

補充協議書

此補充協議書(Supplementary Agreement (SA))基於臺灣國立臺北科技大學(TAIPEI TECH)與義大利帕維亞大學(University of Pavia (UPV))簽訂的合作協議書(Cooperation Agreement)與相關對備忘錄(MoU)所擬定。本補充協議書詳載國立臺北科技大學與帕維亞大學雙聯碩士學程(Double Degree Master Program, 簡稱 DD) 之合作細節。此學程涵蓋帕維亞大學電子工程兩年制碩士學位(Laurea Magistrale in Electronic Engineering)與臺北科技大學光電工程碩士學位。為符合臺灣相關法律與法令、臺灣教育部與臺北科技大學的相關規範、義大利政府制定的政策與法令以及帕維亞大學的相關規範，臺北科技大學與帕維亞大學將遵循下列條款，共同規劃與執行雙聯碩士學程。參與機構都各將在當地提供校園設施，包括但並不侷限於教室、儀器設備、行政協助、實驗室、教授研究室、以及各種與此學程執行相關之有形與無形資源。臺北科技大學與帕維亞大學亦將利用如電子會議等之多媒體，以利合作計劃之進行。

1. 雙聯碩士學程(DD)執行模式

此雙聯碩士學程將結合臺北科技大學與帕維亞大學雙方之課程。在臺北科技大學課程方面，學生在兩年內至少須修習 32 個學分，並進行至少一年的實習或論文工作。在帕維亞大學課程方面，學生首先應修習至少三學期之課程，取得 96 義大利學分(等同 48 臺灣學分)。因此，雙聯碩士學程包括三學期之課程研修與一年之實習及論文寫作。明確之課程規劃列於下表。課程細節請見附件 A，根據第 11 節所述之程序，此附件將視需要更新。

	第一年 第一學期	第一年 第二學期	第二年 第一學期	第二年 第二學期	第三年 第一學期 (視學生需求而定)
臺北科技大學學生	臺北科技大學課程	臺北科技大學課程	帕維亞大學課程	帕維亞大學課程，在義大利或臺灣進行論文寫作	在義大利或臺灣實習或進行論文寫作
帕維亞大學學生	帕維亞大學課程	帕維亞大學課程	臺北科技大學課程	臺北科技大學課程，在義大利或臺灣進行論文寫作	在義大利或臺灣實習或進行論文寫作

2. 聯合課程人數

雙聯碩士學程之交換學生人數最多 30 人，包括臺灣學生與義大利學生。

3. 招生

雙方皆可為雙聯碩士學程進行招生，學程之候選人應為兩校之碩士班學生。意者必須通過學程考試以及英語語言檢定(或是托福成績高於 57)，方能錄取進入學程。臺北科技大學申請人必須完成碩士課程 20 學分以上方可申請本雙聯碩士學程。

4. 交換學生

學生可申請於臺灣或義大利進行論文寫作(或產業實習)，雙方皆應提供合適的安排，

以協助學生尋找可支援論文寫作或產業實習之公司。

5. 註冊、選課、成績

註冊、選課、與評分之過程應符合兩校之學術政策規範。學生成功完成學期課業後，接受交換學生的一方必須提供正式成績單予學生原校。

6. 註冊與學費

學生錄取進入學程後，在兩校都須註冊。學程學生支付原校的學費，亦可能須支付與留學學校行政相關的費用。兩校皆應盡力幫學程學生尋找獎學金。

7. 課程

根據兩校的課程規範，並考量兩校課程的專長，此學程的兩校課程將同時採納兩校的課程模式。學分常態化後，帕維亞大學將承認臺北科技大學之學分，臺北科技大學亦將承認帕維亞大學之學分。由於臺北科技大學的1學分等同帕維亞大學的2.4 CFU學分，本學程將採用下列的學分換算公式：臺北科技大學的兩門3學分課程等同帕維亞大學一門9學分課程與一門6學分課程之加總學分。臺北科技大學的論文課程學分為15 CFU。「專題討論」學分為3 CFU。

共同課程將以英語進行授課，學位論文必須以英語書寫，口頭報告亦以英語進行。

課程原則如下，臺北科技大學課程著重光電工程，帕維亞大學課程著重電子工程(光子學課程)。詳細雙聯課程請見附件，雙方每年須共同重新檢閱此雙聯課程。

8. 實習、論文寫作與論文口試

為期一年的實習與論文寫作為本雙聯碩士學程之規定之一。在學程結束前，應由兩校教授共同組成雙聯口試委員(可透過面對面方式或是透過遠距影像會議)，評估其研究成果以決定是否將學位授與學生。

9. 學位

通過學程規定之畢業生將取得雙學位：臺北科技大學授與之光電工程理學碩士學位(Master of Science in Electro-Optical Engineering)、帕維亞大學授與之電子工程理學碩士學位(Master of Science in Electronic Engineering (“Laurea Magistrale in Electronic Engineering”))。

- 根據中華民國政府教育部規定，碩士學位修業年限為四年。
- 根據中華民國政府與義大利政府在2005年七月四日簽署之協議，雙方皆承認對方之學術學位。

10. 交換教師

兩校教師的主要工作為其原校之教學工作，本學程鼓勵支援學程課程的教師至另校進行交換，兩校皆應支持教師的交換。

11. 協議書管理

雙方應正式發函至對方，指派一位終身職教授負責與本協議相關的課程。負責的教授分別為臺北科技大學之呂海涵教授(Prof. Hai-Han Lu)與帕維亞大學之 Giuseppe Martini 教授。雙方皆有義務為此學程，向各自的大學與政府部門申請補助與認證許可。

