



UNIVERSITAT
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DE VALÈNCIA



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DE VALÈNCIA

SECRETARIA GENERAL
UP17000/2016/135/S
26 de abril de 2016

Us tramet, adjunt, el certificat de l'acord adoptat per la Comissió Acadèmica del Consell de Govern d'aquesta Universitat durant la sessió feta el dia 20 d'abril de 2016, relatiu a l'aprovació de la proposta d'acord de doble titulació amb el "Master of Science in Communication Systems and Networks" (MCSN) de la Universitat de TECHNISCHE HOCHSCHULE KÖLN, perquè en prengueu coneixement i tinga els efectes que corresponga.

Adjunto se remite certificación del acuerdo adoptado por la Comisión Académica del Consejo de Gobierno de esta Universidad durante la sesión celebrada el día 20 de abril de 2016, relativo a la aprobación de la propuesta de acuerdo de doble titulación con el "Master of Science in Communication Systems and Networks" (MCSN) de la Universidad de TECHNISCHE HOCHSCHULE KÖLN, para su conocimiento y efectos oportunos.

El secretari / *El Secretario*



José Alberto Conejero Casares

València, 20 d'abril de 2016 / *Valencia, 20 de abril de 2016*

Sr. cap del Gabinet del rector / *Sr. jefe del Gabinete del Rector*



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José Alberto Conejero Casares, secretari per delegació de la Comissió Acadèmica del Consell de Govern de la Universitat Politècnica de València,

José Alberto Conejero Casares, Secretario por delegación de la Comisión Académica del Consejo de Gobierno de la Universitat Politècnica de València,

CERTIFIQUE: Que la Comissió Acadèmica del Consell de Govern, en sessió del dia 20 d'abril de 2016, va adoptar l'acord d'aprovar l'acord de doble titulació amb el "Master of Science in Communication Systems and Networks" (MCSN) de la Universitat de TECHNISCHE HOCHSCHULE KÖLN que, com a part integrant d'aquest certificat, s'acompanya en 25 fulls, numerats, signats i segellats.

CERTIFICO: Que la Comisión Académica del Consejo de Gobierno, en sesión celebrada el día 20 de abril de 2016, adoptó el acuerdo de aprobar el acuerdo de doble titulación con el "Master of Science in Communication Systems and Networks" (MCSN) de la Universidad de TECHNISCHE HOCHSCHULE KÖLN que, como parte integrante de esta certificación, se acompaña en 25 hojas, numeradas, firmadas y selladas.

De la qual cosa done fe.

De lo que doy fe.



V. i p. / V^o B^o
El president / El Presidente

Miguel Ángel Fernández Prada

València, 20 d'abril de 2016 / Valencia, 20 de abril de 2016

**DOUBLE DEGREE AGREEMENT BETWEEN
UNIVERSITAT POLITÈCNICA DE VALÈNCIA
AND TECHNISCHE HOCHSCHULE KÖLN
FOR A DOUBLE DEGREE IMPLEMENTATION AT THE MASTER OF
TELECOMMUNICATIONS ENGINEERING**

In Valencia, November 27th, 2015

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 Statutes, approved by Valencian Regional Government Act no. 182/2011, of 25th November.

And on the other hand, Prof Klaus Becker, as representative of the Technische Hochschule Köln, hereafter referred to as THK, acting on behalf of the university

DECLARE

I

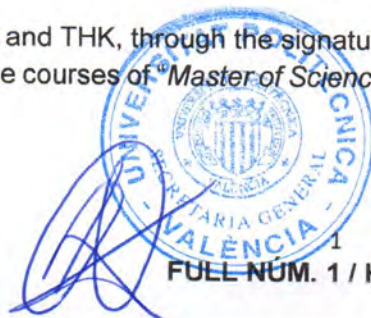
That the UPV is a Public Law entity with its own legal personality that carries out teaching, research and scientific and technological development. As stated in Article 2 of its Statutes, it is interested in intensifying international co-operation through exchange visits involving members of the University 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 THK is a German University of Applied Sciences whose main campus is located in the town of Cologne, awards the degree of "*Master of Science in Communication Systems and Networks*" (MCSN), equivalent to the "*Máster Universitario en Tecnologías, Sistemas y Redes de Comunicaciones*" (MS in Telecommunication Technologies, Systems and Networks (MSTTSN) at the UPV.

