

**DOUBLE DEGREE AGREEMENT BETWEEN
UNIVERSITAT POLITÈCNICA DE VALÈNCIA (SPAIN)
AND TELECOM BRETAGNE (FRANCE)**

VICERECTORADO DE RELACIONES INTERNACIONALES Y COOPERACION UNIVERSIDAD POLITÈCNICA VALENCIA	
05 MAY. 2014	
SALIDA 10826/	ENTRADA 1410

In Valencia, November 28th, 2013

BETWEEN

On the one hand, the Universitat Politècnica de València, hereafter referred to as UPV, whose VAT no. is Q-4618002-B, established by the Spanish Government Act no. 495 of the 11th of March 1971, published on the Congressional Record of the 26th of March 1971, having its head office at Camino de Vera, s/n, in Valencia, P.C. 46022, Spain, and on its behalf the President Mr. Francisco José Mora Más, appointed by the Valencian Regional Government Act no. 65/2013, of 30th May, and pursuant to the authority conferred by article 53-d of the UPV Statues, approved by Valencian Regional Government Act no. 182/2011, of 25th November.

And on the other hand, Dr Paul Friedel, Director of Telecom Bretagne, with its registered address at Technopôle Brest-Iroise, CS 83818, 29238 Brest Cedex 3 (France), acting on behalf of this school

DECLARE

I

That the UPV is a Public Law entity with its own legal personality that carries out teaching, research and scientific and technological development. As stated in Article 2 of its Statutes, it is interested in intensifying international co-operation through exchange visits involving members of the University community, collaboration in the fields of teaching, research, technological development and innovation, one of the objectives of the UPV being that of allowing all its students to undertake part of their university studies at universities in other countries.

II

That Telecom Bretagne is a public graduate engineering school and an international research centre in the field of information technologies, under the aegis of the French Ministry in charge of Industry. The school awards the degree of "Ingénieur Telecom Bretagne" (Master's degree), accredited by the French Commission des Titres d'Ingénieur (CTI) and equivalent to the Master of Telecommunication Engineering from the UPV. Telecom Bretagne is a member of the Institut Mines-Telecom and the European University of Brittany. It has three locations, in Brest (main campus), Rennes and Toulouse.

III

That both the UPV and Telecom Bretagne, through the signature of this agreement, promote the exchange of the students in degree courses of Master in Telecommunication Engineering from the UPV and "Ingénieur Telecom Bretagne" to obtain a double degree. Both institutions



recognize that they exchanged students in Telecommunication Engineering during several academic years, and even they had a Double Degree agreement based on the disappeared Telecommunications Integrated Master at UPV.

NOW, THEREFORE, in consideration of the foregoing, the UPV and the Telecom Bretagne hereby enter into and sign a Double Degree Agreement, in accordance with the following

CLAUSES

FIRST – PURPOSE OF THE AGREEMENT

The purpose of this agreement is to establish a framework for collaboration between the UPV, Escuela Técnica Superior de Ingenieros de Telecomunicación (ETSIT), and Telecom Bretagne in order to establish the conditions that students from these institutions must fulfil to gain the academic degrees of Master in Telecommunication Engineering from the ETSIT-UPV and “Ingénieur Telecom Bretagne”.

SECOND - CONDITIONS

1. There are two different itineraries for the ETSIT-UPV and Telecom Bretagne students, and depending on each one the number of the minimum ECTS already achieved in the home university are different (see annex I):
 - a. ETSIT-UPV to Telecom Bretagne (itinerary 1a): ETSIT-UPV students must have completed a minimum of 180 ECTS at ETSIT-UPV at Bachelor level (*Grado*) and also a minimum of 60 ECTS at ETSIT-UPV at Master level¹
 - b. ETSIT-UPV to Telecom Bretagne (itinerary 2a): ETSIT-UPV students must have completed a minimum of 60 ECTS at ETSIT-UPV at Master level
 - c. Telecom Bretagne to ETSIT-UPV (itinerary 1b): Telecom Bretagne students must have completed a minimum of 2 academic (S1, S2, S3 and S4) years at Telecom Bretagne
 - d. Telecom Bretagne to ETSIT-UPV (itinerary 2b): Telecom Bretagne students must have completed a minimum of 3 semesters (S1, S2 and S3) at Telecom Bretagne
2. The students during their stay at the host university will be enrolled in their home university. For this purpose, the current regulations for grantees will be applied in the respective countries. The students participating in the double degree program are exempt from paying tuition fees at the destination university.
3. The ETSIT-UPV students will enroll in Telecom Bretagne as any European Union citizen and are required to comply with the examination regulations of the destination university.

¹ For ETSIT-UPV students following this *itinerary 1a* must be remarked that they will follow the UPV requirements to register in the Master once the Bachelor degree is awarded.



4. Students from Telecom Bretagne will enroll in the ETSIT-UPV as any European Union citizen and are required to comply with the examination regulations of the destination university.
5. After successful completion of studies and according to the respective regulations, the UPV will award the degree of "Máster Ingeniero de Telecomunicación" and Telecom Bretagne the degree of "Ingénieur Telecom Bretagne" (Master's degree).
6. Both institutions will assist the students in finding accommodation and with social integration.
7. The exchange will be done through the Erasmus programme or its successor and starts at the beginning of each academic year.
8. Both institutions will provide exchange students with the adequate possibility to improve their knowledge of the language of the host country. The host university will provide continuous language training for the incoming students.
9. All the students must prove that they are covered by a health insurance in their mobility, to be covered in case of accident or illness
10. All the students in mobility under this agreement can not apply, in the host university, to other mobility grants handled by this university.
11. Both universities state a number of 3 students per university and per year that can apply for this Double Degree agreement, and they will try to keep the reciprocity.

THIRD – IMPLEMENTATION OF THE AGREEMENT

a) Mobility from ETSIT-UPV to Telecom Bretagne.

Before mobility, ETSIT-UPV students must demonstrate knowledge of French equivalent to level B1.