雙方根據各自國家的法律規範，核准適當的課程更新。

12. 效期

本協議書自簽署並由所有相關單位蓋章後，有效期限為五年。然而，在此效期結束後，經過雙方共同檢閱，可延展本協議書之效期。

簽名： _____

姚立德教授(Prof. Leehter Yao)

校長(President)

國立臺北科技大學 (National Taipei
University of Technology)

臺北(Taipei)

臺灣(Taiwan)

日期(Date): _____

簽名(Signed)： _____

Prof. Fabio Ruggè

校長(Rector)

帕維亞大學(University of Pavia)

帕維亞(Pavia)

義大利(Italy)

日期(Date): _____

補充協議書 - 附件 A

此附件詳載雙方規定的雙聯碩士學位課程。此學程符合各校的規範。

1. 帕維亞大學電子工程碩士學位(“Laurea Magistrale in Electronic Engineering”)規定

帕維亞大學兩年制電子工程碩士學位課程，畢業之要求為 120 CFU(根據波隆那協議(Bologna protocol)之定義)。

- 課程班級人數不得少於三人，不得多於 18 CFU
- 課程總學分不得少於 96 CFU
- 論文學分為 24 CFU

課程應涵蓋下列主題(“Settore Scientifico Disciplinare” - SSD)，並符合下列義大利學分(CFU)之分配：

- 核心課程(“Caratterizzanti”)：資訊科技工程、電子學(ING-INF/01)、電磁場(ING-INF/02)，至少 45 CFU
- 相關課程(“Affini”)：物質物理學(FIS/03)、電信學(ING-INF/03)、數學-微積分(MAT/05)，18 至 42 CFU 之間，至少 18 CFU
- 選修：12 CFU
- 其他活動(“Altre attività”)：1 至 6 CFU 之間，至少 1 CFU

修習臺北科技大學課程所獲得之學分，應根據帕維亞大學規定認可。

2. 臺北科技大學光電工程碩士學位規定

臺北科技大學兩年制光電工程碩士學位課程，畢業之要求為至少 32 學分。

- 專業必修課程：16 學分(包括碩士論文 6 學分、專題討論 4 學分、光電科技概論(I)(II)6 學分)
- 專業選修課程：16 學分
 - 學生須從四門標記著 A~D 的四個研究領域的專業選修課程，修習至少兩個領域的課程。
 - 本系所認可其他系所之選修課程，共可修習 9 學分，前提為本系所無提供此課程，且需經過指導教授同意。

3. 雙聯碩士學位共同規定

雙聯碩士學位對臺北科技大學與帕維亞大學學生之規定分述如下：

- 欲取得帕維亞大學電子工程碩士學位之臺北科技大學學生，應修習共 96 CFU 之課程，並符合第 1 節所列之主題與考試數目規定。
- 欲取得臺北科技大學光電工程碩士學位之帕維亞大學學生，應修習至少共 32 學分(臺北科技大學學分)之課程、參與實習或論文寫作至少 6 學分(臺北科技大學學分)，並完成符合臺北科技大學規定之論文。

4. 課程

根據臺北科技大學的規定，臺北科技大學學生的課程在頭兩個學期有不同的學分數。學分之差距將在之後補齊。

帕維亞大學給予臺北科技大學學生之課程規劃

第一年第一學期(於臺北科技大學修課)

#	臺北科技大學課程	SSD	CFU 值	帕維亞大學相等課程
1	光電科技概論(I)	ING-INF/01	7.5	左方之兩門課等同於： 光電元件(Optoelectronic Devices) (6 CFU) 進階數學方式(Advanced Mathematical Methods) (9 CFU)
2	選修課程(一門在表一 MAT/08 之課程)	MAT/05	7.5	
3	光電實驗(I)	FIS/03	3	左方之兩門課等同於： 量子電子學(Quantum Electronics) (6 CFU)
4	專題討論 (1/4)		3	

第一年第二學期(於臺北科技大學修課)

	臺北科技大學課程	SSD	CFU 值	帕維亞大學相等課程
5	光電科技概論(II)	FIS/03	7.5	左方之兩門課等同於： 半導體元件物理(Semiconductor Device Physics) (6 CFU) 微波(Microwaves) (9 CFU)
6	選修課(一門在表一 ING-INF/02 之課程)	ING-INF/02	7.5	
7	光電實驗(II)	FIS/03	3	左方之兩門課等同於： 雷射安全(Sicurezza laser) (6 CFU)
8	專題討論 (2/4)		3	

第二年第一學期(於帕維亞大學修課)

	帕維亞大學課程	SSD	CFU 值	臺北科技大學相等課程	學分
9	光電設備(Electro-optical Instrumentation)	ING-INF/01	6	光電精密量測	3

10	工業雷射設計(Industrial Laser Design)	ING-INF/01	6	雷射工程 B	3
11	天線與傳播(Antenna and Propagation)	ING-INF/02	9	繞射光學元件與應用	3
12	表二之選修課		6	-	3
13	表二之選修課		6	-	3

第二年第二學期(於帕維亞大學修課)

	帕維亞大學課程	SSD	CFU 值	臺北科技大學相等課程	學分
14	光通訊(Optical Communications)	ING-INF/01	9	光纖通訊 A	3
16	非線性光學(Nonlinear Optics)	FIS/03	6	近代光學	3
17	數位通訊(Digital Communications)	ING-INF/03	6	平面顯示器 C	3
18	論文/實習(Thesis / Internship)	other	24	論文/實習	6

選修課程列於下表。臺北科技大學規定(學生須從標記 A~D 的四個領域的課程中至少選修兩個領域的課程)，並達到總學分之要求。

臺北科技大學學生修習帕維亞大學課程總 CFUs：ING-INF/01- 02: 45, ING-INF/03-FIS/03-MAT/05: 39, 自由選修: 12, 論文: 24, 共計: 120

