UNIVERSEH

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European Space University for Earth and Humanity

UNIVERSEH is an alliance of five European universities established to develop a new way of collaboration in the field of Space, within the "European Universities" initiative.

The alliance aims to create new higher education interactive experiences for the university community, teachers and students, and for the benefit of society as a whole. Such initiatives will enable broadminded, informed and conscientious European citizens to capture and create new knowledge and become smart actors of European innovation, valorisation and societal dissemination within the Space sector, from science, engineering, liberal arts to culture.

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Consortium course and competence overview related to space and humanities

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Abstract

This deliverable provides an in-depth picture of the existing programmes, courses and areas of competence in the Consortium, which are directly or indirectly linked to Space. It is based on the matrix combining academic fields and major application segments for space-based activities.

Combined with the results of Task 3.2, this mapping will act as guidelines for all partners to identify strengths and weaknesses among the Consortium competences and identify potential missing ones, and finally build new curricula (Tasks 3.3., 3.5-3.9)

The deliverable is composed of:

1. The raw data table on existing programmes directly or indirectly related to Space in the Consortium.
2. The matrix combining academic fields and major application segments for space-based activities.
3. This matrix is completed with a list and concise description of identified partners' programmes/courses.
4. This associated report explaining the methodology and providing a concise analysis of the results.

Contents

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I. Methodology

To build a map of the partners' areas of competence, the WP3 team carried out an investigation among partners to collect and list specific information regarding existing programmes/courses directly or indirectly linked to Space. Thanks to the contributions received, a consolidated table with more than 160 programmes and courses has been created.[1]

The information requested for each programme aims at providing a vision of the academic fields involved in these programmes to evaluate the degree of interdisciplinarity and to identify which academic fields are more or less represented. This key information has been linked to identified space applications segments. When a programme/course is linked to several academic fields and space segments, the contributors were asked to identify only, and as far as possible, the prominent links, in order to have the most realistic view on connections between academic fields and space application segments.

Considering ECTS credits for each programme or each course, a synthetic vision has been built combining the results for the academic fields and for the spatial segments[2]. The ECTS credits have been proportionally divided by the number of crossed combinations of academic field and space segment for each programme. This document gives a first view on what already exists, and how the academic fields and space segments are represented, and where are the weaknesses and future potential axes of development, identified in the red and yellow boxes. It also shows the depth and variety of space related activities in science and engineering (green boxes).

Using this matrix, a further analysis has been carried out for the programmes and courses identified in the red and yellow cases, where limited areas of competence were represented. The identified programmes and courses have been listed, with a concise description, a short presentation of contents, and associated areas of competence[2]. This list helps to analyse in detail what are the areas of competence already covered (even partially) and deduce what are the missing ones. Afterwards, this analysis, completed with the results of Task 3.2 (employment questionnaire for UNIVERSEH stakeholders), will constitute a basis to undertake Tasks 3.3 and 3.5-3.9 and build new UNIVERSEH curricula.

[1] Annex 1 - 1. Raw data table – Existing programmes and courses directly or indirectly connected to Space in the Consortium (Excel file)
[2] Annex 2 - 2. Matrix combining academic fields and major application segments for space-based activities, with a list and concise description of identified partners' programmes/courses. (Excel file)

II. Results and Analysis

1. General observations

Level: 126 programmes and 35 individual courses[3] are registered. According to the ECTS credits repartition and considering the European Qualifications Framework 16.7% of the total are at Level 6 (Bachelors); 83.3% are at level 7 (masters and post graduate degrees or diplomas.)[4] In addition, 1 MBA (4 ECTS credits, level 7), 1 Post-Doc programme and 1 State Examination (no associated to ECTS credits) are registered.

Languages: The matrix combines programmes and courses with different weights, hence we chose to analyse the language repartition according to ECTS credits. Considering ECTS, 67.2% of the courses and programmes are in French, 24.2% are in English, 5.4% are in English and Swedish, 2.8% are in English and French, 0.3% are in Polish, 0.1% are in both English and Polish. One State Examination (not associated to ECTS credits) is proposed in German.

Space Segments: Space segments are almost equally represented (Our Earth and Space: 25%, Sustainable Space: 30%, Space settlement and resources: 27%), except for the Space exploration & Discovery segment which represents only 18%.

