges.
    - Alternatives: Proprietary vs Home-Made Software, SaaS.
    - Open Source Software
3. Networking (I)
    - Networking introduction
    - TCP/IP Model
        - Physical Layer
        - Data Link Layer
        - Network Layer
4. Networking (II)
    - TCP/IP Model: Transport Layer
    - OSI Model
    - Networking Hardware
    - Some Common Protocols: DNS, HTTP, SMTP, DHCP.
    - IP Private addresses: NAT, PAT, VPN, VLAN
5. WiFi & Mobile networks
    - Wireless networks. WiFi & others
    - Mobile networking, 2G to 5G
    - Mobile devices. Operating Systems. Android & IOS
    - App Revolution.
    - Corporate challenges: BYOD (Bring Your Own Device), Mobility, ...
6. Cybersecurity Fundamentals
    - Introduction & basic concepts
    - Risk management
    - ASA Model
    - Know your enemy
    - Information Security
    - Legal Framework
    - Some Conclusions
7. Introduction to Cryptography
    - Introduction & basic concepts
    - Symmetric Cryptography
    - Cryptography history
    - Hash Functions
    - Asymmetric Cryptography
    - Applied Cryptography

Block II: Technological Corporate Decisions

1. Cloud Computing
    - Overview. Definition & main characteristics
    - Origins and evolution
    - Advantages/Problems

- Deployment models: Public vs Private vs Hybrid.
- Main Cloud Services
- Cloud Transformation. The business case for Cloud Computing.

2. Identity Management. Security Policies, Governance and Operations.
   - Access Controls. Authentication & Identity Management
   - Secure communications. Firewalls
   - Security Policies.
   - Security Governance
   - Incident detection & response
   - Introduction to digital Forensics.
3. Assessing security
   - Security Assessments.
   - Hacking & pen-testing
   - Malware & attacks. Historic evolution (Focus on Network attacks).
   - Countermeasures
4. Business Continuity
   - Business Continuity. Definition. Justification & models.
   - Disaster Recovery & Crisis Management.
   - Logical & Physical Security Convergence.
5. IT Strategy Introduction
   - Definitions
     - IT origins
     - IT as a service provider
     - Key Roles: CIO, CDO, CISO, ...
     - IT Challenges
   - IT Strategy in simple steps
   - Frameworks: ISO 38500, ITIL, COBIT
   - Enterprise Architecture introduction
   - IT Sourcing

Block III: Current technological trends

1. Tech Trends (I)
   - APIs & Microservices
   - Blockchain
   - Voice Interfaces
2. Tech Trends (II)
   - Internet of Things
   - Introduction to IA & Machine Learning
   - Quantum Computing
3. Tech Trends (III)
   - Additive Manufacturing (3D Printing)

TEACHING METHODOLOGY

General methodological aspects of the subject

In-class Methodology: Activities	
Teaching lectures, in which the theoretical content of the course will be presented by means of audiovisual resources and a guided discussion of the concepts presented will be encouraged.	CG02, CG04
Guided practice of cases applying the concepts learned to real or simulated situations.	CG03, CG05, CG09, CG04
Non-Presential Methodology: Activities	
Personal tutored work. Expansion of the knowledge obtained in class by reading bibliography and references, as well as documenting for the execution of the proposed activities.	CG05, CG09
Individual work for the guided **resolution of cases** applying the concepts learned through personal work to real or simulated situations.	CG02, CG03, CG04

SUMMARY STUDENT WORKING HOURS

CLASSROOM HOURS			
Lectures of an expository nature	Analysis and resolution of cases and exercises, individually or collectively		
25.00	5.00		
NON-PRESENTIAL HOURS			
Analysis and resolution of cases and exercises, individually or collectively	Study and documentation	Monographic and research work, individual or group work	Tutorial sessions
15.00	15.00	10.00	5.00
ECTS CREDITS: 3,0 (75,00 hours)			

EVALUATION AND CRITERIA

The use of AI to produce full assignments or substantial parts thereof, without proper citation of the source or tool used, or without explicit permission in the assignment instructions, will be considered plagiarism and therefore subject to the University's General Regulations.

Evaluation activities	Evaluation criteria	Weight
Final exam	Knowledge of the subject To pass the subject, students must obtain a 5/10 in the exam	50

Exercises & Cases	Knowledge of the subject and clarity in the exposition. Correct application of the concepts shown in class to practical situations, supporting opinions and arguments with clear reasoning and data.	30
Class attendance and participation	Active participation in class. Attendance requirement: 80%.	20

Ratings

In order to pass the course, the student must obtain at least the following:

- Attendance requirements: 80%.
- Cases and exercises: 5/10.
- Final exam: 5/10.

The final grade will be obtained by weighting all the components, and must be equal or higher than 5/10.

Those students who do not pass the first evaluation may repeat the individual exam in the recovery period. The grades achieved by the students in the rest of the components of the evaluation -with their corresponding weightings in the final grade- will be maintained in this second evaluation.

Students with attendance waiver:

- In order to pass the module, these students must present the cases and exercises and take the final exam. The final grade will be obtained by weighting all the components, and must be equal or higher than 5/10.

WORK PLAN AND SCHEDULE

Activities	Date of realization	Delivery date
Practical exercise about Software decisions	Session 2	Session 3
Cloud computing business case	Session 8	Session 10
Business continuity & crisis management case	Session 11	Session 13

BIBLIOGRAPHY AND RESOURCES

Basic Bibliography

- Class notes and documentation.
- (ISC)2 CISSP Certified Information Systems Security Professional Official Study Guide
- Cisco networking Academy (https://skillsforall.com)