The ETSIT-UPV students must accomplish the following requirements to obtain a double degree:

- Itinerary 1a: The students must have completed at least 180 ECTS in the ETSIT-UPV, as indicated in Annex I (denoted as **BACHELOR 1**, **BACHELOR 2** and **BACHELOR 3** in Annex I-Itinerary 1a).
 - They will have to complete in Telecom Bretagne 60 ECTS (denoted as **S3-S4** in Annex I-Itinerary 1a) and, after 60 ECTS at ETSIT-UPV for the 1st Master academic year (denoted as **MASTER 1** in Annex I-Itinerary 1a), another 60 ECTS in Telecom Bretagne (denoted as **S5-S6** in Annex I-Itinerary 1a). Courses are indicated in Annex II. (See foot note 1 at page 1).
- Itinerary 1b: The students must have completed at least 60 ECTS in the ETSIT-UPV, as indicated in Annex I-Itinerary 1b.
 - They will have to complete in Telecom Bretagne 120 ECTS (denoted as **S3-S4** and **S5-S6** in Annex I-Itinerary 2a) in combination with the following activities (96 ECTS + 24 ECTS of the Master Thesis or internship as indicated in Annex II).
- Other requirements for ETSIT-UPV students to obtain Telecom Bretagne's degree:
 - to spend at least 8 months doing an internship (including the S6 internship that lasts 6 months)
 - to learn 2 languages (French and English) up to a required level
 - to obtain 2 ECTS in the intersemester courses offered every January at Telecom Bretagne.



- b) Mobility from Telecom Bretagne to the ETSIT-UPV
Before mobility, Telecom Bretagne students must prove knowledge of Spanish equivalent to level B1.

Students from Telecom Bretagne must meet the following requirements to obtain a double degree:

- Itinerary 2a: The students must have completed at least 120 ECTS in Telecom Bretagne, as indicated in Annex I (denoted as **S1-S2** and **S3-S4** in Annex I-Itinerary 2a).
 - They will have to complete in the ETSIT-UPV 60 ECTS (denoted as **MASTER 1** in Annex I-Itinerary 2a) and another 30 ECTS at ETSIT-UPV or Telecom Bretagne or at a company, as **S6** or Master Thesis, always co-tutored by one professor from each university. Courses are indicated in Annex II.
- Itinerary 2b: The students must have completed at least 90 ECTS in Telecom Bretagne, as indicated in Annex I-Itinerary 2b).
 - They will have to complete in the ETSIT-UPV 30 ECTS (denoted as **BACHELOR 4 2nd semester** in Annex I-Itinerary 2a) and then to follow the itinerary 2a.

In all the 4 cases the students must be registered in the course "*Tesis de Máster*" (Master Thesis) (see table I, column 4) at ETSIT-UPV.

FOURTH – EFFECTIVE DATE AND DURATION

This agreement shall come into effect as of the moment it is signed and shall remain effective for a period of four (4) years with the possibility of extending it for additional periods, if the two signing parties expressly agree to do so.

FIFTH – AMENDMENTS

The parties may amend this agreement at any time, provided the two signing parties expressly agree to do so.

SIXTH – TERMINATION OF THE AGREEMENT

This Agreement may be terminated for the following reasons:

- By mutual agreement between the parties.
- By expiry of the initial period of validity or of its extensions.
- By failure to fulfil the obligations that were established or due to having breached the duty of trust.
- By unilateral decision taken by one of the parties, provided written notice to this effect is given six months before the date on which the agreement is to be terminated.

In any case, if the decision is taken to terminate this agreement prematurely, the two parties commit themselves to finish any undertakings that have already been started when notice of the termination is given.



SEVENTH- RESOLUTION OF CONTROVERSIES

The parties undertake to resolve any discrepancies that may arise from the implementation of this agreement in a friendly manner. Should this give rise to some kind of conflict, the parties shall finally comply with the International Chamber of Commerce rules of arbitration, with the aid of an arbitrator chosen in keeping with such rules.

This Agreement is signed in four in the place and on the date indicated above.

For Universidad Politécnica de Valencia

For Telecom Bretagne



President: Prof. Dr. Francisco J. Mora Mas



27/02/2014

Director: Dr. Paul Friedel



For ETSIT-UPV



Dean: Dr. Alberto González Salvador



ANNEXES TO THE AGREEMENT:

ANNEX I.-FLUX DIAGRAM OF THE 4 MOBILITIES 1A, 1B AND 2A, 2B

ANNEX II.-PLAN OF COURSES TO BE TAKEN IN EACH UNIVERSITY DEPENDING ON THE ITINERARY

ANNEX III.-DESCRIPTION OF THE CREDIT AND GRADING SYSTEM APPLIED AT EACH UNIVERSITY AND THEIR EQUIVALENCE

ANNEX IV.-FOLLOW-UP AND CO-ORDINATION COMMITTEE

JUST FOR UPV:

ANNEX V.-INFORME DE LA COMISIÓN ACADÉMICA DEL TÍTULO CORRESPONDIENTE. INFORME DE LA COMISIÓN ACADÉMICA DEL PROGRAMA DE DOCTORADO EN CASO DE CONVENIO PARA ESTUDIOS DE DOCTORADO

ANNEX VI.- RESOLUCIÓN DE LA SUBCOMISIÓN DE RECONOCIMIENTO DE CRÉDITOS DE LA UPV ACEPTANDO LA PROPUESTA DE RECONOCIMIENTO DE CRÉDITOS DE LOS ESTUDIOS CURSADOS EN LA UNIVERSIDAD DE ORIGEN