Academic fields: Considering the ECTS credits for each academic field in respect to the gross ECTS credits, not surprisingly, Science and Engineering is the field most represented (76%) in our survey focussed on space-related activities. Economy, Business and Finance (2%) is not very developed, for the four different space segments (all red boxes). And then come (in increasing order): Medicine and Health (3%), Innovation and Entrepreneurship (6%), Social and Human sciences (6%) and Art and Cultural studies (7%).

[3] When a full programme doesn't exist.
[4] This repartition should be considered in parallel with the context that there are generally more students enrolled in Bachelors than in Masters.

2. Analysis of the matrix and additional analysis of red & yellow boxes

In our survey, Science & Engineering is the field more represented presently in the existing programmes and courses, and there is an important differential between the weight of the Science & Engineering field and the other academic fields in terms of ECTS. Our consortium covers a large majority of fields of space studies, ranging from launchers to satellites through orbital science and also Martian robotics, innovative materials, data processing and so on. There is also an emergence of New Space studies[5] showing that the consortium is dynamic and responsive to new challenges.

The first conclusion is hence that our alliance is in good position to provide courses involving a wide range of space science and engineering activities.

Another first observation is that a course or a programme exists for every combination of academic field and space segments. However, in this case the coverage may not be extensive. The second step of the analysis was hence to carefully check in details what is behind every red and yellow box to identify what are the links between the contents and the academic fields, what are the areas of competence already covered and deduce what are the missing ones for the future UNIVERSEH courses and programmes.

This further analysis allowed the identification of 32 programmes and courses out of 161. Regarding the level, most of the identified programmes are offered at Masters levels (including 4 PM), except for two at Bachelors level, one for Post-Doc students, and one MBA. The only programme with an asserted interdisciplinarity is the “Interdisciplinary Space Master” from University of Luxembourg, whereas the other programmes are more specialized but they include some contents linked to other academic fields, as following:

Economy, Business, Finance: In this area[6], there could be a possible synergy or potential area of collaboration between Toulouse (Toulouse Business School, ISAE-Supaero) and the University of Luxembourg. Among the areas of competences, Project management, Economics and Finance are more represented than Marketing, and Strategy. Toulouse (ISAE-Supaero, Toulouse Business School) and AGH offer some contents linked to New Space and this could be an identified topic of collaboration. It could also be identified as a valuable axis of development for future employment needs.

[5] New Space: refers to a new business arena where new private actors enter the Space sector offering breakthrough projects and business models, and a revolutionary approach to space exploration and uses.
[6] 13 programmes/courses in Annex 3.

Medicine and Health[7]**:** The University of Toulouse (Université Paul Sabatier, *Institut national Polytechnique*, INP / *École nationale supérieure d'électrotechnique, d'électronique, d'informatique, d'hydraulique et des télécommunications,* ENSEEIHT / *Institut National des Sciences Appliquées de Toulouse*, INSA) and Luleå University of Technology are the only partners offering space-specific programmes linked to the Medicine and Health sector and courses in cognitive neuroscience, cognitive psychology and physiology. UDUS has a Faculty of Medicine and collaboration in this field is potentially very interesting. The present link to Medical and Health contents needs to be qualified. Indeed, the only current programme registered with a direct link to the field is the "Aeronautical and Space Medicine Capacity" (*Capacité de Médecine Aéronautique et Spatiale*), which is a specialization for qualified Doctors willing to deliver medical aptitude examinations for professional and non-professional flight personnel. The areas of competences covered by this short programme could constitute a basis to build an introductory course in Spatial Medicine for future engineers or entrepreneurs potentially interested in Spatial and Health applications. The other programmes have potential space applications: health monitoring applications, and the uses of spatial and medical imagery. Another key topic linked to Medicine & Health with an important connection with the Space sector is Applied Artificial Intelligence (Luleå University of Technology Master available in Swedish and English.) Artificial Intelligence might also be identified as a major research topic to be considered and developed to anticipate future employment needs and the job market's future evolutions. The existing programmes focus on Neurosciences, Cognition, Biology, and Neuromorphic computer technology […], and a potential area of collaboration could be identified with programmes that analyse Human-Computer Interactions (example: the joint master between *Université Paul Sabatier* and *École Nationale de l'Aviation Civile, ENAC,* in this field.) Before being further developed, these preliminary suggestions should be complemented with the results of the Task 3.2 questionnaire.