表一 - 臺北科技大學學生於臺北科技大學可修習之選修課

第一學期

代碼	課程名稱	學分	SSD
6505004	光電實驗(I) (Experiments for Optoelectronic Engineering (I))	1.0 □	ING-INF/01
6503007	近代光學 (Modern Optics)	3.0	ING-INF/02
6505016	傅氏光學 (Introduction to Fourier Optics)	3.0 B	FIS/03
6505034	光纖通訊 (Fiber-Optic Communication)	3.0 A	ING-INF01
6505010	光電精密量測 (Opto-electronic Methods in Precision	3.0	ING-INF/01

	Measurement)		
6505031	積體光學 (Integrated Optics)	3.0	FIS/03
6505045	半導體元件物理 (Physics of Semiconductor Device)	3.0	FIS/03
6505050	光學薄膜設計與應用 (Design and Application of Optical Coating)	3.0	MAT/05
6505054	磊晶技術與量測 (Epitaxy Technology and Measurement)	3.0	ING-INF/01
6505058	光電產業趨勢分析 (Electro-Optical Industry Trend Analysis)	3.0	ING-IND/35
6505089	鏡頭設計 (Lens Design)	3.0	FIS/03
6505093	液晶顯示器驅動電子學 (Electronics of Liquid Crystal Display)	3.0	ING-INF/01
6505095	太陽能電池技術 (Introduction of Solar Cells Technology)	3.0	ING-INF/01
6505097	半導體光學 (Optical Properties of Semiconductors)	3.0 D	ING-INF/01
6505114	平面顯示器導論 (Preliminary Flat-Panel Display)	3.0	ING-INF/02
6505122	非線性光纖光學與應用 (Nonlinear Fiber Optics and Application)	3.0	FIS/03
6505124	TracePro 照明設計 (Lighting Design with TracePro)	3.0	MAT/05

第二學期

代碼	課程名稱	學分	SSD
6505005	光電實驗(II) (Experiments for Optoelectronic Engineering (II))	1.0 <input type="checkbox"/>	ING-INF/01
6505038	平面顯示器 (Flat Panel Display)	3.0 C	ING-INF/03
6505066	生醫光電導論 (Introduction to Biomedical Optics)	3.0	ING-INF/06
6505090	半導體材料與元件 (Semiconductor Materials and Devices)	3.0	ING-INF/01
6503532	色度學 (Colorimetry)	3.0	ING-INF/02
6505024	光電半導體製造 (Fabrication of Photoelectronic Materials and Device)	3.0	ING-INF/01
6505028	光通訊 (Optical Communication)	3.0 A	ING-INF/01
6505033	應用光學 (Applied Optics)	3.0	FIS/03
6505039	繞射光學元件與應用 (Diffractive Optical Elements and Applications)	3.0	ING-INF/02

6505040	雷射工程 (Laser Engineering)	3.0 B	FIS/03
6505044	高密度分波多工系統 (Dense Wavelength Division Multiplexing)	3.0	ING-INF/03
6505052	液晶顯示器光學 (Optics of Liquid Crystal Displays)	3.0 C	FIS/03
6505066	生醫光電導論 (Introduction to Biomedical Optics)	3.0	ING-INF/06
6505096	高科技專利之財產取得與應用 (Obtainment and Application of Property of High-Tech Patent)	3.0	ING-IND/35
6505116	超快光學概論 (Introduction of Ultrafast Optics)	3.0	FIS/03
6505131	Dialux 照明設計 (Dialux Lighting Design)	3.0	MAT/05
6505132	超快光學與應用 (Ultrafast Optics and Application)	3.0	FIS/03
6505049	半導體薄膜特性與製程 (Properties and Fabrication Techniques of Semiconductor Thin Film)	3.0 D	ING-INF/01

學生須從標記 A~D 的四個領域的課程中至少選修兩個領域的課程。

表二 - 臺北科技大學學生於帕維亞大學可修習之選修課

		SSD	CFU	學期
502962	網路與多媒體 (Internet e Multimedia)	ING-INF/03	6 CFU	1
502993	微感應器、積體微系統、MEMS (I) (Microsensori, Microsistemi Integrati e MEMS (I))	ING-INF/01	6 CFU	1
503278	微波量測 (Microwave Measurements)	ING-INF/02	6 CFU	1
503279	計算電磁學 (Computational Electromagnetics)	ING-INF/02	6 CFU	1
505007	電磁兼容性 (Electromagnetic Compatibility)	ING-INF/02	6 CFU	1
505017	衛星與太空系統 (Satellite and Space Systems)	ING-INF/01	6 CFU	1
505002	電子儀器與科技 (Electronic Instrumentation and Technologies)	ING-INF/01	6 CFU	1
504443	有線通訊電路與系統 (Circuits and Systems for Wireline Communications)	ING-INF/01	6 CFU	1
503272	VLSI 類比-數位介面積體電路 (VLSI Analogue-Digital Interfaces ICs)	ING-INF/01	6 CFU	1
504462	程序控制 (Process Control)	ING-INF/04	6 CFU	1
503272	數位信號處理的超大型積體電路結構 (VLSI Architectures for Digital Signal Processing (I))	ING-INF/01	6 CFU	1

