DOUBLE DEGREE AGREEMENT BETWEEN

UNIVERSITAT POLITÉCNICA DE VALÈNCIA

AND TECHNISCHE HOCHSCHULE KÖLN

FOR A DOUBLE DEGREE IMPLEMENTATION AT THE MASTER OF TELECOMMUNICATIONS ENGINEERING

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. José Esteban CAPILLA ROMÁ PhD, who was appointed to office by the Valencian Regional Government Order 74/2021, of 28th May, approved by the Valencian Government Council, and by virtue of the powers granted by Article 53-d of the UPV Statutes, which were approved by the Valencian Regional Government Order 182/2011, of 25th November

And on the other hand, Prof. Dr. Stefan HERZIG, 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 Network*s".
7. Both institutions will assist students in finding accommodation and in their social integration.
8. Mobility will be supported through Erasmus+ Program 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 support 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 30 ECTS of courses in the summer semester.
    - They will have two options for completing the remaining 30 ECTS in the winter semester:
        - They can complete 30 ECTS co-supervised Master Thesis at THK, which will be equivalent to 24 Master Thesis of the MSTTSN plus 6 ECTS (courses 31974, 31714 and 31678).
        - They can complete 24 ECTS co-supervised Master Thesis at ETSIT-UPV plus 6 ECTS corresponding to 6 seminars detailed in Table I.

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 30 ECTS of courses in the winter semester.
    - They will have two options for completing the remaining 30 ECTS in the summer semester:
        - They can complete 30 ECTS co-supervised Master Thesis at THK, which will be equivalent to 24 Master Thesis of the MSTTSN plus 6 ECTS (courses 31974, 31714 and 31678).
        - They can complete 24 ECTS co-supervised Master Thesis at ETSIT-UPV plus 6 ECTS corresponding to 6 seminars detailed in Table I.

- 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 24 ECTS of courses in the winter semester
    - They will have two options for completing the remaining 30 ECTS in the summer semester:
        - They can complete 30 ECTS co-supervised Master Thesis at THK, which will be equivalent to 24 Master Thesis of the MSTTSN plus 6 ECTS (courses 31974, 31714 and 31678).
        - They can complete 24 ECTS co-supervised Master Thesis at ETSIT-UPV plus 6 ECTS corresponding to 6 seminars detailed in Table I.

In all cases, the students must be registered in the course "*Tesis de Máster*" (Master Thesis), and also, depending on the selected itinerary, in the 6 seminars they choose or in courses 31974, 31714 and 31678 at ETSIT-UPV.

c) Defense of the Master Thesis. It is agreed between both institutions that the Master Thesis defense will be held according to the regulations of the MCSN Degree if the student is defending it in THK, whereas MSTTSN regulations for defending the Master Thesis will be followed by students defending it at UPV. UPV regulations on cross-curricular Competences requires the Evaluation committee to fill out an evaluation questionnaire about the degree of achievement of each competence.

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 Universitat Politècnica de València	For Technische Hochschule Köln
President: Prof. Dr. José E. CAPILLA ROMA	President: Prof. Dr. Stefan HERZIG
For ETSIT-UPV	For Fakultät 07, THK
Dean: Dr. Héctor ESTEBAN GONZÁLEZ	Dean: Prof. Dr. Stefan KREISER

ANNEXES TO THE AGREEMENT:

ANNEX I.-FLOWCHART OF THE MOBILITIES (SEMESTER SEQUENCE)

ANNEX II. MASTER COURSES AT UPV (MSTTSN) AND THK (MCSN)

ANNEX III.-EQUIVALENCIES BETWEEN MCSN AND MSTTSN COURSES AT BOTH UNIVERSITIES

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

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

JUST FOR UPV:

ANNEX VI.-INFORME DE LA COMISIÓN ACADÉMICA DEL TÍTULO CORRESPONDIENTE.

