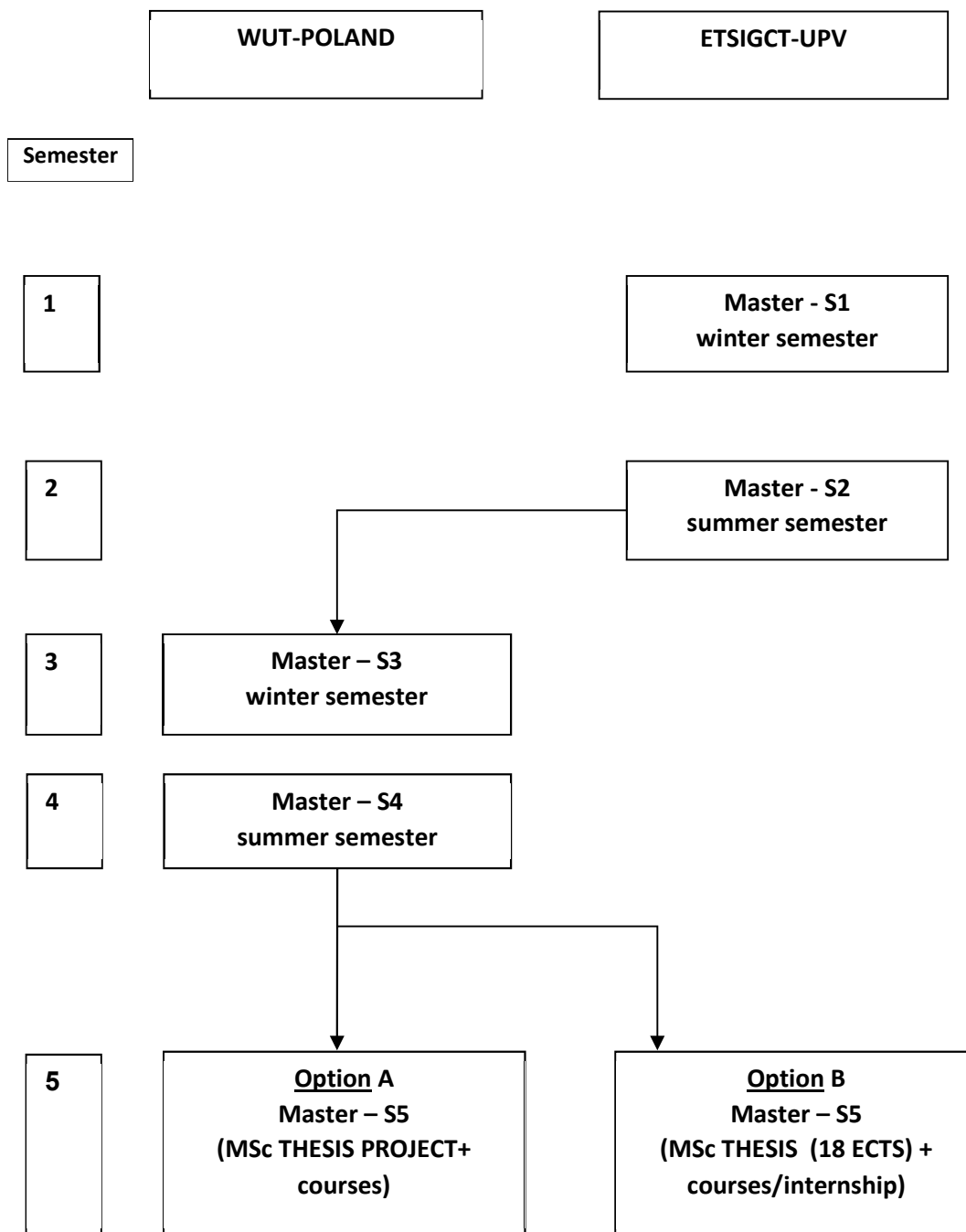**Appendix 1. Flow Diagram of the mobilities**