504232	雷射安全(I) (Laser Safety (I))	FIS/03	6 CFU	1
504702	產業自動化 (Industrial Automation)	ING-INF/04	6 CFU	1
505000	雷達遠距感測 (Radar Remote Sensing)	ING-INF/02	6 CFU	2
505001	逆散射技術與檢測 (Inverse Scattering Techniques and Diagnostic)	ING-INF/02	6 CFU	2
504240	生物光子學 A(I) (Biofotonica A (I))	ING-INF/01	3 CFU	2
504241	生物光子學 B(I) (Biofotonica B (I))	FIS/03	3 CFU	2
504708	數位社會經濟學 (Economics for the Digital Society)	SECS-P/06	6 CFU	2
504464	組織理論與設計 (Organisation Theory and Design)	SECS-P/06	6 CFU	2
502466	功率電子學(I) (Power Electronics (I))	ING-INF/01	6 CFU	2
505060	微電子學工業專題 (Industrial topics in microelectronics)	ING-INF/01	3 CFU	全年
505013	微電子學進階專題 (Advanced Topics in Microelectronics)	ING-INF/01	3 CFU	全年
-	產品與服務之設計、管理、與生產 (I) (Design, management and production of goods and services (I))	選修	3 CFU	2
-	環境倫理(I) (Ambient ethics (I))	選修	3 CFU	2

標示(I)之課程以義大利語授課，並且可抵等同課程。

表三 - 帕維亞大學學生於臺北科技大學可修習之選修課

第一學期

代碼	課程名稱	學分	SSD
6505004	光電實驗(I) (Experiments for Optoelectronic Engineering (I))	1.0 □	ING-INF/01
6505031	積體光學 (Integrated Optics)	3.0	FIS/03
6505050	光學薄膜設計與應用 (Design and Application of Optical Coating)	3.0	MAT/05
6505054	磊晶技術與量測 (Epitaxy Technology and Measurement)	3.0	ING-INF/01
6505058	光電產業趨勢分析 (Electro-Optical Industry Trend Analysis)	3.0	ING-IND/35
6505089	鏡頭設計 (Lens Design)	3.0	FIS/03
6505093	液晶顯示器驅動電子學 (Electronics of Liquid Crystal Display)	3.0	ING-INF/01
6505095	太陽能電池技術 (Introduction of Solar Cells Technology)	3.0	ING-INF/01

6505114	平面顯示器導論 (Preliminary Flat-Panel Display)	3.0	ING-INF/02
6505124	TracePro 照明設計 (Lighting Design with TracePro)	3.0	MAT/05

第二學期

代碼	課程名稱	學分	SSD
6505005	光電實驗(II) (Experiments for Optoelectronic Engineering (II))	1.0 □	ING-INF/01
6505038	平面顯示器 (Flat Panel Display)	3.0 C	ING-INF/03
6505090	半導體材料與元件 (Semiconductor Materials and Devices)	3.0	ING-INF/01
6503532	色度學 (Colorimetry)	3.0	ING-INF/02
6505024	光電半導體製造 (Fabrication of Photoelectronic Materials and Device)	3.0	ING-INF/01
6505028	光通訊 (Optical Communication)	3.0 A	ING-INF/01
6505039	繞射光學元件及應用 (Diffractive Optical Elements and Applications)	3.0	FIS/03
6505044	高密度分波多工系統 (Dense Wavelength Division Multiplexing)	3.0	ING-INF/03
6505052	液晶顯示器光學 (Optics of Liquid Crystal Displays)	3.0	FIS/03
6505096	高科技專利之財產取得與應用 (Obtainment and Application of Property of High-Tech Patent)	3.0	ING-IND/35
6505116	超快光學概論 (Introduction of Ultrafast Optics)	3.0	FIS/03
6505131	Dialux 照明設計 (Dialux Lighting Design)	3.0	MAT/05
6505132	超快光學與應用 (Ultrafast Optics and Application)	3.0	FIS/03
6505049	半導體薄膜特性與製程 (Properties and Fabrication Techniques of Semiconductor Thin Film)	3.0 D	ING-INF/01

臺北科技大學給予帕維亞大學學生之課程規劃

第一年第一學期(於帕維亞大學修課)

#	帕維亞大學課程	SSD	(CFU	臺北科技大學相等課程	學分
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1	進階數學方法(Advanced Mathematical Methods)	MAT/05	9	左方課程等同於： 光電科技概論(I) (Introduction to Optoelectronic Engineering (I)) 半導體材料與元件(Semiconductor Materials and Devices)	3
2	光電元件(Optoelectronic Devices)	ING-INF/01	9		3
3	半導體元件物理 (Semiconductor Device Physics)	FIS/03	6	本門課程與微波 (Microwaves)等同於 光電科技概論(II) (Introduction to Optoelectronic Engineering (II))和半導體元件物理 (Physics of Semiconductor Device)	3
4	量子電子學 (Quantum Electronics)	FIS/03	6	此門課等同於： 光電實驗(I) (Experiments for Optoelectronic Engineering (I)) & 專題討論 (1/4) (Engineering Seminar (1/4))	3

第一年第二學期(於帕維亞大學修課)

	帕維亞大學課程	SSD	(CFU)	臺北科技大學相等課程	學分
5	微波 (Microwaves)	ING-INF/02	9	本門課程與半導體元件物理 (Semiconductor Device Physics)等同於光電科技概論(II) (Introduction to Optoelectronic Engineering (II))和半導體元件物理 (Physics of Semiconductor Device)	3
6	光通訊 (Optical Communications)	ING-INF/01	9	光纖通訊 A (Fiber-Optic Communication A)	3
7	非線性光學 (Nonlinear Optics)	FIS/03	6	非線性光纖光學與應用 (Nonlinear Fiber Optics and Application)	3
8	數位通訊 (Digital Communications)	ING-INF/03	6	此門課等同於： 光電實驗(II) (Experiments for Optoelectronic Engineering (II)) & 專題討論 (2/4) (Engineering Seminar (2/4))	3

第二年第一學期(於臺北科技大學修課)