(Report signed by the academic board of the UPV degree)

ANNEX VII.- 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

(Report signed by the UPV committee in charge of approving the credit recognition of UPV courses in exchange for courses completed in the home university)

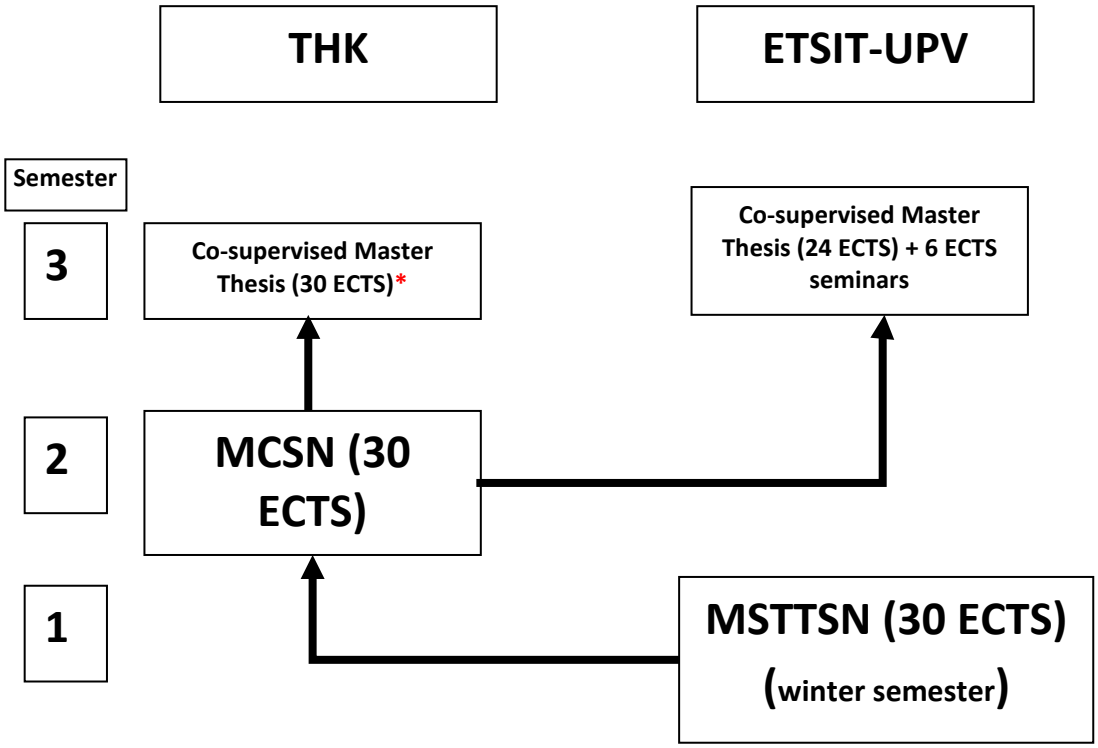
ANNEX I

FLOWCHART OF THE MOBILITIES

(semester sequence)