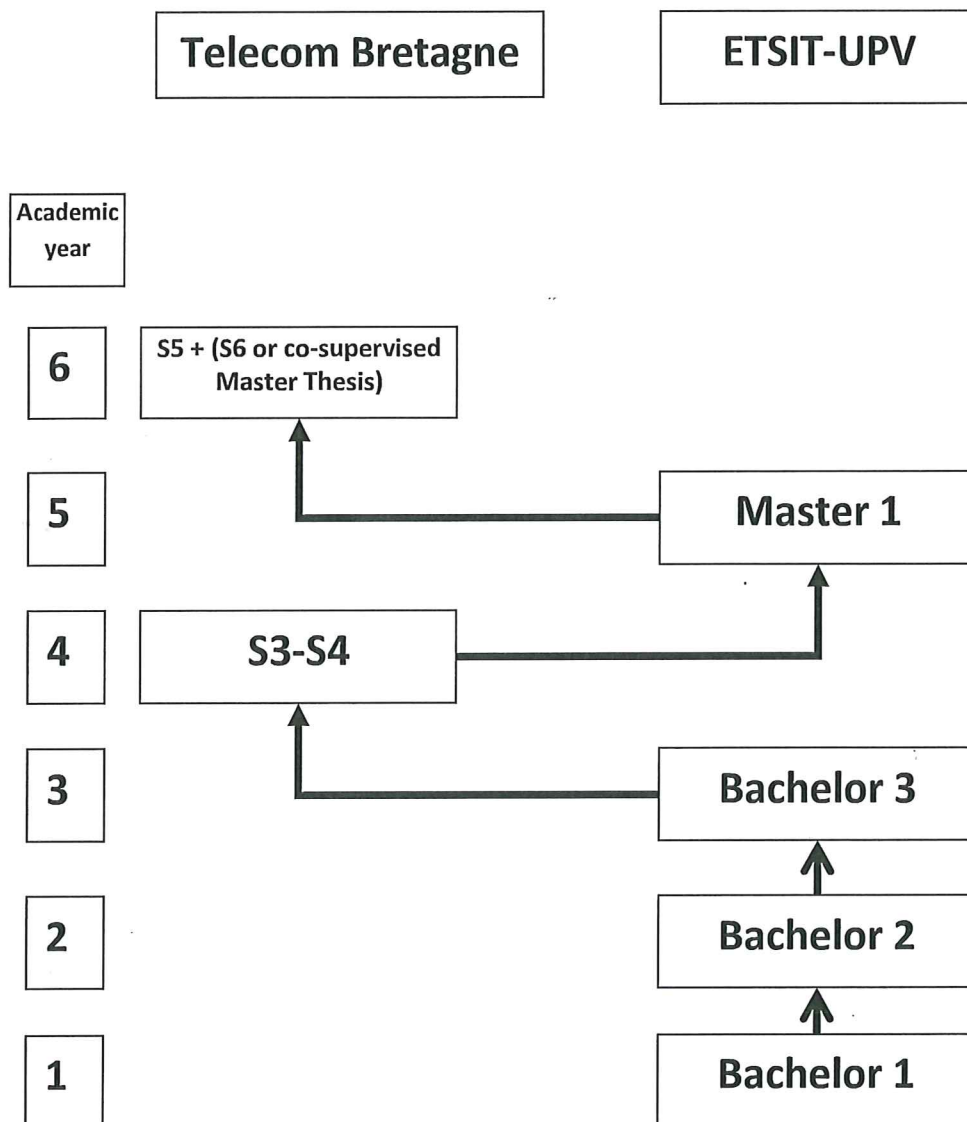
ANNEX I

**Flux diagram of the 4
mobilities 1a, 1b and 2a, 2b**

ITINERARY 1a: ETSIT-UPV to Telecom Bretagne

[each box represents:

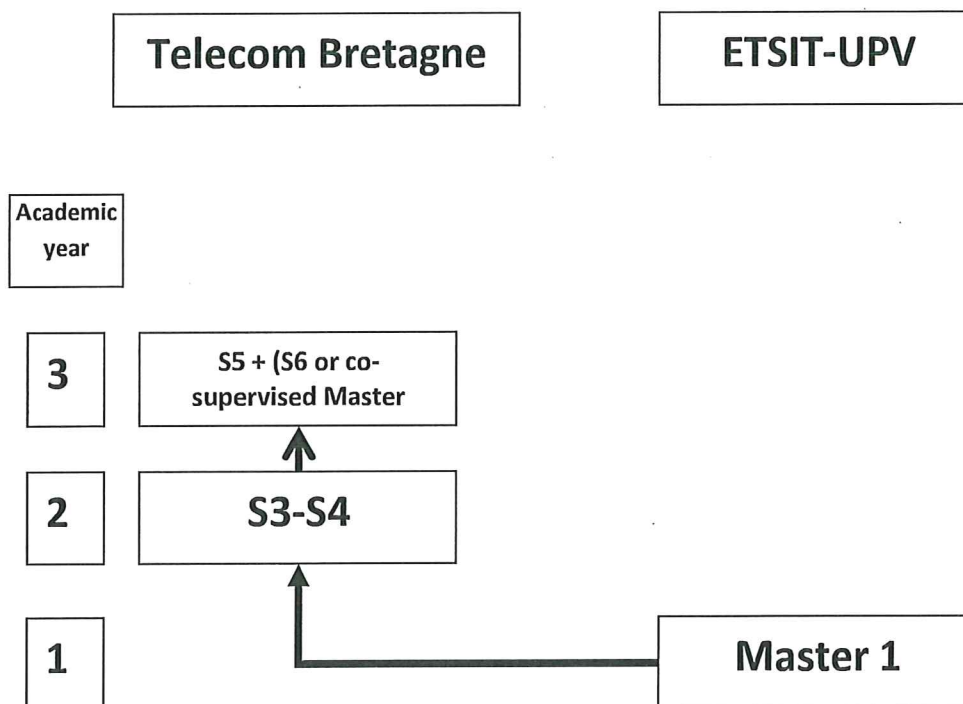
30 ECTS (1st semester)+ 30 ECTS (2nd semester), except S5 and S6 in Telecom Bretagne that are 36 ECTS + 24 ECTS]