Social and Human Sciences: The University of Toulouse (UT2) and the University of Luxembourg are the only partners offering space-related programmes linked to Social and Human Sciences. Among the six programmes registered, four[8] cover areas of competences that could be associated to other specialized programmes, for example, history, sociology, project management, law, that could be directly applied to space applications, and easily shared between partners. On the contrary, the two last programmes are already very specialized with a non-direct link to the spatial sector: two

[7] 5 programmes/courses in Annex 3.
[8] Annex 3: Master 'Industrial Project Management and Innovation', Master 'History and Heritage of Aeronautics and Space', Interdisciplinary Space Master, Master in 'Space, Communication and Media Law'.

masters “Cognitive Ergonomics, Technological Innovation and Human Factor”, and “Social Sciences Applied to Food Studies”.

Art and Cultural studies: Only six programmes linked to Art & Cultural studies with space applications are already in operation and they all belong to the University of Toulouse (UT2.) Five programmes[9] focus on the Design sector with different approaches and one is linked to the audio-visual sector[10]. One can easily note the absence of programmes in the field of Literature, or other visual arts (not related to Design/architecture), whereas the space sector has always been a topic of perpetual fascination in this field. UDUS has a Faculty of Arts and Humanities and there could be a possible area of cooperation in this field with UT2.

Innovation & Patents, Entrepreneurship: Fifteen existing programmes are listed with a link to Innovation, Patents or Entrepreneurship. A first observation is the potential synergy between Toulouse Business School, Luleå University of Technology and the University of Luxembourg. Some of the programmes are business oriented and therefore include contents linked to the field, whereas other programmes have a direct link to Innovation (new technologies, materials, composites, nanotechnology…), and/or encourage entrepreneurship with contents directly linked (management and leadership, space market and funding, Space policy and law…) Patents and Intellectual property are not very developed in the existing programmes and could be identified as an axis of development by the representatives of the employment sector (Task 3.2.)

[9] Annex 3: Master ‘Spatial Design, Color, Lighting’, Master ‘Object design, experimentation and development’, Master ‘Digital Arts & Design / Digital Creation’, Master ‘Sensory Design’, Master ‘Transdisciplinary Design, Cultures and Territories’.
[10] Annex 3: Vocational bachelor ‘Computer graphics creation applied to the audiovisual industry’.

III. General conclusions

- Initial discussions regarding the creation of UNIVERSEH programmes should raise the **question of the levels** considering that only a few bachelors are offered to the students in the red and yellow boxes. This primary reflection should also question what could be the appropriate levels to develop interdisciplinarity in programmes with space applications.

- **Multilingualism** remains to be developed in the future courses and programmes. Even if many programmes are offered in English, not a lot of programmes are available in two different languages.

- Considering **Space application segments**, all segments are almost equally covered but the Space exploration & Discovery segment could be more developed. The results of questionnaire 3.2 will help to draw some conclusions.

- **Academic fields and Interdisciplinarity**: Sciences & Engineering are a fundamental for Space related activities and are part of a wide range of programmes among the Consortium. Other Academic fields are all represented but an in-depth review to evaluate to what extent they are covered in the programmes showed that the links with other academic fields should be qualified. The degree of interdisciplinarity will constitute an important workstream to be put in perspective with current and future employment needs addressed in the results of the Task 3.2 questionnaire.

Acronyms

AGH: University of Science and Technology of Kraków (Akademia Górniczo-Hutnicza)

ECTS: European Credit Transfer and Accumulation System

ENAC: École Nationale de l'Aviation Civile

ENSEEIHT: École nationale supérieure d'électrotechnique, d'électronique, d'informatique, d'hydraulique et des télécommunications

FSI: Engineering Sciences Faculté (Université Paul Sabatier)

INP: Institut national Polytechnique,

INSA: Institut National des Sciences Appliquées de Toulouse

ISAE-Supaero: Institut Supérieur de l'Aéronautique et de l'Espace

LTU: Luleå University of Technology

UDUS: Heinrich Heine University Düsseldorf (HHU)

UniLu: University of Luxembourg

UT2 : Université de Toulouse 2 Jean Jaurès

UT3 / UPS : Université de Toulouse 3 Paul Sabatier

Annex 1 : Raw data table – Existing programmes connected directly or indirectly to Space in the Consortium