Learning track 1: ETSIGCT-UPV to FGC-WUT. **OPTION A** and **OPTION B**

Each box represents an average of 30 ECTS.(see details)

	WUT-POLAND		ETSIGCT-UPV

Semester

Semester	WUT-POLAND	ETSIGCT-UPV
1		**Master - S1** **winter semester**
2		**Master - S2** **summer semester**
3	**Master – S3** **winter semester**	
4	**Master – S4** **summer semester**	
5	<u>Option</u> **A** **Master – S5** **(MSc THESIS PROJECT+** **courses)**	<u>Option</u> **B** **Master – S5** **(MSc THESIS (18 ECTS) +** **courses/internship)**

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LEARNING TRACK 1- **OPTION A**

FGC-WUT

ETSIGCT-UPV

S1-MASTER			
Subject	Category	ECTS	
Geostatistics and Multivariate Analysis (EF)	Compulso	6	S1-UPV
Big Data/ Data Mining (EF)	Elective	6	S1-UPV
Urban Planning and Cadastre	Compulso	6	S1-UPV
Geomatic Applications in Geomarketing (EF)	Elective	6	S1-UPV
Programming for Geospatial Applications (EF	Compulso	6	S1-UPV
		30	

S2-MASTER			
Subject	Category	ECTS	
Web Development and Geoportals (EF)	Compulso	6	S2-UPV
Positioning(EF)	Compulso	6	S2-UPV
GIS Application Development (EF)	Compulso	6	S2-UPV
Distribution of Spatial Information (EF)	Compulso	6	S2-UPV
Geospatial Content Managers and Smart Citi	Elective	6	S2-UPV
		30	

	S3-MASTER		
	Subject	Category	ECTS
S1 WUT	Mobile and Navigational Cartography	Obligator	3
S1 WUT	Imagen recognition and deep machine learning	Obligator	4
S1 WUT	Modern Photogrammetry	Obligator	3
S1 WUT	Reference systems for navigation	Obligator	2
S1 WUT	Geophysics	Obligator	2
S1 WUT	Selected problems of stochactics	Obligator	4
S1 WUT	Selected sections of physical geodesy and geodyna	Obligator	2
S3 WUT	Practices in fields	Obligator	2
S3 WUT	Spatial data mining and Big Data	Obligator	3
S3 WUT	Urban solutions for autonomous vehicles	Obligator	1
S3 WUT	Intelligent transportation systems and autonomous	Obligator	1
S3 WUT	Contemporary challenges in cities development	Elective	2
	Polish language	Foreign l	2
		ECTS to obtain	31

	S4-MASTER		
	Subject	Category	ECTS
S2 WUT	Geodetic and cartographic documentation	Obligaot	2
S2 WUT	Integrated Navigation Systems	Obligator	4
S2 WUT	Spatial analysis	Obligator	2
S2 WUT	English for geomatics	Foreign l	1
S2 WUT	Modern measuring instruments	Elective	2
S2 WUT	Indoor navigation	Elective	2
S2 WUT	Augmented Reality	Elective	2
S2 WUT	Computer Vision and 3D data processing	Obligator	3
S2 WUT	3D city modelling	Obligator	2
S2 WUT	Algorithmics of navigation applications	Obligator	3
S2 WUT	Mobile mapping technologies	Obligator	4
S2 WUT	Simultaneous localization and mapping (SLAM)	Obligator	3
	Polish language	Foreign l	2
		ECTS to obtain	32

	S5-MASTER **OPTION A**		
	Subject	Category	ECTS
S3-WUT	Diploma Thesis	Obligator	20
S3-WUT	Diploma seminar	Obligator	1
S1 WUT	Standard for geodata	Obligator	1
S1 WUT	Programming language with numerical metho	Obligator	2
S1 WUT	Satellite Navigation Systems	Obligator	3
		ECTS to obtain	27
	TOTAL OPTION A	**60+90=150**	

TOTAL ECTS at UPV = 60 ECTS.

TOTAL ECTS at WUT= 90 ECTS.

TOTAL = 150 ECTS.