ITINERARY 1b: ETSIT-UPV to Telecom Bretagne

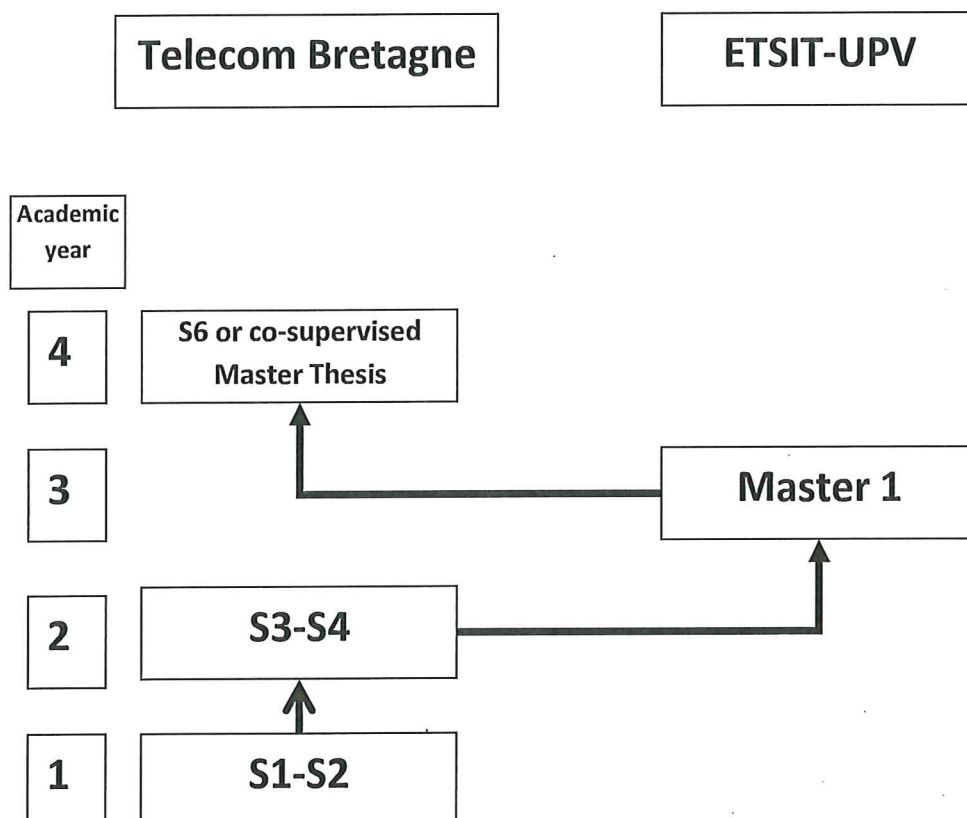
[each box represents:

30 ECTS (1st semester)+ 30 ECTS (2nd semester), except S5 and S6 in Telecom Bretagne that are 36 ECTS + 24 ECTS]



ITINERARY 2a: Telecom Bretagne to ETSIT-UPV

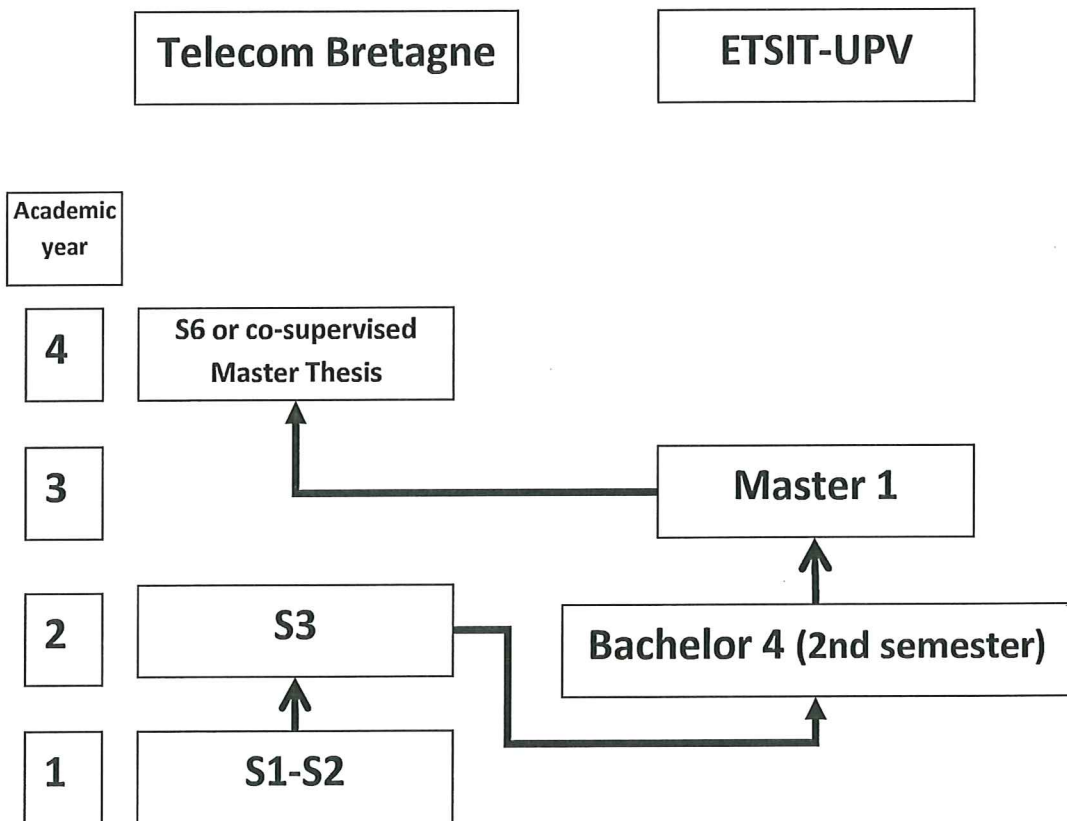
[each box represents:
30 ECTS (1st semester)+ 30 ECTS (2nd semester), and S6
represents just one semester]



ITINERARY 2b: Telecom Bretagne to ETSIT-UPV

[each box represents:

30 ECTS (1st semester)+ 30 ECTS (2nd semester) and S6 represents just one semester]



ANNEX II

Plan of Courses to be Taken in each University Depending on the Itinerary

ITINERARY 1a

ACEDMIC YEARS: 1 st , 2 nd and 3 rd	ACADEMIC YEAR: 4 th	ACADEMIC YEAR: 5 th	ACADEMIC YEAR: 6 th
ETSIT-UPV students at UPV (BACHELOR 1, BACHELOR 2 and BACHELOR 3)	ETSIT-UPV students at Telecom Bretagne (S3-S4)	ETSIT-UPV students at UPV (MASTER 1)	ETSIT-UPV students at Telecom Bretagne (S5-S6)
They must have obtained 180 ECTS, all from the academic years 1, 2 and 3 at ETSIT-UPV (see table II, and IIIa, IIIb and IIIc, depending on the speciality)	List of courses at Telecom Bretagne (see table IV)	They must have obtained 60 ECTS corresponding to the 1 st academic year (see table I: MASTER 1)	List of courses at Telecom Bretagne (see table V)
Σ CP= 180 ECTS	Σ CP= 60 ECTS	Σ CP= 60 ECTS	Σ CP= 60 ECTS