III

That both, the UPV and THK, through the signature of this agreement, promote the exchange of students in degree courses of "*Master of Science in Communication Systems and Networks*"



and “*Máster Universitario en Tecnologías, Sistemas y Redes de Comunicaciones*” (MS in Telecommunication Technologies, Systems and Networks) to obtain a double degree.

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

CLAUSES

FIRST – PURPOSE OF THE AGREEMENT

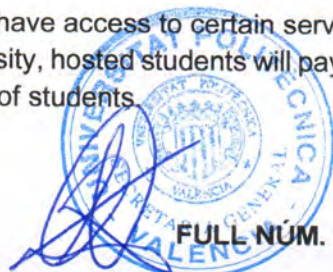
The purpose of this agreement is to establish a framework for collaboration between the UPV, Escuela Técnica Superior de Ingenieros de Telecomunicación (ETSIT), and THK, Fakultät 07, Department of Telecommunication Technology, in order to establish the conditions that students from these institutions must fulfil to gain the academic degrees of “MSc in Telecommunication Technologies, Systems and Networks” from the ETSIT-UPV and “MSc in Communication Systems and Networks” from the THK.

SECOND - CONDITIONS

1. There are 3 itineraries for the ETSIT-UPV and THK students to get the Double Degree (see annex I), that are summarized as follows for the minimum requirement for each student:
 - a. ETSIT-UPV to THK (itinerary 1): ETSIT-UPV students must have completed a minimum of 30 ECTS credits of the “*Máster Universitario en Tecnologías, Sistemas y Redes de Comunicaciones*” at ETSIT-UPV.
 - b. THK to ETSIT-UPV (itinerary 2): THK students must have completed a minimum of 30 ECTS credits of the Master program in Communication Systems and Networks
 - c. THK to ETSIT-UPV (itinerary 3): THK students must have completed a minimum of 36 ECTS credits of the Master program in Communication Systems and Networks at THK”.
2. Students have to acquire 90 ECTS credits in total during their studies at both Universities in the respective Master programs to be awarded the Double Degree. Additionally, the students from UPV have to pass the compulsory modules of the MCSN program.
3. During their stay at the host university, students will be enrolled in their home university. For this purpose, the current regulations on grants will be applied in the respective countries.

Students participating in the double degree program are exempt from paying tuition fees at the host university. This exemption does not extend to fees/charges for the issue of the official degree.

In order to have access to certain services (transportation, sports, internet, etc.) at the host university, hosted students will pay fees or public prices under the same conditions as the rest of students.



4. The ETSIT-UPV students will enroll at the THK as European Union citizens and will be required to comply with its academic regulations.
5. The THK students will enroll at the ETSIT-UPV as European Union citizens and will be required to comply with its academic regulations.
6. After successful completion of studies and according to the respective regulations, the UPV will award the degree of "*Máster Universitario en Tecnologías, Sistemas y Redes de Comunicaciones*" and the THK will award the degree of "*Master of Science in Communication Systems and Networks*".
7. Both institutions will assist students in finding accommodation and in their social integration.
8. Mobility will be supported through Erasmus+ Programme or any other available funding means. If this is not possible, the home institution has the option to decide whether or not the mobility is authorized.
9. Both institutions will provide exchange students with the adequate possibility to improve their knowledge of the language of the host country.
10. Participating students will have to make arrangements to have adequate health insurance cover for the study period abroad.
11. Participating students are not eligible to apply for other mobility grants handled by the host institution.
12. THK and UPV establish that the maximum number of participating students will be three per university and per academic year.

Both institutions will try to comply with the principle of reciprocity (the number of students received by each University in the exchange shall be equal to the number of students that are sent).

13. Exchange students will be encouraged to study the host university language (Spanish or German) during their visit
14. Selected students are required to have a B2 English level, internet-based Toefl higher than 80, IELTS band score: 6.5, or equivalent proof of English language proficiency.
15. Students are selected and admitted based on their academic results, motivation and language skills. The selection is carried out in collaboration between the two institutions. Admission of students is always at the discretion of the host institution.



THIRD – IMPLEMENTATION OF THE AGREEMENT

a) Mobility from ETSIT-UPV to THK.