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LEARNING TRACK 1- **OPTION B**

FGC-WUT

ETSIGCT-UPV

S1-MASTER

	Subject	Category	ECTS	
	Geostatistics and Multivariate Analysis (EF)	Compulso	6	S1-UPV
	Big Data/ Data Mining (EF)	Elective	6	S1-UPV
	Urban Planning and Cadastre	Compulso	6	S1-UPV
	Geomatic Applications in Geomarketing (EF)	Elective	6	S1-UPV
	Programming for Geospatial Applications (EF	Compulso	6	S1-UPV
			30	

S2-MASTER

	Subject	Category	ECTS	
	Web Development and Geoportals (EF)	Compulso	6	S2-UPV
	Positioning(EF)	Compulso	6	S2-UPV
	GIS Application Development (EF)	Compulso	6	S2-UPV
	Distribution of Spatial Information (EF)	Compulso	6	S2-UPV
	Geospatial Content Managers and Smart Citi	Elective	6	S2-UPV
			30	

S3-MASTER

	Subject	Category	ECTS
S1 WUT	Mobile and Navigational Cartography	Obligator	3
S1 WUT	Imagen recognition and deep machine learning	Obligator	4
S1 WUT	Modern Photogrammetry	Obligator	3
S1 WUT	Reference systems for navigation	Obligator	2
S1 WUT	Geophysics	Obligator	2
S1 WUT	Selected problems of stochactics	Obligator	4
S1 WUT	Selected sections of physical geodesy and geodyna	Obligator	2
S3 WUT	Practices in fields	Obligator	2
S3 WUT	Spatial data mining and Big Data	Obligator	3
S3 WUT	Urban solutions for autonomous vehicles	Obligator	1
S3 WUT	Intelligent transportation systems and autonomous	Obligator	1
S3 WUT	Contemporary challenges in cities development	Elective	2
	Polish Language	Foreign l	2
	ECTS to obtain		31

S4-MASTER

	Subject		Category	ECTS
S2 WUT	Geodetic and cartographic documentation			2
S2 WUT	Integrated Navigation Systems		Obligator	4
S2 WUT	Spatial analysis		Obligator	2
S2 WUT	English for geomatics		Foreign l	1
S2 WUT	Modern measuring instruments		Elective	2
S2 WUT	Indoor navigation		Elective	2
S2 WUT	Computer Vision and 3D data processing		Obligator	3
S2 WUT	3D city modelling		Obligator	2
S2 WUT	Algorithmics of navigation applications		Obligator	3
S2 WUT	Mobile mapping technologies		Obligator	4
S2 WUT	Simultaneous localization and mapping (SLAM)		Obligator	3
	Polish Language		Foreign l	2
	ECTS to obtain			30

*S5-MASTER OPTION B

	Subject	Category	ECTS	
	Master thesis	Compulso	18	
	Remote sensing and cartographic updating	Compulso	6	S3-UPV
	Geospatial Apps in mobile devices	Compulso	6	S3-UPV
	Internship	Elective	6	
	ECTS to obtain		30	
	TOTAL OPTION B	61+90=151		