ITINERARY 2a

ACADEMIC YEAR: 1 st	ACADEMIC YEAR: 2 nd	ACADEMIC YEAR: 3 rd
ETSIT-UPV students at UPV (MASTER 1)	ETSIT-UPV students at Telecom Bretagne (S3-S4)	ETSIT-UPV students at Telecom Bretagne (S5-S6)
They must have obtained 60 ECTS corresponding to the 1 st academic year (see table I)	List of courses at Telecom Bretagne (see table IV)	List of courses at Telecom Bretagne (see table V)
Σ CP= 60 ECTS	Σ CP= 60 ECTS	Σ CP= 60 ECTS

ITINERARY 1b

ACADEMIC YEARS: 1 st and 2 nd	ACADEMIC YEAR: 3 rd	ACADEMIC YEAR: 4 th
<p>Telecom Bretagne students at Telecom Bretagne (S1-S2 and S3-S4)</p>	<p>Telecom Bretagne students at ETSIT-UPV (MASTER 1)</p>	<p>Telecom Bretagne students at ETSIT-UPV or Telecom Bretagne (S6 or co-supervised Master Thesis)</p>
<p>They must have obtained 120 ECTS corresponding to the 1st and 2nd academic years</p>	<p>LIST OF COURSES AT ETSIT-UPV (see table I: MASTER 1)</p>	<p>(see table I: Master Thesis and table V: S6)</p>
<p>Σ CP= 120 ECTS</p>	<p>Σ CP= 60 ECTS</p>	<p>Σ CP= 30 ECTS</p>

ITINERARY 2b

ACADEMIC YEARS: 1 st and 1 st semester of the 2 nd	ACADEMIC YEAR: 2 nd semester of the 2 nd	ACADEMIC YEAR: 3 rd	ACADEMIC YEAR: 4 th
Telecom Bretagne students at Telecom Bretagne (S1-S2 and S3)	Telecom Bretagne students at ETSIT-UPV (BACHELOR 4 [2 nd semester])	Telecom Bretagne students at ETSIT-UPV (MASTER 1)	Telecom Bretagne students at ETSIT-UPV or Telecom Bretagne (S6 or co-supervised Master Thesis)
They must have obtained 120 ECTS corresponding to the 1 st and 2 nd academic years	LIST OF COURSES AT ETSIT-UPV (see table IIIa, IIb or IIIc, -BACHELOR 4-, depending on the desired speciality)	LIST OF COURSES AT ETSIT-UPV (see table I: MASTER 1)	(see table I: Master Thesis and table V: S6)
Σ CP= 90 ECTS	Σ CP= 30 ECTS	Σ CP= 60 ECTS	Σ CP= 30 ECTS

TABLE I.-Master courses at ETSIT-UPV

MASTER 1		MASTER 2	
Semester 1	Semester 2	Semester 1	Semester 2
PSCA: Procesamiento de señal en sistemas de comunicaciones y audiovisuales [<i>Signal processing in communication systems and audiovisuals</i>] (6 ECTS)	SYS: Sistemas y servicios de transmisión por radio [<i>Radio transmission services and systems</i>] (6 ECTS)	IRS: Implantación de redes y servicios de telecomunicación [<i>Implantation of telecommunication networks and services</i>] (4,5 ECTS)	TFM: Tesis de Master [<i>Master Thesis</i>] (30 ECTS)
ESC: Equipos y subsistemas de comunicaciones [<i>Communication devices and subsystems</i>] (6 ECTS)	RTD: Redes de transporte y distribución por cable [<i>Cable networks for transport and distribution</i>] (6 ECTS)	O: Optativas [<i>Optionals</i>] (18 ECTS)	
IST: Integración de servicios telemáticos [<i>Integration of Telematic services</i>] (6 ECTS)	IRT: Interconexión de redes de telecomunicación [<i>Interconnection of Telecommunication networks</i>] (7,5 ECTS)	ITSI: Integración de tecnologías y sistemas en ingeniería de telecomunicación [<i>Integration of technologies and systems in Telecommunication Engineering</i>] (7,5 ECTS)	
CHS: Codiseño hardware-software [<i>Hardware-Software co-design</i>] (6 ECTS)	CEAF: Circuitos electrónicos de alta frecuencia [<i>High frequency electronic circuits</i>] (6 ECTS)		
TIE: Transductores e instrumentación electrónica [<i>Electronic instrumentation and transducers</i>] (6 ECTS)	GTPT: Gestión técnica y económica de proyectos de telecomunicación [<i>Technical and economic management of telecommunication projects</i>] (4,5 ECTS)		

TABLE II.-Bachelor courses at ETSIT-UPV: Academic years 1 and 2

BACHELOR 1		BACHELOR 2	
Semester 1	Semester 2	Semester 1	Semester 2
Matemáticas I [Mathematics I] (7.5 ECTS)	Matemáticas II [Mathematics II] (7.5 ECTS)	Redes telemáticas [Telematic networks] (4.5 ECTS)	Arquitecturas telemáticas [Telematic architectures] (4.5 ECTS)
Física I [Physics I] (6 ECTS)	Física II [Physics II] (6 ECTS)	Matemáticas III [Mathematics III] (4.5 ECTS)	Teoría de la comunicación [Communication theory] (6 ECTS)
Programación [Programming] (6 ECTS)	Dispositivos electrónicos [Electronic devices] (6 ECTS)	Circuitos electrónicos [Electronics circuits] (6 ECTS)	Sistemas digitales Programables [Programmable digital systems] (4.5 ECTS)
Fundamentos de computadores [Computer basics] (4.5 ECTS)	Fundamentos de telemática [Telematic basics] (4.5 ECTS)	Probabilidad y señales (procesos) aleatorias [Statistics and random signals] (4.5 ECTS)	Acústica [Acoustics] (4.5 ECTS)
Teoría de circuitos [Circuit theory] (6 ECTS)	Fundamentos de organización y gestión de empresas [Basics of company management] (6 ECTS)	Señales y sistemas [Signal and Systems] (6 ECTS)	Radiación y propagación de Ondas [Wave radiation and propagation] (6 ECTS)
		Fundamentos de sistemas Digitales [Basics of digital systems] (4.5 ECTS)	Sistemas microprocesadores [Microprocessor systems] (4.5 ECTS)