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

- Itinerary 1: Students must have completed at least 30 ECTS credits at ETSIT-UPV, as indicated in Annex I-Itinerary 1.
 - They will have to complete at THK 60 ECTS (30 ECTS of courses in the summer semester + 30 ECTS of the Master Thesis or internship as indicated in Annex II).

b) Mobility from THK to the ETSIT-UPV

The THK students must fulfill the following requirements to obtain a double degree, depending on their starting semester:

- Itinerary 2 (students who start in the summer semester at THK): The students must have completed at least 30 ECTS at THK in the summer semester, as indicated in Annex I-Itinerary 2.
 - They will have to complete at ETSIT-UPV 60 ECTS (30 ECTS of courses in the winter semester + 30 ECTS of the Master Thesis or internship as indicated in Annex II).
- Itinerary 3 (students who start in the winter semester at THK): The students must have completed at least 16 or 20 ECTS at THK in the winter semester plus another 20 or 16 ECTS (complementary to the previous semester, to get in total 36 ECTS), as indicated in Annex I-Itinerary 3.
 - They will have to complete at ETSIT-UPV 54 ECTS (24 ECTS of courses in the winter semester + 6 ECTS of seminars + 24 ECTS of the Master Thesis or internship as indicated in Annex II) or
 - They will have to complete at ETSIT-UPV 24 ECTS (24 ECTS of courses in the winter semester) and another 30 ECTS for their Master Thesis at THK.

In all cases the students must be registered in the course “Tesis de Máster” (Master Thesis) 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 Technische Hochschule Köln

President: Prof. Dr. Francisco J. Mora Mas

Vice President R&D: Prof. Dr. Klaus Becker

For ETSIT-UPV

For Fakultät 07, THK



Dean: Dr. Alberto González Salvador

Dean: Prof. Dr. Stefan Kreiser



ANNEXES TO THE AGREEMENT:

ANNEX I.-FLUX DIAGRAM OF THE MOBILITIES

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:

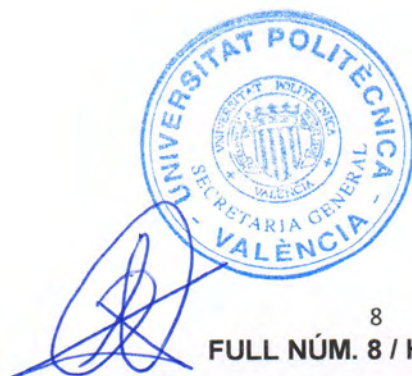
ANNEX V.-INFORME DE LA COMISIÓ ACADÉMICA DEL TÍTULO CORRESPONDIENTE. INFORME DE LA COMISIÓ ACADÉMICA DEL PROGRAMA DE DOCTORADO EN CASO DE CONVENIO PARA ESTUDIOS DE DOCTORADO