*Students in S5- Master Option B will select 12 ECTS courses among three options + 18 ECTS for Master Thesis.
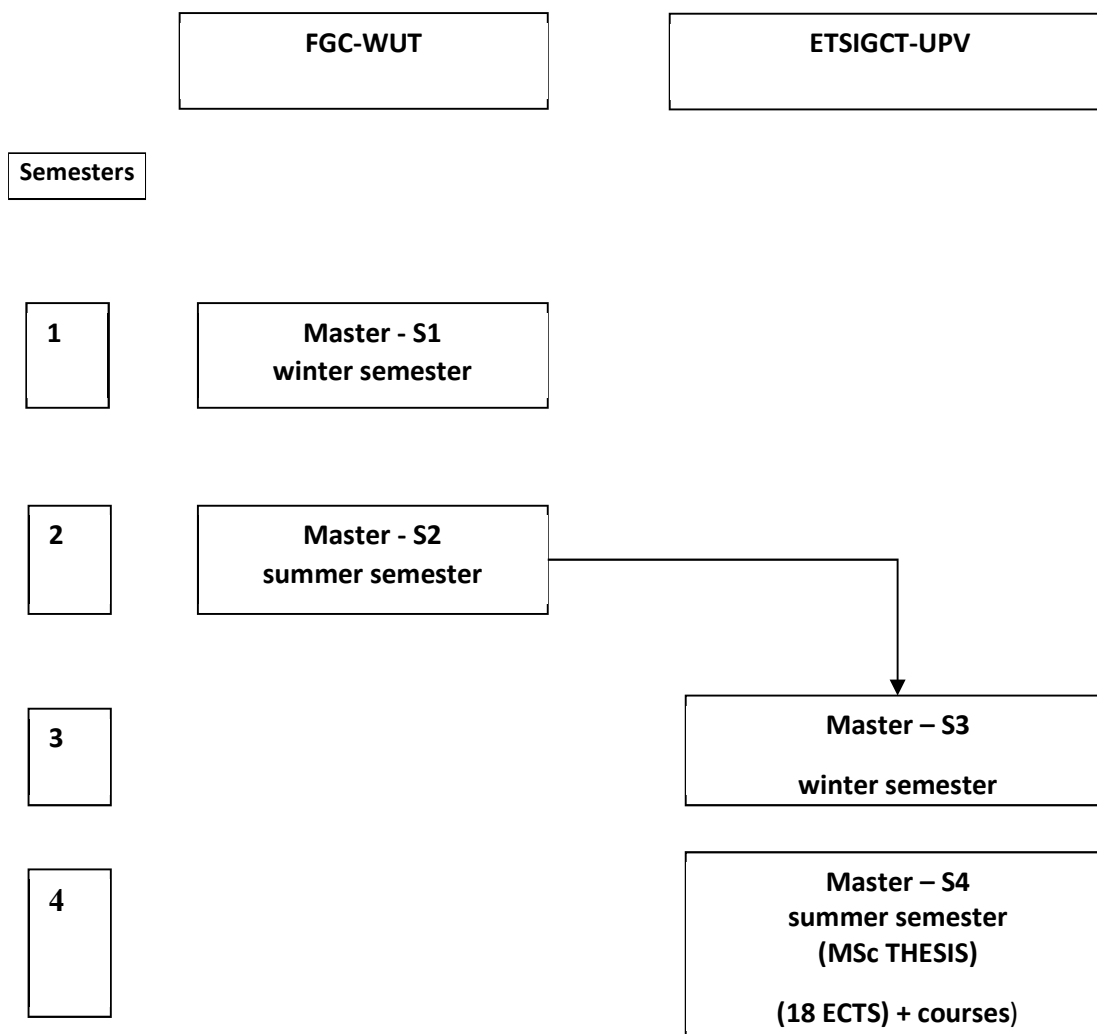
TOTAL ECTS at UPV= 90 ECTS.

TOTAL ECTS at WUT= 61 ECTS.

TOTAL = 151 ECTS

Learning track 2A: FGC-WUT (English-taught specialization) to ETSIGCT-UPV

Each box represents at least 30 ECTS.