	臺北科技大學課程	SSD	(CFU)	帕維亞大學相等課程
9	選修課程(從表三選一門 ING-INF/01)	ING-INF/01	7.5	-

10	選修課程 (從表三選一門 ING-INF/01)	ING-INF/01	7.5	-
11	選修課程 (從表三選一門 ING-INF/02)	ING-INF/02	7.5	-
12	自由選修課程 (從表三選一門課程)		7.5	-

第二年第二學期(於臺北科技大學修課)

13	自由選修課程 (從表三選一門課程)		7.5	
14	論文/實習		24	論文/實習(帕維亞大學或臺北科技大學)

帕維亞大學學生修習臺北科技大學課程之總 CFU 學分數:

ING-INF/01 或/02: 49.5, ING-INF/03-FIS/03-MAT/05: 33, 自由選修: 15, (超額學分:1.5) 論文 24 = 總計 120

臺北科技大學規定(學生須從標記 A~D 的四個領域的課程中至少選修兩個領域的課程), 並達到總學分之要求。



Supplementary Agreement

This supplementary agreement (SA) is based upon the Cooperation Agreement and relative MoU between National Taipei University of Technology, Taiwan (TAIPEI TECH) and University of Pavia, Italy (UPV). This SA details the cooperation between TAIPEI TECH and UPV for a Double Degree Master Program (abbreviated DD). This program is based on UPV two-years Master’s degree in Electronic Engineering (Laurea Magistrale in Electronic Engineering) and TAIPEI TECH Master’s degree in Electro-Optical Engineering. Abiding by the pertinent laws and decrees of Taiwan, the pertinent rules and regulations of the Ministry of Education in Taiwan and TAIPEI TECH, and also in accordance with the policy and decrees laid down by Italian Government with the rules and by laws of UPV, TAIPEI TECH and UPV will collaboratively launch and run the DD master program following the terms below. Each hosting institution will provide on its site facilities in the campus, including but not limited to classrooms, equipment, administrative support, laboratories, professor research rooms, and tangible and intangible resources suitable for the execution of the program. Multi-media such as e-conference will be used in TAIPEI TECH and UPV in order to facilitate the cooperation activity.

1. Execution Model for the Double Degree Master Program (DD)

The DD program will join TAIPEI TECH and UPV curricula. In TAIPEI TECH Curriculum, students should take at least 32 credits for graduation in two years and perform internship/thesis work for a total period of at least one year. In UPV curriculum, students should attend first at least three semesters of courses for a total of 96 UPV CFU (equivalent to 48 TW credits). Therefore the DD will include three semesters of courses and one year of internship/thesis work. Specifically the curriculum is shown in the table here below. This curriculum is detailed in Appendix A, that will be updated as needed according to the procedure stated in Paragraph 11.

	Year 1 Term 1	Year 1 Term 2	Year 2 Term 1	Year 2 Term 2	Year 3 Term 1 (if student needs it)
TAIPEI TECH students	TAIPEI TECH courses	TAIPEI TECH courses	UPV courses	UPV courses and thesis in Italy or Taiwan	Internship/thesis in Italy or Taiwan
UPV students	UPV courses	UPV courses	TAIPEI TECH courses	TAIPEI TECH courses and thesis in Italy or Taiwan	Internship/thesis in Italy or Taiwan

2. Size of the Joint Class

Maximum number of DD students being exchanged (Taiwanese to Italy and Italian to Taiwan) is 30 people.



3. Recruitment

Both parties recruit the students of DD. The candidates of program should be the master students on both sides. The students on each side will have to pass through an entrance examination, and an English language examination (or TOEFL IBT with score high than 57 for Taiwanese students and Italian students) for admission of candidates at both sides. In order to be eligible to apply for the D.D. Master Program, the candidates from Taipei Tech shall have completed at least 20 credits.

4. Exchange of Students

The students can apply for performing the thesis work (or the industrial internship) either in Taiwan or Italy. Each party should provide the appropriate arrangements and assist students in finding a Company where they can be hosted for the thesis or the industrial internship.

5. Matriculation, Registration for Courses, and Grading

The process of matriculation, registration, and grading for courses should conform to the academic policies of both institution. The host institution must provide an official transcript to the home institution upon successful completion of the semester.

6. Registration and Fee

All students will register at both universities from their entrance to this program. All students in the program will pay tuition for their home university and may be charged of nominal fee for administration at the hosting side. Each party should make every effort to find scholarship for the students of the program.

7. Curriculum

Depending on the educational requirements of each university and considering the specialties of respective curricula on each side, the two curricula of the program will contain the modules of both universities. UPV will recognize credits given by TAIPEI TECH and TAIPEI TECH will recognize credits given by UPV, taking account of a normalization factor. As 1 TAIPEI TECH credit is equivalent to 2.4 CFU (UPV) credits, the following round-off is applied: two 3-credit courses at TAIPEI TECH are equivalent to two courses of 9 and 6 CFU at UPV. Thesis at TAIPEI TECH gives 15 credits. Each "Engineering Seminars" corresponds to 3 credits. Shared courses will be given in English; final thesis and oral presentation must be accomplished in English.

As policy, TAIPEI TECH curriculum will focus on Electro-Optical Engineering, and UPV curriculum will focus on Electronic Engineering (Photonics Curriculum). The detailed double curricula are given in an Appendix and be jointly reviewed yearly.

8. Internship, Thesis and Defence

One year internship / thesis work is required by this double master program. A



thesis form shall be submitted to seek approval from both side before the start of thesis work. A joint Jury (“Commissione”) composed of professors from both sides will be established (face to face or via video conference) at the end of each program to valid the studies and decide to deliver the degrees.