TABLE IIIa: Bachelor courses at ETSIT-UPV: Telecommunication Systems speciality

BACHELOR 3			BACHELOR 4	
Semester 1	Semester 2		Semester 1	Semester 2
Conversión y control de Energía [<i>Energy control and conversion</i>] (4.5 ECTS)	Sistemas de telecomunicación [<i>Telecommunication systems</i>] (4.5 ECTS)		Comunicaciones móviles e Inalámbricas [<i>Mobile and wireless communications</i>] (6 ECTS)	Comunicaciones ópticas II [<i>Optical communications II</i>] (4.5 ECTS)
Fundamentos de transmisión [<i>Transmission basics</i>] (7.5 ECTS)	Tratamiento digital de señal en comunicaciones II [<i>Digital signal processing in Communications II</i>] (4.5 ECTS)		Comunicaciones ópticas I [<i>Optical communications I</i>] (4.5 ECTS)	Radiodeterminación [<i>Radiodetermination</i>] (4.5 ECTS)
Diseño de servicios telemáticos [<i>Design of telematic services</i>] (4.5 ECTS)	Líneas de transmisión [<i>Transmission Lines</i>] (4.5 ECTS)		Microondas [<i>Microwaves</i>] (6 ECTS)	Optativa IV [<i>Optional IV</i>] (4.5 ECTS)
Lengua extranjera [<i>Foreign language</i>] (4.5 ECTS)	Antenas [<i>Antennas</i>] (6 ECTS)		Comunicaciones digitales [<i>Digital communications</i>] (4.5 ECTS)	Optativa V [<i>Optional V</i>] (4.5 ECTS)
Tratamiento digital de señal en comunicaciones I [<i>Digital signal processing in Communications I</i>] (4.5 ECTS)	Política y normativa de telecomunicación [<i>Telecommunication regulations</i>] (4.5 ECTS)		Optativa I [<i>Optional I</i>] (4.5 ECTS)	Trabajo Fin de Grado [<i>Bachelor Thesis</i>] (12 ECTS)
Radiocomunicaciones [<i>Radiocommunications</i>] (4.5 ECTS)	Optativa II [<i>Optional II</i>] (6 ECTS)		Optativa III [<i>Optional III</i>] (4.5 ECTS)	

TABLE IIIb: Bachelor courses at ETSIT-UPV: *Electronic Systems* speciality

BACHELOR 3		BACHELOR 4	
Semester 1	Semester 2	Semester 1	Semester 2
Conversión y control de Energía [<i>Energy control and conversion</i>] (4.5 ECTS)	Aplicaciones de los microcontroladores [<i>Microcontroller applications</i>] (4.5 ECTS)	Microelectrónica analógica y mixta [<i>Mixed and analogic microelectronic</i>] (4.5 ECTS)	Optativa SE II [<i>Optional SE II</i>] (4.5 ECTS)
Fundamentos de transmisión [<i>Transmission basics</i>] (7.5 ECTS)	Fundamentos de VLSI [<i>VLSI basics</i>] (4.5 ECTS)	Procesadores digitales de la señal DSP [<i>DSP-Digital signal processors</i>] (4.5 ECTS)	Optativa SE III [<i>Optional SE III</i>] (4.5 ECTS)
Diseño de servicios telemáticos [<i>Design of telematic services</i>] (4.5 ECTS)	Sensores [<i>Sensors</i>] (4.5 ECTS)	Integración de sistemas digitales [<i>Digital system integration</i>] (6 ECTS)	Optativa IV [<i>Optional IV</i>] (4.5 ECTS)
Lengua extranjera [<i>Foreign language</i>] (4.5 ECTS)	Sistemas electrónicos de comunicaciones [<i>Communication electronic systems</i>] (6 ECTS)	Optativa SE I [<i>Optional SE I</i>] (4.5 ECTS)	Optativa V [<i>Optional V</i>] (4.5 ECTS)
Instrumentación y calidad [<i>Instrumentation and quality</i>] (6 ECTS)	Política y normativa de telecomunicación [<i>Telecommunication regulations</i>] (4.5 ECTS)	Optativa II [<i>Optional II</i>] (6 ECTS)	Trabajo Fin de Grado [<i>Bachelor Thesis</i>] (12 ECTS)
Electrónica analógica integrada [<i>Integrated analogic electronic</i>] (4.5 ECTS)	Optativa I [<i>Optional I</i>] (4.5 ECTS)	Optativa III [<i>Optional III</i>] (4.5 ECTS)	

TABLE IIIc: Bachelor courses at ETSIT-UPV: Telematics speciality

BACHELOR 3		BACHELOR 4	
Semester 1	Semester 2	Semester 1	Semester 2
Conversión y control de Energía [<i>Energy control and conversion</i>] (4.5 ECTS)	Redes públicas de acceso [<i>Public access networks</i>] (6 ECTS)	Redes corporativas de empresa [<i>Corporate networks</i>] (6 ECTS)	Aplicaciones telemáticas [<i>Telematic applications</i>] (4.5 ECTS)
Fundamentos de transmisión [<i>Transmission basics</i>] (7.5 ECTS)	Redes de área local [<i>Local area networks</i>] (6 ECTS)	Redes públicas de transporte [<i>Public Access networks</i>] (6 ECTS)	Sistemas multimedia [<i>Multimedia systems</i>] (4.5 ECTS)
Diseño de servicios telemáticos [<i>Design of telematic services</i>] (4.5 ECTS)	Sistemas telemáticos para la gestión de la información [<i>Telematic systems for the information management</i>] (6 ECTS)	Ingeniería de sistemas telemáticos [<i>Engineering of telematic systems</i>] (4.5 ECTS)	Optativa IV [<i>Optional IV</i>] (4.5 ECTS)
Lengua extranjera [<i>Foreign language</i>] (4.5 ECTS)	Política y normativa de telecomunicación [<i>Telecommunication regulations</i>] (4.5 ECTS)	Seguridad [<i>Security</i>] (6 ECTS)	Optativa V [<i>Optional V</i>] (4.5 ECTS)
Comunicación de datos [<i>Data communications</i>] (6 ECTS)	Optativa II [<i>Optional II</i>] (6 ECTS)	Optativa I [<i>Optional I</i>] (4.5 ECTS)	Trabajo Fin de Grado [<i>Bachelor Thesis</i>] (12 ECTS)
Conmutación [Commutation] (4.5 ECTS)		Optativa III [<i>Optional III</i>] (4.5 ECTS)	