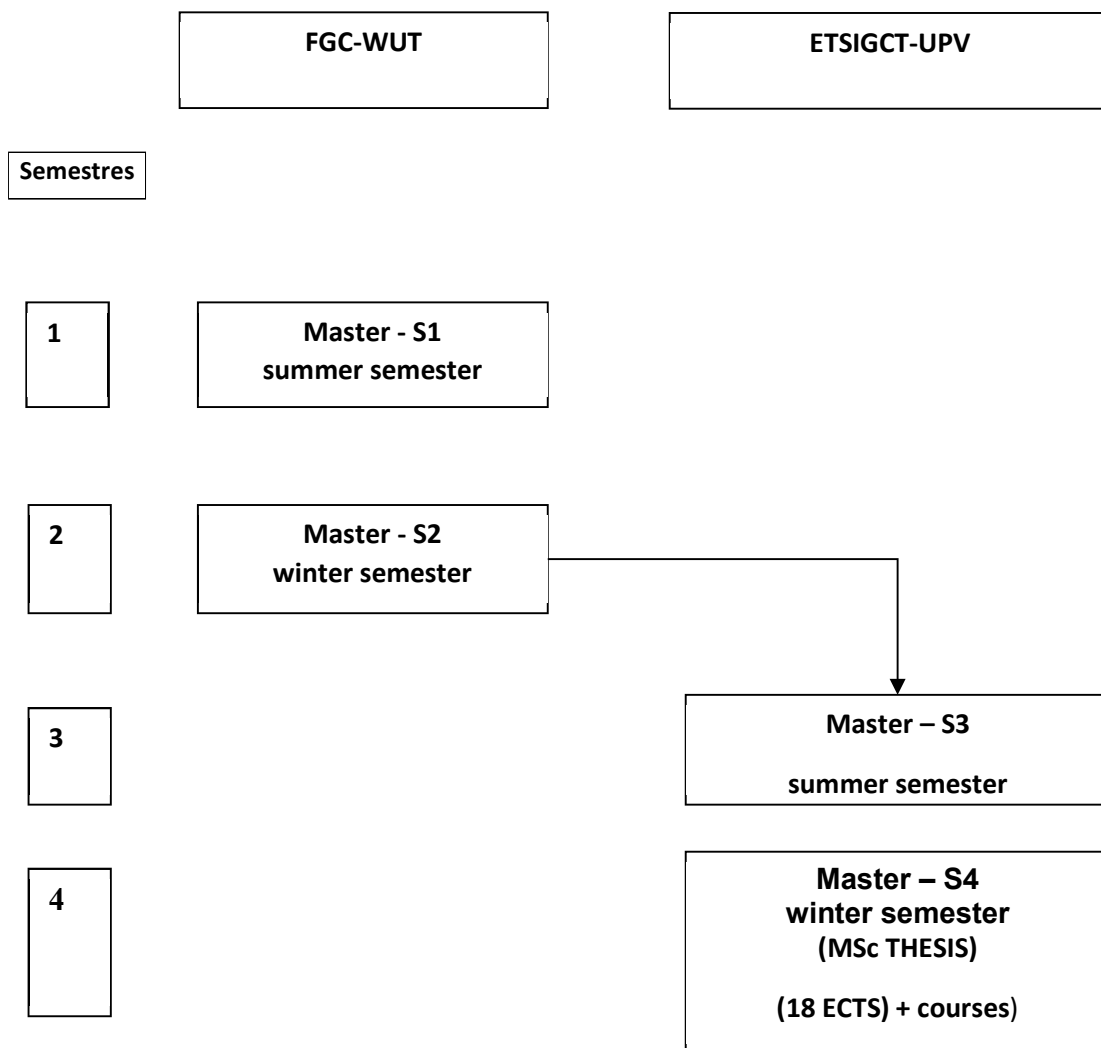| FGC-WUT	ETSIGCT-UPV

Semesters

1 | **Master - S1**
winter semester

2 | **Master - S2**
summer semester

3 | **Master – S3**
winter semester

4 | **Master – S4**
summer semester
(MSc THESIS)
(18 ECTS) + courses)

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FGC-WUT

	S1-MASTER Mobile Mapping and Navigation Systems		
	Subject	Category	ECTS
S1 WUT	Reference systems for navigation	Obligatory	2
S1 WUT	Mobile and Navigational Cartography	Obligatory	3
S1 WUT	Satellite Navigation Systems	Obligatory	3
S1 WUT	Imagen recognition and deep machine learning	Obligatory	4
S1 WUT	Programming language with numerical methods	Obligatory	2
S1 WUT	Selected problems of stochastic data analysis	Obligatory	4
S1 WUT	Standards for geodata	Obligatory	1
S1 WUT	Modern Photogrammetry	Obligatory	3
S1 WUT	Basics of international economic law and intellectual	Obligatory	1
S1 WUT	Geophysics	Obligatory	2
S1 WUT	Mathematics	Obligatory	3
S1 WUT	Selected sections of physical geodesy and geodynami	Obligatory	2
		ECTS to obtain	30