ITINERARY 1: ETSIT-UPV to THK

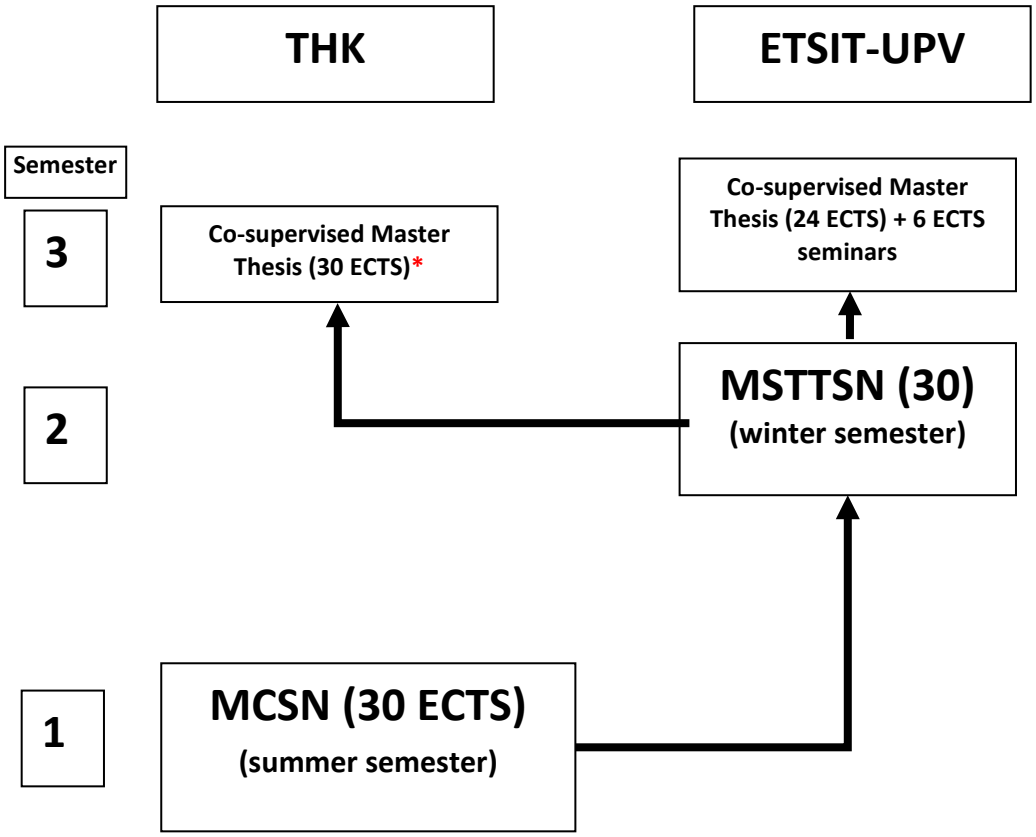
[Each box represents 30 ECTS credits]



*The 30 ECTS Master Thesis at THK are equivalent to 24 Master Thesis of the MSTTSN plus 6 ECTS (courses 31974 *Cursos de Formacion Recibidos en Congresos Internacionales*, 31714 *Cursos de formación recibidos en redes de excelencia europea*s and 31678 *Reconocimiento por actividades I+D+I*).