Table IV: courses at Telecom Bretagne, semesters 3 and 4

In semesters 3 and 4 ETSIT-UPV students will have to choose 2 different domains among 5, one as major (16 ECTS) and the other as minor (8 ECTS), depending on their interests.

Domains:

- Mathematics and signal processing
- Electronics and physics
- Computer science
- Networks
- Economics and social sciences

They will also have to do a project (6 ECTS), in small multicultural groups, and study 2 languages (English and French).

Major: system design/acquisition of knowhow/ further in-depth study (168 hours).

Minor: basic understanding of systems rather than analytical or technological aspects (84 hours).

Semester 3: Entrepreneurship project (84 hours)

Semester 4: Engineering project (120 hours)

1. Mathematics and signal processing

Major unit 1 (UV1): Bases in signal and information processing (8 ECTS)	Number of hours
- Digital signals	21
- Stochastic processes	21
- Statistical signal processing	21
- Speech and images	21
Major unit 2 (UV2): Applications in signal processing (8 ECTS) – 2 mandatory courses and track 1 or 2	Number of hours
- Digital communications (mandatory)	21
- Information coding techniques (mandatory)	21
- Signal processing and digital communications in practice (track 1)	21
- Data analysis (track 2)	21
- Multimedia technologies (track 1)	21
- Stochastic modeling and simulation (track 2)	21
Minor unit 1 (UV1): Signal and information processing (8 ECTS)	Number of hours
- Digital signal	18
- Random signal processing	24
- Digital and wireless communications	21

- Speech, images and multimedia	21
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2. Electronics and physics (not allowed to ETSIT-UPV students from Electronic systems specialty)

Major unit 1 (UV1): Function modelling and devices for electronic, optical and very high frequency systems design (8 ECTS)	Number of hours
- Electronic components	21
- Devices and analog functions	19,5
- Devices and optical functions.	12
- Digital electronics	19,5
- Introduction to systems engineering	7,5
- Transmission systems and networks	4,5
- Architectures of digital processing systems	6
Major unit 2 (UV2) (8 ECTS) - one track to be chosen among the following:	Number of hours
- Biomedical sensors	87
- High speed wireless networks	87
- Monitoring systems	87
Minor unit 1 (UV1): Concepts for the analysis and design of electronic, optical and very high frequency devices (8 ECTS)	Number of hours
- Optical transmission and data processing	21
- Analog RF and microwave design	21
- Digital functions design	21
- Experimental project	21

3. Computer science

Major unit 1 (UV1): Software and data engineering (8 ECTS)	Number of hours
- Software and data engineering	84
Major unit 2 (UV 2): Theoretical foundations of computer science (8 ECTS)	Number of hours
- Advanced analysis of algorithms	21
- Logic and languages	21
- Graph theory	18
- Distributed systems	21

Minor unit 1 (UV1): Software and data engineering (8 ECTS)	Number of hours
- Software engineering and object oriented programming	40,5
- Information systems and databases	39

4. Networks (not allowed to ETSIT-UPV students from Telematics specialty)

Major unit 1 (UV1): Architecture and protocols for networks (8 ECTS)	Number of hours
- Local area networks	21
- IP network fundamentals	21
- Mobile networks: from GSM to UMTS	21
Major unit 2 (UV2): Network engineering (8 ECTS)	Number of hours
- High speed networks: towards new architecture	21
- Performance evaluation and network reliability	42
- Network security fundamentals	42
Minor unit 1 (UV1): Network security fundamentals (8 ECTS)	Number of hours
- IP networks	21
- Mobile and wireless networks	21
- QoS and network engineering	21
- Advanced telephony	21

5. Economics and social sciences (mandatory)

Major unit 1 (UV1): Economic and legal aspects in business (8 ECTS)	Number of hours
- Economic conjuncture and policy	21
- Law and regulation within Europe	21
- Behaviour of firms and markets structure (part 2)	21
- Decision theory for the company strategy	21
Major unit 2 (UV2): Business organisation (8 ECTS)	Number of hours
- Behaviour of firms and markets structure (part 1)	21
- Organizational behaviour	21
- Marketing policy	21

- Corporate management and policy	21
Minor unit 1 (UV1): Engineer managerial environment (8 ECTS)	Number of hours
- How companies function	21
- Key issues in society, understanding and debating	42
- Strategic marketing	21

One of the minors can be replaced by Workshops (laboratory activities with a total duration of 84 hours, mainly focusing on measurement and testing and complementing the project work) or by a research-oriented semester.

Table V: Semesters 5 and 6

In semester 5 ETSIT-UPV students will have to choose one final-year option among the following:

- Engineering and system integration (in Brest or Toulouse)
- Software systems and networks (in Brest or Rennes)
- Services and business engineering (in Brest or Rennes)
- Information processing systems (in Brest)
 - o IT and health (in Montpellier)

Options are generally based on a five-level structure. Level 1 contains a common-core unit while other levels have several units as shown in the table below. A unit is made up of one or more modules. Students have to choose one unit per level and do a technical project. Total of credits: 36 ECTS.

A specific course for entering the professional world is also part of this semester.