	S2-MASTER Mobile Mapping and Navigation Systems		
	Subject	Category	ECTS
S2 WUT	Geodetic and cortography documentation		2
S2 WUT	Principles of transport economics		2
S2 WUT	Integrated Navigation Systems	Obligatory	4
S2 WUT	Spatial analysis	Obligatory	2
S2 WUT	English for geomatics	Foreign lang	1
S2 WUT	Modern measuring instruments /	Elective	2
S2 WUT	Surveying services of investment /▯	Elective	2
	Building Information Modelling /▯	Elective	2
	Robustness of observation systems to gross errors▯		
S2 WUT	Application of aerial and satellite photogramm	Elective	2
S2 WUT	Augmented Reality	Elective	2
S2 WUT	Indoor navigation	Elective	2
S2 WUT	Computer Vision and 3D data processing	Obligatory	3
S2 WUT	3D city modelling	Obligatory	2
S2 WUT	Algorithmics of navigation applications	Obligatory	3
S2 WUT	Mobile mapping technologies	Obligatory	4
S2 WUT	Simultaneous localization and mapping (SLAM)	Obligatory	3
	Spanish Language (B1)		4
		ECTS to obtain	42

		TOTAL	72

ETSIGCT-UPV

S3-MASTER		
Subject	Category	ECTS
Remote Sensing and Cartographic Updating (EF)	Compulsory	6
Environmental Mapping and Modelling (EF)	Compulsory	6
Techniques for Heritage and Architectural Documenta	Compulsory	6
Sensor Georeferencing and Navigation (EF)	Compulsory	6
Geospatial Apps in Mobile Devices (EF)	Compulsory	6
Geomatic Applications in Geomarketing (EF)	Elective	6
Programming for Geospatial Applications (EF)	Compulsory	6
	ECTS to obtain	42

S4-MASTER		
Subject	Category	ECTS
Instrumentation for Spatial Data Acquisition	Elective	6
Geovisualisation and 3D Modelling (EF)	Elective	6
Geospatial Content Managers and Smart Cities (EF)	Elective	6
Master thesis	Compulsory	18
	ECTS to obtain	36

	TOTAL	78

TOTAL ECTS at WUT = 72 ECTS.
TOTAL ECTS at UPV = 78 ECTS.
TOTAL = 150 ECTS.

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Learning track 2B: WUT-POLAND (Polish-taught specialization) to ETSIGCT-UPV.

Each box represents at least 30 ECTS.

FGC-WUT	ETSIGCT-UPV

Semestres

1	Master - S1 summer semester

2	Master - S2 winter semester

3	Master – S3 summer semester

4	Master – S4 winter semester (MSc THESIS) (18 ECTS) + courses)

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FGC-WUT — ETSIGCT-UPV

S1 — First Semester (FGC-WUT)

S1-MASTER Geodesy and Satellite Navigation

Subject	Category	ECTS
Selected Legal Issues of Business Activity	Obligat	1
Mathematics	Obligat	3
Selected Topics of Mathematics and Numerical Methods	Obligat	4
Geophysics	Obligat	2
Selected Topics of Physical Geodesy nad Geodynamics	Obligat	2
Digital Image Processing	Obligat	2
Norms in geographic information systems	Obligat	2
Reference Frames in Geodesy	Obligat	2
Space Geodetic Techniques	Obligat	3
Engineering Surveying	Obligat	2
Geodetic Services of Investment	Obligat	3
Geodetic studies for low purposes	Obligat	4
ECTS to obtain		30

(S1-MASTER Engineering and Industrial Surveying, S1-MASTER Cadastre and Real Estate Management, and S1-MASTER Photogrammetry and Remote Sensing share the same S1 core structure.)