University	Structure	Type	Programme	Level	ECTS	Volume (hrs) - teaching effort	Languages	Science & Engineering	Economy, Business, Finance	Medicine & Health	Social & Human Sciences	Art & Cultural Studies	Innovation & Patents, Entrepreneurship	Total1	Our Earth and space	Sustainable Space (e.g. earth orbit)	Space Settlement and resources	Space Exploration & discovery	Non-Space Segments (but of interest for our EU projects)	Total2
TLSE	INP-ENSAT / UT2J	Master	GIS and Remote Sensing applied to agriculture and environment (SIGMA : Sciences géomatiques en environnement et aménagement)	M1+M2	120,0	1000h + 6month training	French	1						1	1					1
TLSE	INP-ENSEEIHT	Master of Science	Satellite communications systems (SatCOM)	M1+M2	120,0	1000h + 6month training	English	1						1	1	1				2
TLSE	INP-ENSIACET / UT3	Master	Materials and structures for the aerospace industry (Matériaux et structures pour l'aéronautique et le spatial+	M2	60,0	350h + 6month training	French	1						1	1	1	1	1		4
TLSE	INP-ENSEEIHT / INSA / UT3 / ISAE	Master	Networks and telecommunications (RT : Réseaux et télécommunications)	M2	60,0	350h + 6month training	French	1						1	1	1				2
TLSE	INP-ENSEEIHT / INSA	Master of Science	Electronic Systems for Embedded and Communicating Applications (ESECA)	M1+M2	120,0	1000h + 6month training	English	1		1				2	1	1	1	1		4
TLSE	INP-ENSEEIHT / ISAE-SUPAERO	Master	Embedded Systems	M2	60,0	525h + 6month training	English	1						1		1	1	1		3
TLSE	INP-ENSEEIHT	Engineering degree	Integrated circuits and systems (Intégration de systèmes)	M2	60,0	450h + 6month training	French	1						1	1	1	1	1		4
TLSE	INP-ENSEEIHT	Engineering degree	Communication systems (Systèmes communicants)	M2	60,0	450h + 6month training	French	1						1	1	1	1	1		4
TLSE	INP-ENSEEIHT	Engineering degree	Wireless telecommunications and connected objects (Télécommunications sans fil et objets connectés)	M2	60,0	450h + 6month training	French	1						1	1	1	1	1		4
TLSE	INP-ENM	Engineering degree	Meteo-climatic sciences	M2	60,0	350h + 6month training	English	1						1	1					1
TLSE	INP-ENM	Technician degree	Meteorogical (exploitation TSE)	L2	60,0		French	1						1	1					1
TLSE	INP-PURPAN	Option	Remote Sensing	M1	1,0	12h	French	1						1	1					1
TLSE	INP-PURPAN	Option	Introduction to big data & machine learning	B3	1,0	4h	French	1						1	1					1
TLSE	INP-PURPAN	Minor	Remote Sensing & GIS	B3	3,0	20h	English	1						1	1					1
TLSE	INP-PURPAN	Minor	Digital mapping	M2	2,0	19h	French	1						1	1					1
TLSE	INP-PURPAN	Minor	Geography: land use	B1	3,0	0/40h	French	1						1	1					1
TLSE	INP-PURPAN	Ootion	Earth observation	M1	3,0	15h	French	1						1	1					1
TLSE	INP-PURPAN	Ootion	Scace farmino	M1	3,0	15h	French	1						1	1		1			2
TLSE	INP-ENSEEIHT	Master	Electrical Energy, Conversion, Materials, Sustainable Development (E2CMD : Énergie Électrique, Conversion, Matériaux, Développement Durable)	M2	60,0	350h + 6month training	French	1						1		1	1	1		3
TLSE	INP-ENSEEIHT	Master	Performance in Software, Media and Scientific Computing (PSMSC)	M2	60,0	350h + 6month training	English	1						1		1	1	1		3
TLSE	INP-ENSEEIHT/UT3/INSA/ISAE/IMT Mines	Master	Fluid dynamics, energy and transfers (DET : Dynamique des fluides, énergétique et transferts)	M2	60,0	350h + 6month training	French	1						1		1	1	1		3