ITINERARY 2: THK to ETSIT-UPV

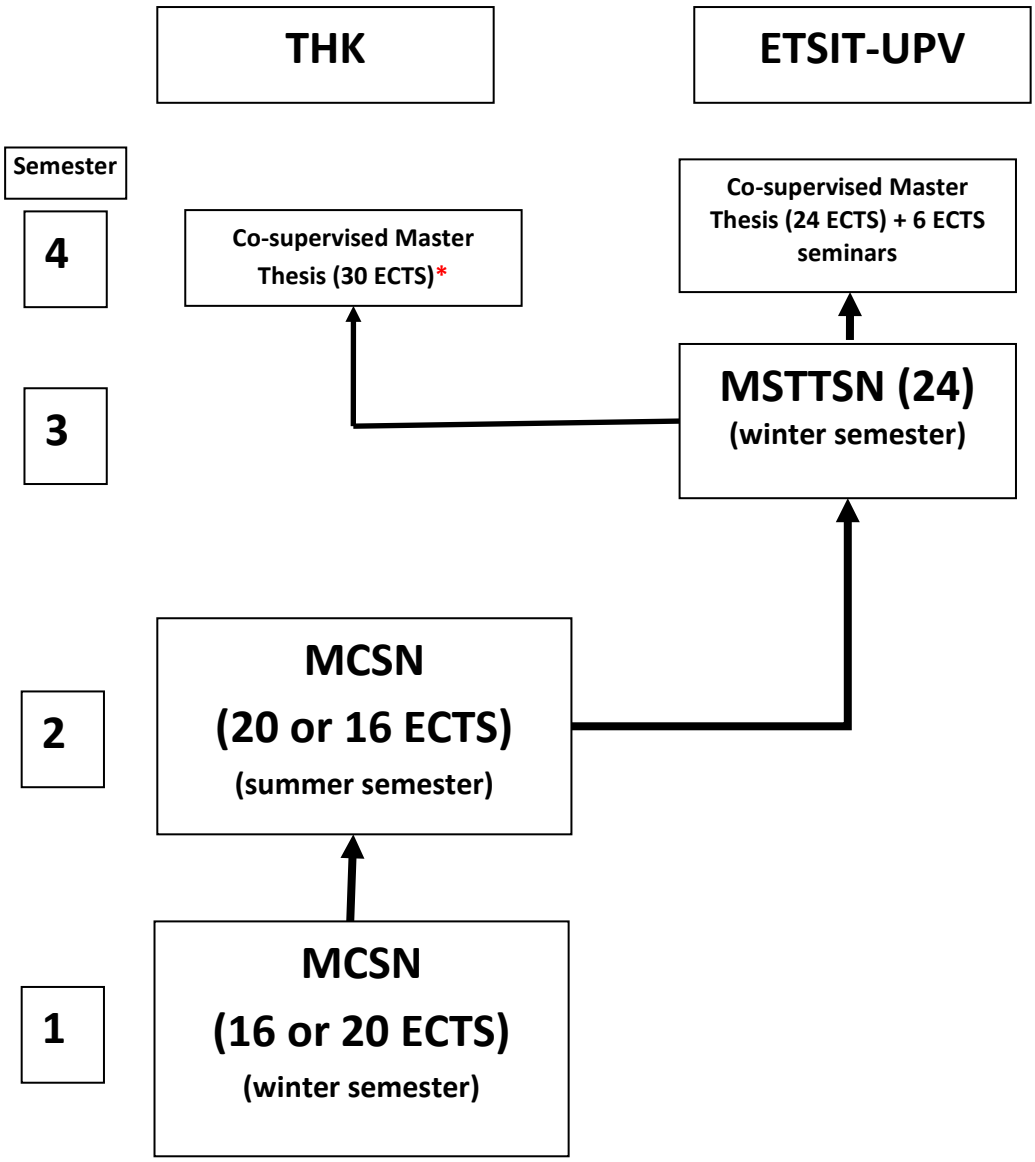
[Each box represents 30 ECTS credits]



*The 30 ECTS Master Thesis at THK are equivalent to 24 Master Thesis of the MSTTSN plus 6 ECTS (courses 31974 *Cursos de Formacion Recibidos en Congresos Internacionales*, 31714 *Cursos de formación recibidos en redes de excelencia europea*s and 31678 *Reconocimiento por actividades I+D+I*).

ITINERARY 3: THK to ETSIT-UPV

[each box represents 30 ECTS unless other thing indicated]



*The 30 ECTS Master Thesis at THK are equivalent to 24 Master Thesis of the MSTTSN plus 6 ECTS (courses 31974 *Cursos de Formacion Recibidos en Congresos Internacionale*s, 31714 *Cursos de formación recibidos en redes de excelencia europe*as and 31678 *Reconocimiento por actividades I+D+I*).

ANNEX II

MASTER COURSES AT UPV (MSTTSN) AND THK (MCSN)