S1 — First Semester (ETSIGCT-UPV)

S1-MASTER Cartography and GiS

Subject	Category	ECTS
Selected Legal Issues of Business Activity	Obligat	1
Mathematics	Obligat	3
Selected Topics of Mathematics and Numerical Methods	Obligat	4
Geophysics	Obligat	2
Selected Topics of Physical Geodesy nad Geodynamics	Obligat	2
Digital Image Processing	Obligat	2
Norms in geographic information systems	Obligat	2
Spatial data infrastructure	Obligat	2
Cartographic Modelling	Obligat	3
Photogrammetric Technologies	Obligat	4
Geostatistics	Obligat	2
Technologies in Spatial Information Systems	Obligat	3
ECTS to obtain		30

S1-MASTER Spatial Information Systems

Subject	Category	ECTS
Selected Legal Issues of Business Activity	Obligaton	1
Mathematics	Obligaton	3
Selected Topics of Mathematics and Numerical Methods	Obligaton	4
Geophysics	Obligaton	2
Selected Topics of Physical Geodesy nad Geodynamics	Obligaton	2
Digital Image Processing	Obligaton	2
Norms in geographic information systems	Obligaton	2
Spatial data infrastructure	Obligaton	2
Cartographic Modelling	Obligaton	3
Photogrammetric Technologies	Obligaton	4
Geostatistics	Obligaton	2
Technologies in Spatial Information Systems	Obligaton	3
ECTS to obtain		30

S2 — Second Semester (FGC-WUT)

S2-MASTER Geodesy and Satellite Navigation

Subject	Category	ECTS
Advanced Methods of GNSS Data	Obligat	4
Physical Geodesy	Obligat	5
Geodetic Metrology	Obligat	1
Selected Topics of Navigation	Obligat	5
GNSS Augmentation Systems	Obligat	4
Algorithms of Geodetic Data Ana	Obligat	4
Human rights	Elective	2
UAV Technologies in Situational	Elective	2
Production and application of	Elective	1
BIM in Construction Site Survey	Elective	2
Applications of Aerial and	Elective	1
Open data and open software in	Elective	1
Geodetic and cartographic docu	Obligat	2
Spatial data mining and big data	Obligat	2
Practices in a field (MMNS)	Obligat	2
Spanish Language	foreign	4
ECTS to obtain		42

S2-MASTER Engineering and Industrial Surveying

Subject	Category	ECTS
Urban Geodesy	Obligat	3
Specialized Measurements in Su	Obligat	3
Survey System Design	Obligat	3
Measurements of Displacements	Obligat	3
Engineering Surveying Seminar	Obligat	1
Field Practice in Engineering Surv	Obligat	2
Mechanics of Structures and Con	Obligat	2
Information Systems of Engineer	Obligat	2
Basics of Analyses of Measuring	Obligat	4
Human rights	Elective	2
UAV Technologies in Situational	Elective	2
Production and application of	Elective	1
BIM in Construction Site Survey	Elective	2
Applications of Aerial and	Elective	1
Open data and open software in	Elective	1
Geodetic and cartographic docu	Obligat	2
Spatial data mining and big data	Obligat	2
Practices in a field (MMNS)	Obligat	2
Spanish Language	foreign	4
ECTS to obtain		42

S2-MASTER Cadastre and Real Estate Management

Subject	Category	ECTS
Land consolidation and Land Excl	Obligat	3
Geodesy for Local Development	Obligat	3
Technical Basis of Property Value	Obligat	3
Real Estate Valuation	Obligat	3
Cadastre	Obligat	5
Selected Aspects of Property Val	Obligat	2
Economic Basis of Real Estate Val	Obligat	2
Human rights	Elective	2
UAV Technologies in Situational	Elective	2
Production and application of	Elective	1
BIM in Construction Site Survey	Elective	2
Applications of Aerial and	Elective	1
Open data and open software in	Elective	1
Geodetic and cartographic docu	Obligat	2
Spatial data mining and big data	Obligat	2
Practices in a field (MMNS)	Obligat	2
Spanish Language	foreign	4
ECTS to obtain		42

