Academic Master's 2 Program (Harmonized)

National Program
Updated: 2022

Domain: Sciences and Technologies

Field: Telecommunications
Specialization: Networks and Telecommunications

Admission Conditions

Holder of a Master's 1 degree in Networks and Telecommunications, meeting the admission requirements.

Semester Organization Sheets

Semester 3

Teaching Unit	Subjects/ Titles	Credits	Coefficien	Weekly Hours (Course/ Tutorials/ Labs)	Semester Hours (15 weeks)	Complementary Work	Evaluation Mode (Continuous/Exam)	
Fundamental TU (FTU 2.1.1)	Wireless and Mobile Networks	6	3	3h/1h30/0h	67h30	82h30	40%	60%
	Cryptography and Network Security	4	2	1h30/1h30/0h	45h00	55h00	40%	60%
Fundamental TU (FTU 2.1.2)	Video and Audio over IP	4	2	1h30/1h30/0h	45h00	55h00	40%	60%
	Web Technologies	4	2	1h30/1h30/0h	45h00	55h00	40%	60%
Methodological TU (MTU 2.1)	Lab Wireless and Mobile Networks	2	1	0h/0h/1h30	22h30	27h30	100%	
	Lab Cryptography and Network Security	2	1	0h/0h/1h30	22h30	27h30	100%	
	Lab Web Technologies and VoIP	2	1	0h/0h/1h30	22h30	27h30	100%	
	Artificial Intelligence	3	2	1h30/0h/1h	37h30	37h30	40%	60%
Discovery UE (UED 2.1)	Elective Subject 1	1	1	1h30/0h/0h	22h30	02h30	100%	
	Elective Subject 2	1	1	1h30/0h/0h	22h30	02h30	100%	
Transversal TU (TTU 2.1)	Document Research and Thesis Design	1	1	1h30/0h/0h	22h30	02h30	100%	

Total Semester 3: 30 Credits, 17 Coefficients, 375h00

Elective Subjects for Discovery Units (S3)

1. Linux System
2. Standards and Protocols
3. Data Representation in Images and Videos
4. Satellite Networks
5. Internet of Things (IoT)
6. Field Networks
7. Operator Networks
8. Wireless Sensor Networks
9. Electromagnetic Compatibility
10. Embedded Systems and Telecommunications
11. Radar Techniques
12. Space Telecommunications
13. Radionavigation System
14. Emerging Areas in Optical Telecommunications
15. Optical Fiber Installation and Maintenance
16. Radio Engineering
17. VSAT Technology
18. Propagation of Acoustic Microwaves in Piezoelectric Solids
19. RF and Microwave Measurements
20. Portable Micro-Antennas
21. Emerging Telecommunication Systems
22. Theoretical Physics of Optical and Microwave Analogies
23. Biological Effects of Electromagnetic Waves (Bioelectromagnetism)
24. CAD for Telecom Circuits
25. Characterization of RF Devices

Semester 4

Internship in a company or research laboratory, culminating in a thesis and defense.

Activity	Hours	Coefficient	Credits
Personal Work	550	09	18
Internship	100	04	06
Seminars	50	02	03
Other (Supervision)	50	02	03
Total Semester 4	750	17	30

Evaluation of the Master's Final Project

- Scientific Value (Jury Assessment) /6
- Thesis Writing (Jury Assessment) /4
- Presentation and Q&A (Jury Assessment) /4
- Supervisor's Assessment /3
- Internship Report Presentation (Jury Assessment) /3

Semester 3 – Teaching Objectives Table

Subject Title	Teaching Objectives
Wireless and Mobile Networks	Understand architectures, protocols, and services in wireless and cellular networks (Wi-Fi, WiMAX, 3G, 4G, 5G). Learn about planning, QoS, spectrum management, and cognitive radio.
Cryptography and Network Security	Explore symmetric and asymmetric encryption, cryptanalysis techniques, and practical network security tools such as firewalls, VPNs, and IPsec. Gain competence in designing secure network systems.
Video and Audio over IP	Learn protocols (RTP, RTSP, SIP), compression standards (G.711, H.264), and streaming techniques. Understand architecture and implementation of VoIP, IPTV, and real-time multimedia services.
Web Technologies	Master client-server web architectures. Learn HTML/CSS/JavaScript, PHP/ASP/JSP, database interaction, and AJAX frameworks. Understand web design principles.
Lab: Wireless and Mobile Networks	Acquire hands-on skills in configuring and testing wireless setups (Wi-Fi, WiMAX, 3G/4G). Use spectrum analyzers, QoS monitoring tools, and simulation platforms like ATTOL.
Lab: Cryptography and Network Security	Practice implementing encryption (Feistel, DES, AES) and security mechanisms (DMZ, IPsec VPN) using MATLAB and simulation tools.
Lab: Web Technologies and VoIP	Develop and test multimedia web applications. Set up web and SIP servers. Analyze VoIP traffic and implement video streaming techniques.
Artificial Intelligence	Learn AI/ML techniques (regression, classification, CNNs, reinforcement learning). Apply them to telecom problems like resource allocation, modulation recognition, and signal classification using Python (TensorFlow, Keras).
Elective Subject 1 & 2 (e.g., IoT, Field Networks)	Gain focused expertise in emerging topics like IoT, field networks, satellite systems, embedded telecom, etc. Learn application-level protocols and platform design.
Document Research and Thesis Design	Develop research and scientific writing skills. Learn how to define research topics, collect/analyze information, avoid plagiarism, and present results effectively.

Semester 4 – Final Master Project Structure

Component	Teaching Objectives
Internship (100h)	Apply technical and scientific skills in a real-world company or lab environment. Gain practical experience and explore research or industrial challenges.
Personal Work (550h)	Independently develop, analyze, and solve a substantial engineering/research problem. Build a complete project under supervision.
Seminars (50h)	Attend and participate in scientific or technical seminars related to the research topic. Enhance knowledge and academic discussion skills.
Supervision (50h)	Receive structured guidance and feedback throughout the thesis development. Benefit from expertise and academic mentoring.