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



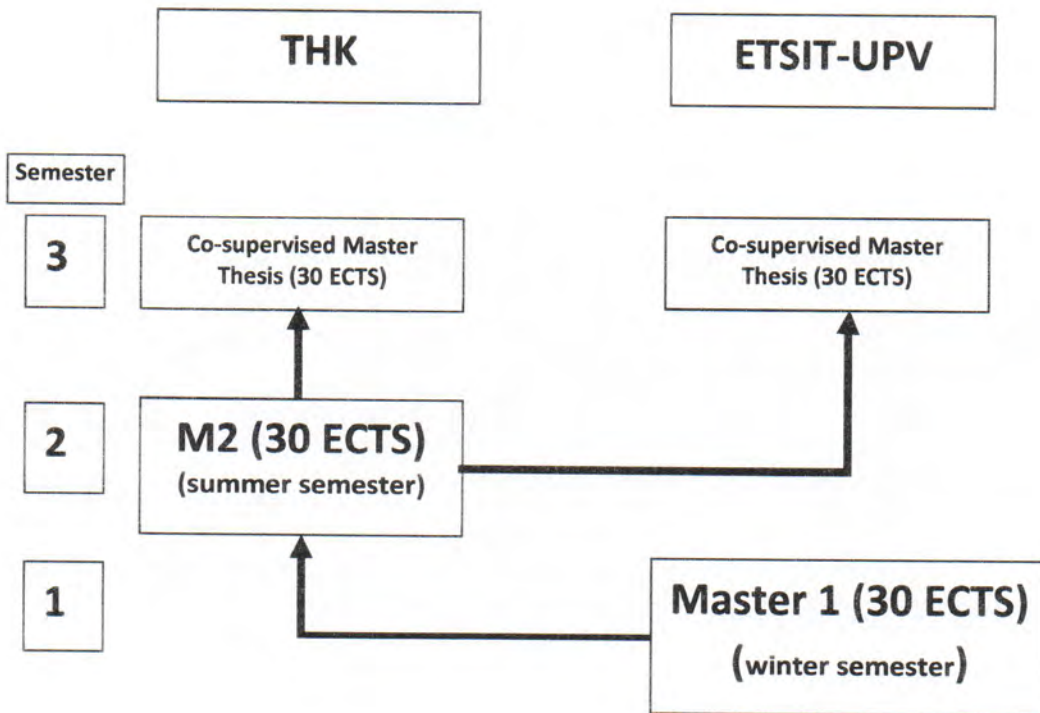
ANNEX I

FLUX DIAGRAM OF THE MOBILITIES



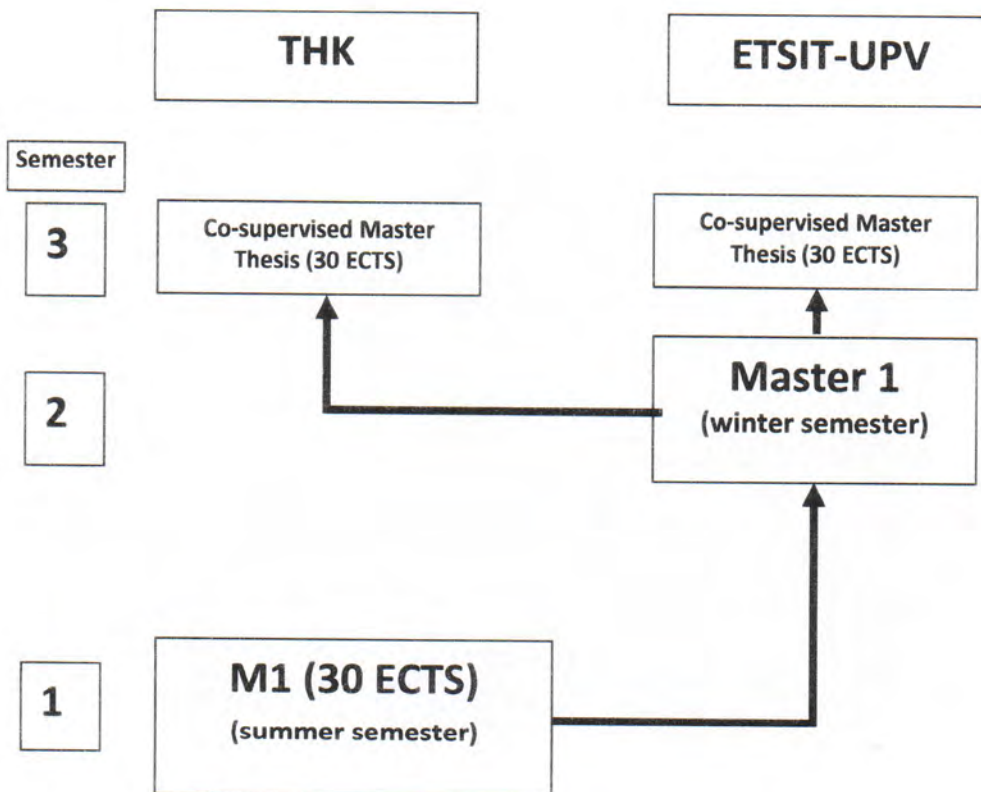
ITINERARY 1: ETSIT-UPV to THK

[Each box represents 30 ECTS credits]