9. Degrees

The qualified graduate from this program will receive two degrees. They are Master of Science in Electro-Optical Engineering from TAIPEI TECH and Master of Science in Electronic Engineering (“Laurea Magistrale in Electronic Engineering”) from UPV.

According to the regulations of the Ministry of Education of the Republic of China (Taiwan), the duration of the aforementioned Master's degree program shall be limited to four years. Abiding by the agreement signed on July 4th, 2005 between the Governments of Taiwan and Republic of Italy, academic titles are mutually recognized.

10. Exchange of Teachers

The teaching staff members from each side are mainly responsible for the teaching work in each own side. The exchange of teachers to cover part of courses is encouraged and will be supported by both parties.

11. Agreement Management

Each party will appoint, by a letter to the other party, a tenure professor in charge of classes related to the agreement. These professors are, respectively, professor Hai-Han Lu (TAIPEI TECH) and professor Giuseppe Martini (UPV). Each party has the duty to get the required allowance/license for the program from the corresponding university and government departments on each side. Both parties will agree on appropriate updates on the classes, always according to their respective laws, regulations and by laws.

12. Effect

This agreement will take effect for the period of 5 years after it is signed and sealed by all concerned parties. However, it may be extended, subject to a mutual review by relevant parties at the end of the period.



*Supplementary agreement for a Double Master Degree by National Taipei University of
Technology, Taiwan (TAIPEI TECH) and University of Pavia, Italy (UPV)*



Signed: _____
Prof. Leehter Yao
President
National Taipei University of Technology
Taipei
Taiwan
Date: _____

Signed: _____
Prof. Fabio Rugge
Rector
University of Pavia
Pavia
Italy
Date: _____



Supplementary Agreement – Appendix A

This Appendix details the curriculum defined by both parties for the aforementioned double master program. This program complies with the regulations of each party.

1. Requirements of UPV Master's Degree in Electronic Engineering (“Laurea Magistrale in Electronic Engineering”)

The curriculum for UPV two-years master degree in Electronic Engineering (“Laurea Magistrale in Electronic Engineering”) requires 120 total credits or CFU (defined as per the Bologna protocol)

- Courses size will be not less than 3 and no more than 18 CFU
- Should include courses totalling not less than 96 CFU.
- Thesis work is credited 24 CFU

The curriculum should include the following topics (“Settore Scientifico Disciplinare” - SSD) associated with the following Italian Credits (CFU):

- Core (“Caratterizzanti”): Information Technology Engineering, Electronics (ING-INF/01) and Electromagnetic Fields (ING-INF/02), at least 45 CFUs
- Related (“Affini”): Physics of Matter (FIS/03), Telecommunications (ING-INF/03), Mathematics-Calculus (MAT/05), between 18 and 42 CFUs and at least 18 CFUs
- Elective/ Free Choice (FC): 12 CFUs
- Other activities (“Altre attività”): between 1 and 6 CFUs and at least 1 CFU

Credits gained on TAIPEI TECH courses are accredited according to UPV rules.

2. Requirements of TAIPEI TECH master degree in Electro-Optical Engineering

The curriculum for TAIPEI TECH two-years master degree in Electro-Optical Engineering requires at least 32 credits for graduation.

- Professional Required: 16 credits (including 6 credits for master's thesis, 4 credits for seminar, 6 credits for the courses "Introduction to Optoelectronic Engineering (I)(II)")
- Professional electives: 16 credits
 - Students should take at least 2 courses from 2 different research fields among the 4 ones with the courses mark A~D.
 - 9 credits can be approved from cross-department elective courses which the major graduate program does not provide and the advisor professor consents to.



3. Combined requirements of the Double Master Degree

Combined requirements of the double master degree imply the following approach for, respectively, TAIPEI TECH and UPV students:

- TAIPEI TECH students wishing to pursue the UPV Master in Electronic Engineering, should attend courses for 96 CFU complying with the requirements by topics and number of examinations mentioned by Paragraph 1.
- UPV students, in order to obtain the TAIPEI TECH master degree in Electro-Optical Engineering, should attend courses for at least 32 TAIPEI TECH credits, and internship or thesis for at least 6 TAIPEI TECH credits, and finish the thesis complying with TAIPEI TECH regulations.

4. Curricula

In order to comply with TAIPEI TECH rules, the curriculum for TAIPEI TECH students has different credits for the first two semesters. The credit gap is recovered afterwards.



Pavia's curriculum for TAIPEI TECH students

Year 1 Semester 1 (at TAIPEI TECH)

#	TAIPEI TECH Course	SSD	CFU value	Equivalence to Pavia
1	Introduction to Optoelectronic Engineering (I)	ING-INF/01	18	<i>the two courses on the left are considered equivalent to:</i> Optoelectronic Devices (9 CFU) Advanced Mathematical Methods (9 CFU)
2	Elective Courses (one MAT/05 and one ING-INF/01 from Table I)	MAT/05		
3	Experiments for Optoelectronic Engineering (I)	FIS/03	3	<i>the two courses on the left are considered equivalent to</i> Quantum Electronics (6 CFU)
4	Engineering Seminar (1/4)		3	

Year 1 Semester 2 (at TAIPEI TECH)

	TAIPEI TECH Course	SSD	CFU value	Equivalence to Pavia
5	Introduction to Optoelectronic Engineering (II)	FIS/03	7.5	<i>the two courses on the left are considered equivalent to:</i> Semiconductor Device Physics (6 CFU) Microwaves (9 CFU)
6	Elective Course (one ING-INF/02 from Table I)	ING-INF/02	7.5	
7	Experiments for Optoelectronic Engineering (II)	FIS/03	3	<i>the two courses on the left are considered equivalent to:</i> Sicurezza laser (6 CFU)
8	Engineering Seminar (2/4)		3	