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

MSTTSN	Offered	Language
30740 Tecnologías fotónicas para comunicaciones y sensado en redes B5G (TEFB5G)	winter term	English friendly course[1]
30743 Nanofotónica (N)	winter term	English friendly course
30744 Procesado óptico de señales en redes ópticas (POR)	winter term	English friendly course
30739 Sistemas de comunicaciones espaciales (SCE)	winter term	English friendly course
30733 Sistemas de comunicaciones digitales (SCD)	winter term	English friendly course
30738 Sistemas de comunicaciones móviles e inalámbricas (SCM)	winter term	English friendly course
30752 Interoperabilidad en Internet of Things (IIT)	winter term	English friendly course
30748 Redes de comunicaciones móviles: arquitectura y protocolos (RCMAP)	winter term	English friendly course
30750 Ciberinteligencia y seguridad de aplicaciones (CSA)	winter term	Spanish
30747 Gestión de tráfico y calidad de servicio (GTCS)	winter term	English friendly course
30742 Análisis digital de imagen y visión artificial (ADIVA)	winter term	English friendly course
30734 Procesado de señal para comunicaciones de nueva generación (PSCNG)	winter term	English friendly course
30741 Procesado óptimo de señales y datos (POSD)	winter term	English friendly course
30751 Comunicaciones multimedia y calidad de experiencia (CMCE)	winter term	Spanish
30746 Modelización y evaluación de redes de comunicaciones (MERC)	winter term	English friendly course
30754 Economía y regulación de las telecomunicaciones (ERTEL)	winter term	English friendly course
30737 Aplicaciones de las altas frecuencias más allá de la tecnología radar (AAFR)	winter term	English friendly course
30735 Simulación de sistemas de alta frecuencia (SSAF)	winter term	English friendly course
30745 Análisis y dimensionado de redes de comunicaciones móviles (ARCM)	winter term	English friendly course

[1] *English friendly course means that lecture slides, exams writing and exams wording can be offered in English language. Furthermore, the classes are held in English language if all students agree. Details should be checked on a individual base in advance of the exchange.*

MSTTSN	Offered	Language
Seminars:		
31214 Simulation of communication systems (SCS)	summer term	English
31970 Next generation optical networks and energy efficiency (ROyEE)	summer term	English
33024 Routing protocols and algorithms (PE)	summer term	English
33025 Practical design of antennas for wireless devices using commercial electromagnetic simulation software (PDA)	summer term	English
34477 Object localization with focus on RFID-based systems (ORFID)	summer term	English
34478 Modern antennas for vehicles and mobile devices (MAVB)	summer term	English
31684 Comunicaciones en la industria 4.0 (CI)	summer term	Spanish
31969 Nuevas tecnologías para redes vehiculares y servicios para entornos inteligentes (NTRV)	summer term	Spanish
31971 Redes de acceso ópticas: FTTH (RAO)	summer term	Spanish
31674 Caracterización teórica y experimental del canal radio móvil (CCRM)	summer term	Spanish

Courses offered every year may be somewhat different. They can be consulted on www.upv.es/titulaciones/MUTSRC/index-en.html.

Note: the structure of the degree programs and the multiple combinations of required courses and electives at UPV and THK make it impossible to establish a single list of courses to be completed at the home university and a fixed chart of credit recognition at the host university.

Therefore, the partners will establish a personalized study program for each student, to be approved by both institutions, keeping in mind the general guidelines described in Article 3 of the present agreement, as well as Annex I and Annex III

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

MCSN	Offered	Mandatory/optional
Advanced Mathematics (5 ECTS) (in German/ English)	winter term /summer term	mandatory
Basics on Systems and Networks (in English)	summer term	mandatory
Project Management (5 ECTS) (in English)	summer term	mandatory
Next Generation Networks (5 ECTS) (in English)	summer term	optional
Advanced Channel Coding (5 ECTS) (in English)	summer term	optional
Simulation of Acoustic Environments (5 ECTS) (in English)	winter term	optional
Digital Signal Processing (5 ECTS) (in English)	winter term	optional
Optische und drahtlose Übertragungsnetze (in German) (5 ECTS)	summer term	optional
RF System Design (5 ECTS) (in English)	summer term	optional
Advanced Multimedia Communications (5 ECTS) (in English)	winter term	optional
Communications in distributed systems (5 ECTS) (in English)	summer term	optional
Machine Learning and Scientific Computing (in German) (5 ECTS)	summer term	optional
Zuverlässigkeit von Systemen (in German) (5 ECTS)	winter term	optional
IT Security (5 ECTS) (in English)	winter term	optional
Cryptography (5 ECTS) (in English)	summer term	optional
Embedded Security (in German) (5 ECTS)	summer term	optional
Servicemanagement in Netzen (in German) (5 ECTS)	winter term	optional
Virtuelle Private Netze (in German) (5 ECTS)	winter term	optional
Identifikation and Privacy Enhanced Technologies (in German(E)) (5 ECTS)	summer term	optional
Colloquium (in combination with the Master thesis of 27 ECTS) (3 ECTS) (in English)	winter/summer term	mandatory

Courses offered every year may be somewhat different. They can be consulted on www.mcsn.de

Note: the structure of the degree programs and the multiple combinations of required courses and electives at UPV and THK make it impossible to establish a single list of courses to be completed at the home university and a fixed chart of credit recognition at the host university.