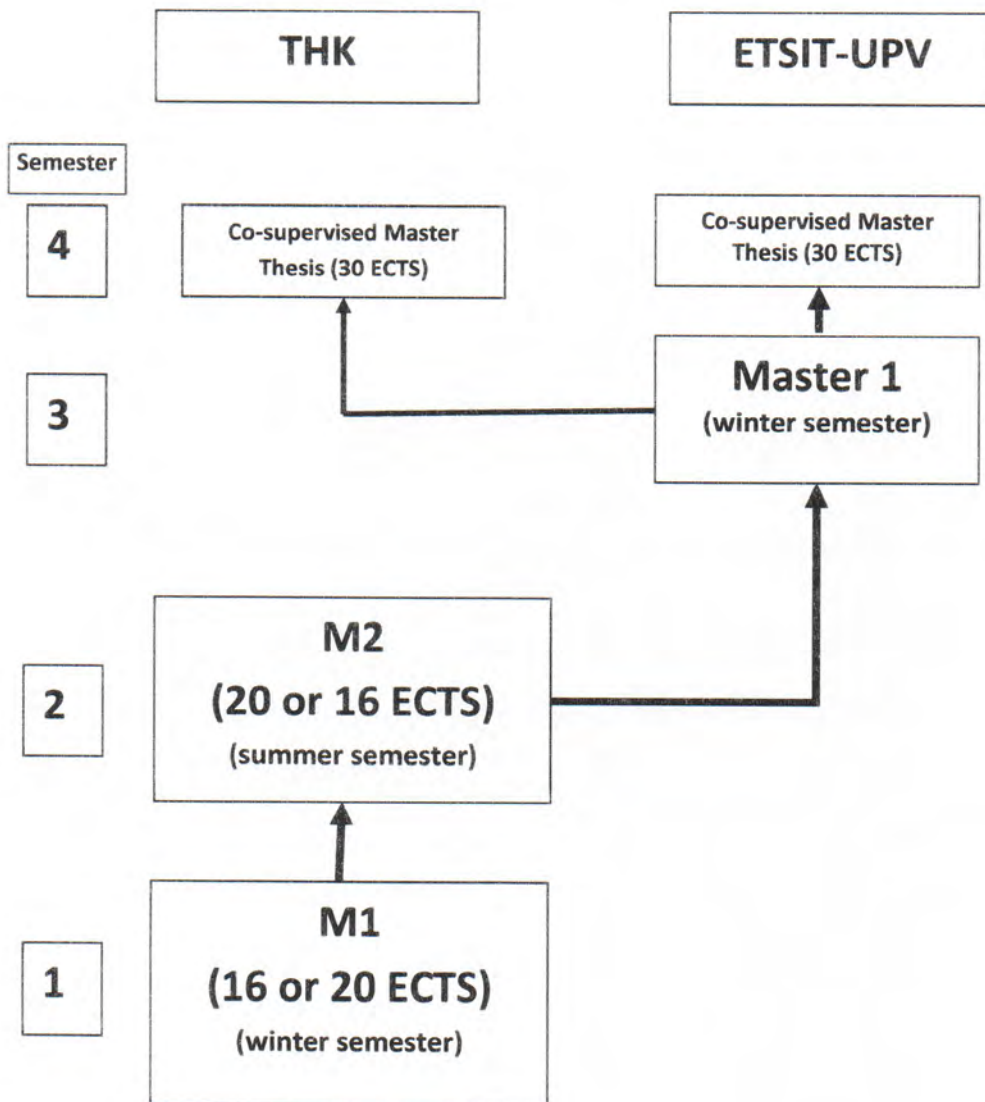
ITINERARY 2: THK to ETSIT-UPV

[Each box represents 30 ECTS credits]



ITINERARY 3: THK to ETSIT-UPV

[each box represents 30 ECTS unless other thing indicated]



ANNEX II

PLAN OF COURSES TO BE TAKEN DEPENDING ON THE ITINERARY



ITINERARY 1

FIRST ACADEMIC YEAR	FIRST ACADEMIC YEAR	SECOND ACADEMIC YEAR
ETSIT-UPV students at UPV (MASTER 1-winter semester)	ETSIT-UPV students at THK (M1-summer semester)	ETSIT-UPV students at THK or UPV (Master thesis)
Students must obtain 30 ECTS attending courses from TABLE I (page 16)	Students must obtain 30 ECTS attending courses from TABLE II (page 17)	Co-tutorized Master thesis equivalent to 30 ECTS
30 ECTS	30 ECTS	30 ECTS