Year 2 Semester 1 (at UPV)

	Pavia Course	SSD	CFU value	Equivalence to TAIPEI TECH	Credit
9	Electro-optical Instrumentation	ING-INF/01	6	Optoelectronic Methods in Precision Measurement	3
10	Industrial Laser Design	ING-INF/01	6	Laser Engineering	3
11	Antenna and Propagation	ING-INF/02	9	Diffraction Optical Elements and Applications	3
12	Elective Course from Table II		6	-	3
13	Elective Course from Table II		3	-	3

Year 2 Semester 2 (at UPV)

	Pavia Course	SSD	CFU value	Equivalence to TAIPEI TECH	Credit
14	Optical Communications	ING-INF/01	9	Fiber-Optic Communication A	3
16	Nonlinear Optics	FIS/03	6	Modern Optics	3
17	Digital Communications	ING-INF/03	6	Flat-Panel Display C	3
18	Thesis / Internship	other	24	Thesis / Internship	6

Elective courses are listed in Table below. Constraints of TAIPEI TECH (2 courses from 2 different research fields among the 4 ones with the courses mark A~D), and total credits are satisfied

Total CFUs of UPV curriculum for TAIPEI TECH students: ING-INF/01- 02: 45, ING-INF/03-FIS/03-MAT/05: 39, free choice: 12, thesis: 24, total: 120



Table I- Elective courses at TAIPEI TECH for TAIPEI TECH students

1st Semester

Code	Course Name	Credits	SSD
6505004	Experiments for Optoelectronic Engineering (I)	1.0	FIS/03
6503007	Modern Optics	3.0	FIS/03
6505016	Introduction to Fourier Optics	3.0 B	FIS/03
6505034	Fiber-Optic Communication	3.0 A	ING-INF01
6505010	Opto-electronic Methods in Precision Measurement	3.0	ING-INF/01
6505031	Integrated Optics	3.0	FIS/03
6505045	Physics of Semiconductor Device	3.0	FIS/03
6505050	Design and Application of Optical Coating	3.0	ING-INF/02
6505054	Epitaxy Technology and Measurement	3.0	ING-INF/01
6505058	Electro-Optical Industry Trend Analysis	3.0	ING-IND/35
6505089	Lens Design	3.0	FIS/03
6505093	Electronics of Liquid Crystal Display	3.0	ING-INF/01
6505095	Introduction of Solar Cells Technology	3.0	ING-INF/01
6505097	Optical Properties of Semiconductors	3.0 D	ING-INF/01
6505114	Preliminary Flat-Panel Display	3.0	ING-INF/01
6505122	Nonlinear Fiber Optics and Application	3.0	FIS/03
6505124	Lighting Design with TracePro	3.0	MAT/05



2nd Semester

Code	Course Name	Credits	Course Name
6505005	Experiments for Optoelectronic Engineering (II)	1.0	FIS/03
6505038	Flat Panel Display	3.0 C	ING-INF/01
6505066	Introduction to Biomedical Optics	3.0	ING-INF/06
6505090	Semiconductor Materials and Devices	3.0	ING-INF/01
6503532	Colorimetry	3.0	ING-INF/02
6505024	Fabrication of Photoelectronic Materials and Device	3.0	ING-INF/01
6505028	Optical Communication	3.0 A	ING-INF/01
6505033	Applied Optics	3.0	FIS/03
6505039	Diffraction Optical Elements and Applications	3.0	ING-INF/02
6505040	Laser Engineering	3.0 B	ING-INF/01
6505044	Dense Wavelength Division Multiplexing	3.0	ING-INF/03
6505052	Optics of Liquid Crystal Displays	3.0 C	FIS/03
6505066	Introduction to Biomedical Optics	3.0	ING-INF/06
6505096	Obtainment and Application of Property of High-Tech Patent	3.0	ING-IND/35
6505116	Introduction of Ultrafast Optics	3.0	FIS/03
6505131	Dialux Lighting Design	3.0	MAT/05
6505132	Ultrafast Optics and Application	3.0	FIS/03
6505049	Properties and Fabrication Techniques of Semiconductor Thin Film	3.0 D	ING-INF/01

Students should take at least 2 courses from 2 different research fields among the 4 ones with the courses mark A~D.



Table II - Elective Courses at UPV for TAIPEI TECH students

Code	Course Name	SSD	CFU	Semester
502962	Internet e Multimedia	ING-INF/03	6 CFU	1
502993	Microsensori, Microsistemi Integrati e MEMS (I)	ING-INF/01	6 CFU	1
503278	Microwave Measurements	ING-INF/02	6 CFU	1
503279	Computational Electromagnetics	ING-INF/02	6 CFU	1
505007	Electromagnetic Compatibility	ING-INF/02	6 CFU	1
505017	Satellite and Space Systems	ING-INF/01	6 CFU	1
505002	Electronic Instrumentation and Technologies	ING-INF/01	6 CFU	1
504443	Circuits and Systems for Wireline Communications	ING-INF/01	6 CFU	1
503272	VLSI Analogue-Digital Interfaces ICs	ING-INF/01	6 CFU	1
504462	Process Control	ING-INF/04	6 CFU	1
503272	VLSI Architectures for Digital Signal Processing (I)	ING-INF/01	6 CFU	1
504232	Sicurezza laser (I)	FIS/03	6 CFU	1
504462	Process Control	ING-INF/04	6 CFU	1
504702	Industrial Automation	ING-INF/04	6 CFU	1
505000	Radar Remote Sensing	ING-INF/02	6 CFU	2
505001	Inverse Scattering Techniques and Diagnostic	ING-INF/02	6 CFU	2
504240	Biofotonica A (I)	ING-INF/01	3 CFU	2
504241	Biofotonica B (I)	FIS/03	3 CFU	2
504708	Economics for the Digital Society	SECS-P/06	6 CFU	2
504464	Organisation Theory and Design	SECS-P/06	6 CFU	2
502466	Elettronica di potenza (I)	ING-INF/01	6 CFU	2
505060	Industrial topics in microelectronics	ING-INF/01	3 CFU	annual