	OPTION 1 Engineering and system integration Brest	OPTION 1 Engineering and system integration Toulouse	OPTION 2 Software systems and networks Brest	OPTION 2 Software systems and networks Rennes	OPTION 3 Services and business engineering Rennes	OPTION 3 Services and business engineering Brest	OPTION 4 Information processing systems Brest	OPTION 4 Information processing systems Montpellier
Level 6								
Level 5	Integrated RF systems (6 ECTS)		Computer security (6 ECTS)	Service deployment and performance (6 ECTS)	Strategic marketing of new medias (6 ECTS)	Information systems and organization (6 ECTS)	Multimedia and security (6 ECTS)	Medical devices and medical robotics (5 ECTS)
	Operated networks: from infrastructure to deployed and OTT services (6 ECTS)		Engineering of mobile and ubiquitous applications (6 ECTS)	Deployment and performance of mobile networks (6 ECTS)	Business ethics (6 ECTS)	Decision aid (6 ECTS)	Heterogeneous data processing (6 ECTS)	
	Embedded systems (6 ECTS)		Operated networks: from infrastructure to deployed and OTT services (6 ECTS)	Deployment and security solutions (6 ECTS)			Heterogeneous data processing: Application to biomedical field (6 ECTS)	
	Heterogeneous data processing (6 ECTS)		Embedded systems (6 ECTS)	Strategic marketing of new medias (6 ECTS)			Trading algorithms (6 ECTS)	

Level 3	Radio and optronics design (6 ECTS)	Components of space systems (13 ECTS)	Software development engineering (6 ECTS)	Network implementation (6 ECTS)	Banking and financial engineering (6 ECTS)	Economic and legal issues in ITC (6 ECTS)	Design of digital communication systems (turbocodes and standards) (6 ECTS)	Biological and medical data processing (5 ECTS)
	Optics and photonics (6 ECTS)		Information systems design and evolution (6 ECTS)		Financial regulations (6 ECTS)	Information systems design and evolution (6 ECTS)	Advanced image processing (6 ECTS)	
	Mixed integrated circuits: design and tools (6 ECTS)		Digital integrated circuits (6 ECTS)				Conception tools in information engineering for 2D-3D images (6 ECTS)	
Level 2			Research Master in Computer Science - options (6 ECTS)				Conception tools in information engineering for finance (6 ECTS)	
	Digital images: from acquisition to applications (6 ECTS)	Basic techniques in communication and networking for space systems (10 ECTS)	Software systems evaluation, analysis and design (6 ECTS)	Innovatory networks and services (6 ECTS)	Business process management (6 ECTS)	Socio-economic assessment and audit of information systems (6 ECTS)	Digital communications systems (6 ECTS)	Economy and organisation of health systems (5 ECTS)
	Operating systems, programming systems and networks (6 ECTS)		Knowledge engineering & semantic web (6 ECTS)		Innovatory networks and services (6 ECTS)	Decision support systems (6 ECTS)	Digital images: from acquisition to applications (6 ECTS)	

Level 1	Digital communication system: from acquisition to application (6 ECTS)	Operating systems, programming systems and networks (6 ECTS)						Finance: Mathematical models (6 ECTS)	
	Transmission systems architecture (6 ECTS)	Research Master in Computer Science – common core (6 ECTS)						Transmission systems architecture (6 ECTS)	
	Complex system engineering (6 ECTS)	Project management (2 ECTS)	Distributed software systems (6 ECTS)	Integrated approach to service engineering (6 ECTS)	Integrated approach to service engineering (6 ECTS)	Integrated approach to service engineering (6 ECTS)	Statistical information processing (6 ECTS)		Basics of health sciences (5 ECTS)

Semester 6

Semester 6 is spent doing an internship, in industry or in a research centre, in France or abroad, generally related to the chosen option topics. It lasts 6 months (24 ECTS).

To validate the internship, at the end of it, students have to prepare a written report and present it orally to an examining board, made up of academic staff from Telecom Bretagne and supervisors from the host company or laboratory.

ANNEX III

**DESCRIPTION OF THE CREDIT AND GRADING
SYSTEM APPLIED AT EACH UNIVERSITY AND
THEIR EQUIVALENCE**

CREDIT SYSTEM

Both institutions use the same credit system, ECTS (European Credit Transfer System), so there is no equivalence on this.

GRADING SYSTEM

a) From Telecom Bretagne to ETSIT-UPV

$$C_{Spain} = \frac{(C_{France} - C_{xm}) \cdot (C_{em} - C_{xm})}{C_{xm} - C_{xm}} + C_{em} \quad (1)$$

Where:

C_{Spain} =Grade in ETSIT-UPV	C_{France} =Grade in Telecom Bretagne
C_{xm} =Minimum grade in Telecom Bretagne: 0	C_{xm} =Maximum grade in Telecom Bretagne: 20
C_{em} =Minimum grade in ETSIT-UPV: 0	C_{em} =Maximum grade in ETSIT-UPV: 10

b) From ETSIT-UPV to Telecom Bretagne

$$C_{France} = \frac{(C_{Spain} - C_{xm}) \cdot (C_{em} - C_{xm})}{C_{xm} - C_{xm}} + C_{em} \quad (1)$$

Where:

C_{Spain} =Grade in ETSIT-UPV	C_{France} =Grade in Telecom Bretagne
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C_{xM} = Minimum grade in ETSIT-UPV: 0	C_{xM} = Maximum grade in ETSIT-UPV: 10
C_{eM} = Minimum grade in Telecom Bretagne: 0	C_{eM} = Maximum grade in Telecom Bretagne: 20

ANNEX IV

**FOLLOW-UP AND CO-
ORDINATION COMMITTEE**

The coordination committee will consist of the following people:

FROM ETSIT-UPV	FROM Telecom Bretagne
The ETSIT-UPV Dean	The Dean of Studies
The ETSIT-UPV vice-dean of International Relations	The Head of International Office or Deputy Head

ANNEX V

INFORME DE LA COMISIÓN ACADÉMICA DEL TÍTULO CORRESPONDIENTE

ANNEX VI

**RESOLUCIÓN DE LA
SUBCOMISIÓN DE
RECONOCIMIENTO DE
CRÉDITOS DE LA UPV
ACEPTANDO LA PROPUESTA
DE RECONOCIMIENTO DE
CRÉDITOS DE LOS ESTUDIOS
CURSADOS EN LA
UNIVERSIDAD DE ORIGEN**