ITINERARY 2

FIRST ACADEMIC YEAR	FIRST ACADEMIC YEAR	SECOND ACADEMIC YEAR
<p>THK students at THK (M1-summer semester)</p> <p>Students must obtain 30 ECTS attending courses from TABLE II (page 17)</p> <p style="text-align: center;">30 ECTS</p>	<p>THK students at ETSIT-UPV (MASTER 1)</p> <p>Students must obtain 30 ECTS attending courses from TABLE I (page 16)</p> <p style="text-align: center;">30 ECTS</p>	<p>THK students at ETSIT-UPV or THK (Master thesis)</p> <p>Co-tutorized Master thesis equivalent to 24 ECTS + 6 ECTS attending seminars from TABLE I (page 16)</p> <p style="text-align: center;">30 ECTS</p>



ITINERARY 3

FIRST ACADEMIC YEAR	FIRST ACADEMIC YEAR	SECOND ACADEMIC YEAR	SECOND ACADEMIC YEAR
THK students at THK (M1-winter semester)	THK students at THK (M1-summer semester)	THK students at ETSIT-UPV (MASTER 1-winter semester)	THK students at ETSIT-UPV or THK (Master thesis)
Students must obtain 16 or 20 ECTS attending courses from TABLE II (page 17)	Students must obtain 20 or 16 ECTS attending courses from TABLE II (page 17)	Students must obtain: 24 ECTS attending courses from TABLE I	Co-tutorized Master thesis equivalent to 24 ECTS + 6 ECTS attending seminars from TABLE I (page 16)
16 or 20 ECTS	20 or 16 ECTS	24 ECTS	30 ECTS
In total: 36 ECTS			
		24 ECTS	30 ECTS



TABLE I.-Master courses at ETSIT-UPV (elective courses up to 30 ECTS)

MASTER 1			Seminars	
Winter Semester	Winter Semester	Summer Semester	Summer Semester	Summer Semester
Mobile and Wireless Communication Systems (3 ECTS)	Optical signal processing in optical networks (3 ECTS)	Communication Networks Simulation based on Opnet Modeler Software (1 ECTS)	Technology Innovation and Strategy (1 ECTS)	
Network Architecture and Protocols for Mobile Communications (3 ECTS)	Optical Wireless Systems (3 ECTS)	Practical design of antennas for wireless devices using commercial electromagnetic simulation software (1 ECTS)	Simulation of Communication Systems (1 ECTS)	
Image and Video Processing Techniques (3 ECTS)	Content Distribution Mechanisms over IP Networks (3 ECTS)	Ad Hoc and Mesh Networking: Mac, Routing and QoS (1 ECTS)	Wireless sensor Networks Applications and Systems (1 ECTS)	
Digital Communication Systems (3 ECTS)	Distributed Real Time Systems (3 ECTS)			
Satellite Communication Systems (3 ECTS)	Traffic Management and Quality of Service (3 ECTS)			
Nanophotonics (3 ECTS)	Telecommunications Economics and Regulation (3 ECTS)			



TABLE II: MCSN courses at THK (as December 2015)

Module	Offered	Mandatory/Optional
Advanced Mathematics (5 ECTS)	winter term /summer term	mandatory
Digital Signal Processing (5 ECTS)	summer term	mandatory
Next Generation Networks (5 ECTS)	summer term	mandatory
Project Management (5 ECTS)	summer term	mandatory
Advanced Channel Coding (5 ECTS)	winter term	optional
Audio/Video Coding (5 ECTS)	summer term	optional
Digital Communications (5 ECTS)	winter term	optional
Optische und drahtlose Übertragungsnetze (in German) (5 ECTS)	summer term	Optional
RF System Design (5 ECTS)	summer term	Optional
Advanced Multimedia Communications (5 ECTS)	winter term	Optional
Planung, Realisierung, betrieb und Optimierung von Kommunikationsnetzen (5 ECTS)	winter term	Optional
Routing and Traffic Engineering (in German) (5 ECTS)	summer term	Optional
Zuverlässigkeit von Kommunikationssystemen (in German) (5 ECTS)	winter term	Optional
Information Security (5 ECTS)	winter term	Optional
Cryptography (5 ECTS)	summer term	Optional
Embedded Security (in German) (5 ECTS)	summer term	Optional
Sicherheit in Netzen (in German) (5 ECTS)	winter term	Optional
Malware (in German) (5 ECTS)	winter term	Optional
Colloquium (in combination with the Master thesis of 27 ECTS) (3 ECTS)	winter/summer term	mandatory