505013	Advanced topics in microwave technologies	ING-INF/02	3 CFU	annual
503281	Progetto, gestione e produzione di beni e servizi (I) (Planning, management and supply of goods and services, in English in 2016)	choice	3 CFU	2
501246	Etica ambientale (I)	choice	3 CFU	2

Courses labeled (I) are delivered in Italian, and are used for equivalence purposes

Table III- Elective courses at TAIPEI TECH for UPV students

1st Semester

Code	Course Name	Credits	SSD
6505004	Experiments for Optoelectronic Engineering (I)	1.0	FIS/03
6505031	Integrated Optics	3.0	FIS/03
6505050	Design and Application of Optical Coating	3.0	ING-INF/02
6505054	Epitaxy Technology and Measurement	3.0	ING-INF/01
6505058	Electro-Optical Industry Trend Analysis	3.0	ING-IND/35
6505089	Lens Design	3.0	FIS/03
6505093	Electronics of Liquid Crystal Display	3.0	ING-INF/01
6505095	Introduction of Solar Cells Technology	3.0	ING-INF/01
6505114	Preliminary Flat-Panel Display	3.0	ING-INF/01
6505124	Lighting Design with TracePro	3.0	MAT/05

2nd Semester

Code	Course Name	Credits	SSD
6505005	Experiments for Optoelectronic Engineering (II)	1.0	FIS/03
6505028	Optical Communication	3.0 A	ING-INF/01



6505038	Flat Panel Display	3.0 C	ING-INF/01
6505090	Semiconductor Materials and Devices	3.0	ING-INF/01
6503532	Colorimetry	3.0	ING-INF/02
6505024	Fabrication of Photoelectronic Materials and Device	3.0	ING-INF/01
6505039	Diffraction Optical Elements and Applications	3.0	ING-INF/02
6505044	Dense Wavelength Division Multiplexing	3.0	ING-INF/03
6505052	Optics of Liquid Crystal Displays	3.0 C	FIS/03
6505096	Obtainment and Application of Property of High-Tech Patent	3.0	ING-IND/35
6505116	Introduction of Ultrafast Optics	3.0	FIS/03
6505131	Dialux Lighting Design	3.0	MAT/05
6505132	Ultrafast Optics and Application	3.0	FIS/03
6505049	Properties and Fabrication Techniques of Semiconductor Thin Film	3.0 D	ING-INF/01

TAIPEI TECH's curriculum for UPV students

Year 1 Semester 1 (at UPV)

#	Pavia Course	SSD	CFU	Equivalence to TAIPEI TECH	Credit
1	Advanced Mathematical Methods	MAT/05	9	<i>The courses on the left are equivalent to "Introduction to Optoelectronic Engineering (I)" and "Semiconductor Materials and Devices"</i>	3
2	Optoelectronic Devices	ING-INF/01	9		3
3	Semiconductor Device Physics	FIS/03	6	<i>This course and "Microwaves" are equivalent to "Introduction to Optoelectronic Engineering (II)" and "Physics of Semiconductor Devices"</i>	3
4	Quantum Electronics	FIS/03	6	<i>This course is equivalent to "Experiments for Optoelectronic Engineering (I)" and "Engineering Seminar (1/4)".</i>	3



Year 1 Semester 2 (at UPV)

	Pavia Course	SSD	CFU	Equivalence to TAIPEI TECH	Credit
5	Microwaves	ING-INF/02	9	<i>This course and "Semiconductor Device Physics" are equivalent to "Introduction to Optoelectronic Engineering (II)" and "Physics of Semiconductor Devices"</i>	3
6	Optical Communications	ING-INF/01	9	Fiber-Optic Communication	3
7	Nonlinear Optics	FIS/03	6	Nonlinear Fiber Optics and Application	3
8	Digital Communications	ING-INF/03	6	<i>This course is equivalent to "Experiments for Optoelectronic Engineering (II)" and "Engineering Seminar (2/4)".</i>	3

Year 2 Semester 1 (at TAIPEI TECH)

	TAIPEI TECH Course	SSD	CFU	Equivalence to UPV
9	Elective Courses (ING-INF/01 from Table III)	ING-INF/01	12	Electro-optical instrumentation Microsensori, microsistemi integrati e MEMS
10	Elective Course (ING-INF/01 from Table III)	ING-INF/01	6	Industrial laser design
11	Diffraction Optical Elements and Applications OR Design and Application of Optical Coating	ING-INF/02	9	Antennas and propagation
12	Free Elective Course (one from Table III)		3	Biofotonica A



Year 2 Semester 2 (TAIPEI TECH)

	TAIPEI TECH Course	SSD	CFU	Equivalence to UPV
13	Free Elective Course (one from Table III)		6	Sicurezza laser
14	Thesis / Internship		24	Thesis / Internship (Pavia or TAIPEI TECH)

Total CFUs of TAIPEI TECH curriculum for UPV students:

ING-INF/01 or /02: 49.5, ING-INF/03-FIS/03-MAT/05: 33, free elective: 15, thesis 24=121.5 total (Excess credits:1.5)

Constraints of TAIPEI TECH (2 courses from 2 different research fields among the 4 ones with the courses mark A~D), and total credits are satisfied