S2-MASTER Photogrammetry and Remote Sensing

Subject	Category	ECTS
Image Data Acquisition techniqu	Obligat	3
Spatial Orientation of Images	Obligat	3
Airborne Laser Scanning	Obligat	2
Automation in Photogrammetric	Obligat	5
Close Range Photogrammetry	Obligat	4
Image Processing Methods in Re	Obligat	3
Hyperspectral Remote Sensing	Obligat	3
Human rights	Elective	2
UAV Technologies in Situational	Elective	2
Selected issues of GNSS	Elective	1
BIM in Construction Site Survey	Elective	1
Applications of Aerial and	Elective	1
Open data and open software in	Elective	1
Geodetic and cartographic docu	Obligat	2
Spatial data mining and big data	Obligat	2
Practices in a field (MMNS)	Obligat	2
Spanish Language	foreign	4
ECTS to obtain		42

S2 — Second Semester (ETSIGCT-UPV)

S2-MASTER Cartography and GiS

Subject	Category	ECTS
Spatial Databases Design	Obligat	4
Thematic Cartography	Obligat	3
Mathematical Cartography	Obligat	3
Cyfrowe systemy produkcji map	Obligat	3
Cartographic 3D Models	Obligat	4
Computer Graphics in Cartograp	Obligat	3
Generalisation of Geographic Inf	Obligat	3
Field Training - 5 days	Obligat	2
Human rights	Elective	2
UAV Technologies in Situational	Elective	2
Selected issues of GNSS	Elective	1
BIM in Construction Site Survey	Elective	1
Applications of Aerial and	Elective	1
Open data and open software in	Elective	1
Geodetic and cartographic docu	Obligat	2
Spatial data mining and big data	Obligat	2
Practices in a field (MMNS)	Obligat	2
Spanish Language	foreign	4
ECTS to obtain		42

S2-MASTER Spatial Information Systems

Subject	Category	ECTS
Spatial Databases Design	Obligaton	4
Programming in GIS	Obligaton	3
GIS software	Obligaton	3
Providing Access to Spatial Data	Obligaton	2
Spatial Analyses and Modelling	Obligaton	3
Remote Sensing Data Sources for	Obligaton	5
GIS Applications	Obligaton	2
Human rights	Elective	2
UAV Technologies in Situational	Elective	2
Selected issues of GNSS	Elective	2
BIM in Construction Site Survey	Elective	1
Applications of Aerial and	Elective	1
Open data and open software in	Elective	1
Geodetic and cartographic docur	Obligaton	2
Spatial data mining and big data	Obligaton	2
Practices in a field (MMNS)	Obligat	2
Spanish Language	foreign lai	4
ECTS to obtain		42

S4-MASTER

Subject	Category	ECTS	
Instrumentation for Spatial Data Acquisition	Elective	6	S4-UPV
Geovisualisation and 3D Modelling (EF)	Elective	6	S4-UPV
Gis Application Development	Elective	6	S2-UPV
Geospatial Content Managers and Smart Cities	Compulso	6	S2-UPV
Web Development and Geoportals	Compulso	6	S2-UPV
ECTS to obtain		30	

S3-MASTER

Subject	Category	ECTS	
Techniques for Heritage and Architectural Docu	Compulso	6	S3-UPV
Sensor Georeferencing and Navigation (EF)	Compulso	6	S3-UPV
Geospatial Apps in Mobile Devices (EF)	Compulso	6	S3-UPV
Geomatic Applications in Geomarketing (EF)	Elective	6	S1-UPV
Programming for Geospatial Applications (EF)	Compulso	6	S1-UPV
Master thesis	Compulso	18	S4-UPV
ECTS to obtain		48	

TOTAL 72   TOTAL 78

1
2 **TOTAL ECTS at WUT = 72 ECTS**
3 **TOTAL ECTS at UPV = 78 ECTS. TOTAL = 150 ECTS.**