Equivalencies that limit the choice of modules for students

TABLE 3: equivalent modules that limit the choice for students from THK

Module Master CSN	Excludes in the Master TTSN the following module
Next Generation Networks	Content Distribution mechanisms over IP Networks
Advanced Channel Coding	Codification and detection techniques in communications
Audio/Video Coding	Image and Video Processing Techniques
Digital Communications	Digital Communication Systems
Optische und drahtlose Übertragungsnetze (in German)	Optical Wireless Systems
Advanced Multimedia Communications	Multimedia communication and quality of service
Planung, Realisierung, betrieb und Optimierung von Kommunikationsnetzen	Network architecture and protocols for mobile communications
Routing and Traffic Engineering (in German)	Traffic Management and Quality of Service, Analysis and dimensioning of mobile communication networks

TABLE 3: equivalent modules that limit the choice for students from UPV

Module Master TTSN	Excludes in the Master CSN the following module
Network architecture and protocols for mobile communications	Planung, Optimierung und und Inbetriebnahme von Kommunikationsnetzen
Image and Video Processing Techniques	Audio and video coding
Digital Communication Systems	Digital Communication Systems
Optical Wireless systems	Optische und drahtlose Übertragungsnetze
Content Distribution Mechanisms over IP Networks	Next Generation Networks
Traffic Management and Quality of Service	Routing and Traffic Engineering
Codification and detection techniques in communications	Advanced Channel Coding
Analysis and dimensioning of mobile communication networks	Routing and traffic Engineering
Multimedia communication and quality of service	Advanced Multimedia Communications



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 no equivalence table is required.

UPV GRADING SYSTEM

In the Spanish university system, courses are graded on a scale of 0 to 10 points, with the following qualitative equivalences:

From 0.0 to 4.9 → "Suspenso" (Fail)

From 5.0 to 6.9 → "Aprobado" (Pass)

From 7.0 to 8.9 → "Notable" (Good)

From 9.0 to 10.0 → "Sobresaliente" (Excellent)

M.H.: A special mention, "Matrícula de Honor" may be granted to up to 5% of the students in a group provided they have got a "sobresaliente".

To pass a course is necessary to get at least 5 points

THK GRADING SYSTEM

1,0,1,3 → "sehr gut " (very good)

1,7/2,0/2,3 → "gut" (good)

2,7/3,0/3,3 → "befriedigend" (satisfactory)

3,7/ 4,0 → "ausreichend" (pass)

5,0 → "mangelhaft" (Fail)

If averaging of the grade is necessary, then:

up to 1.5 → "sehr gut " (very good)

over 1,5 to 2,5 → "gut " (good)

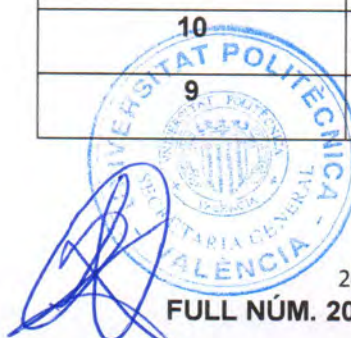
over 2,5 to 3,5 → "befriedigend" (satisfactory)

over 3,5 to 4,0 "ausreichend" (pass)

over 4,0 → "mangelhaft" (Fail)

EQUIVALENCES

UPV grade	THK grade
10	1
9	1,3



UPV grade	THK grade
8	2,0
7	2,7
6	3,3-
5	4,0
<5	5,0

THK grade	UPV grade
1,0	10
1,3	9,5
1,7	9
2,0	8
2,3	7,5
2,7	7
3,0	6,5
3,3	6
3,7	5,5
4,0	5
5,0	1-4 (to be decided individually)



ANNEX IV

FOLLOW-UP AND CO- ORDINATION COMMITTEE



The coordination committee will consist of the following people:

FROM ETSIT-UPV	FROM THK
The ETSIT-UPV Dean	The Fakultät 07 Dean
The ETSIT-UPV vice-dean of International Relations	The program coordinator of the MA CSN program



ANNEX V

INFORME DE LA COMISIÓ 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