Therefore, the partners will establish a personalized study program for each student, to be approved by both institutions, keeping in mind the general guidelines described in Article 3 of the present agreement, as well as Annex I and Annex III

ANNEX III

EQUIVALENCE BETWEEN MCSN AND MSTTSN COURSES AT BOTH UNIVERSITIES

Equivalencies that limit the choice of modules for students

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

Module Master CSN	**Excludes in the Master TTSN the following module**
Next Generation Networks	30752 Interoperabilidad en Internet of Things (IIT)
Advanced Channel Coding	30734 Procesado de señal para comunicaciones de nueva generación (PSCNG)
Basics on Systems and Networks	30733 Sistemas de comunicaciones digitales (SCD)
Optische und drahtlose Übertragungsnetze (in German/Englisch (Summer/Winter term)	30740 Tecnologías fotónicas para comunicaciones y sensado en redes B5G (TEFB5G)
Advanced Multimedia Communications	30751 Comunicaciones multimedia y calidad de experiencia (CMCE)

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

Module Master TTSN	**Excludes in the Master CSN the following module**
30733 Sistemas de comunicaciones digitales (SCD)	Basics on Systems and Networks
30740 Tecnologías fotónicas para comunicaciones y sensado en redes B5G (TEFB5G)	Optische und drahtlose Übertragungsnetze (in German)
30752 Interoperabilidad en Internet of Things (IIT)	Next Generation Networks
30734 Procesado de señal para comunicaciones de nueva generación (PSCNG)	Advanced Channel Coding
30751 Comunicaciones multimedia y calidad de experiencia (CMCE)	Advanced Multimedia Communications

Note: the structure of the degree programs and the multiple combinations of required courses and electives at UPV and THK make it impossible to establish a single list of courses to be completed at the home university and a fixed chart of credit recognition at the host university.

Therefore, the partners will establish a personalized study program for each student, to be approved by both institutions, keeping in mind the general guidelines described in Article 3 of the present agreement, as well as Annex I and Annex III

This list of equivalent courses represents the courses that the students CANNOT choose upon arrival at their host institution, for they have already obtained these learning skills previously in the home institution.

ANNEX IV

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)

EQUIVALENCE

UPV grade	THK grade
10	1
9	1,3
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	8.9
2,0	8.5
2,3	8.0
2,7	7.4
3,0	7.0
3,3	6.5
3,7	5.9
4,0	5
5,0	1-4 (to be decided individually)

ANNEX V

FOLLOW-UP AND COORDINATION COMMITTEE

The coordination committee will consist of the following people:

FROM ETSIT-UPV	FROM THK
The ETSIT-UPV Dean (as of 2022, Prof. Dr. Héctor ESTEBAN GONZÁLEZ hesteban@upv.es	The Fakultät 07 Dean (as of 2022, Prof. Dr. Stefan KREISER) stefan.kreiser@th-koeln.de
The ETSIT-UPV vice-dean of International Relations (as of 2022,Prof. Dr. Felipe PEÑARANDA FOIX) fpenaran@dcom.upv.es	The program coordinator of the MCSN program (as of 2022, Prof. Dr. Uwe DETTMAR uwe.dettmar@th-koeln.de

ANNEX VI

INFORME DE LA COMISIÓN ACADÉMICA DEL TÍTULO CORRESPONDIENTE

(Report signed by the academic board of the UPV degree)

ANNEX VII

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

(Report signed by the UPV committee in charge of approving the credit recognition of UPV courses in exchange for courses completed in the home university)