TLSE	INP-ENSEEIHT	Master	Ocean, atmosphere and climate sciences (SOAC : Sciences de l'océan, de l'atmosphère et du climat)	M2	60,0	350h + 6month training	French	1						1	1					1
TLSE	INP-ENSEEIHT	Master of Science	Electrical Energy Systems (EES)	M1+M2	120,0	1000h + 6month training	French	1						1		1	1	1		3
TLSE	INP-ENSEEIHT / INP-ENSIACET / INSA	Master of Science	Fluids Engineering for Industrial Processes (FEIP)	M1+M2	120,0	1000h + 6month training	English	1						1		1	1			2
TLSE	INP-ENSEEIHT	Master of Science	Water engineering and water management (WEWM)	M1+M2	120,0	1000h + 6month training	English	1						1			1			1
TLSE	INP-ENSEEIHT	Master	Hydraulics	M2	60,0	450h + 6month training	French	1						1		1	1			2
TLSE	INP-ENSEEIHT / INP-ENSIACET	Master	New energy technologies	M2	60,0	450h + 6month training	French	1						1					1	1
TLSE	INP-ENSEEIHT	Master	Computer security (Sécurité informatique)	M2	60,0		French	1						1	1	1	1	1	1	5
TLSE	INP-ENSEEIHT	Engineering degree	Computational physics (Physique numérique)	M2	60,0	450h + 6month training	French	1						1					1	1
TLSE	Toulouse INP	Engineering degree	Eco-energy	M2	60,0	450h + 6month training	French	1						1		1	1	1		3
TLSE	INP-ENSEEIHT	Engineering degree	Electrical conversion and energy networks (Conversion électrique et réseaux d'énergie)	M2	60,0	450h + 6month training	French	1						1		1	1	1		3
TLSE	INP-ENSEEIHT	Engineering degree	Electrodynamics and advanced mechatronics (Électrodynamique et mécatronique avancée)	M2	60,0	450h + 6month training	French	1						1		1	1	1		3
TLSE	INP-ENSEEIHT	Engineering degree	Control and computing architecture for embedded systems (Architecture de commande et informatique pour les systèmes embarqués)	M2	60,0	450h + 6month training	French	1						1		1	1	1		3
TLSE	INP-ENSEEIHT	Engineering degree	Fluids, energy and processes (Fluides, énergétique et procédés)	M2	60,0	450h + 6month training	French	1						1		1	1			2
TLSE	INP-ENSEEIHT	Engineering degree	Water and environmental sciences (Sciences de l'eau et de l'environnement)	M2	60,0	450h + 6month training	French	1						1	1	1	1			3
TLSE	INP-ENSEEIHT	Engineering degree	Modeling and numerical simulation (Modélisation et simulation numérique)	M2	60,0	450h + 6month training	French	1						1					1	1
TLSE	INP-ENSEEIHT	Engineering degree	Software systems (Systèmes logiciels)	M2	60,0	450h + 6month training	French	1						1	1	1	1	1		4
TLSE	INP-ENSEEIHT	Engineering degree	Image and multimedia	M2	60,0	450h + 6month training	French	1						1	1	1	1	1		4
TLSE	INP-ENSEEIHT	Engineering degree	HPC and Big Data	M2	60,0	450h + 6month training	French	1						1	1	1	1	1	1	5
TLSE	INP-ENSEEIHT	Engineering degree	Big data infrastructure and IoT (Infrastructure du Big Data et IoT)	M2	60,0	450h + 6month training	French	1						1	1	1	1	1	1	5
TLSE	INP-ENSEEIHT	Engineering degree	Embedded systems and networks (Systèmes et réseaux embarqués)	M2	60,0	450h + 6month training	French	1						1	1	1	1	1		4
TLSE	INP-ENSEEIHT	Engineering degree	Cybersecurity	M2	60,0	450h + 6month training	French	1						1	1	1	1	1	1	5
TLSE	INP-ENSEEIHT	Engineering degree	Artificial intelligence (ModIA)	M2	60,0	450h + 6month training	French	1						1		1	1	1		3
TLSE	INP-ENSIACET	Engineering degree	Materials	M2	60,0	450h + 6month training	French	1						1		1	1	1		3
TLSE	INP-ENSIACET	Engineering degree	Chemical engineering	M2	60,0	450h + 6month training	French	1						1		1	1	1		3
TLSE	INP-ENSIACET	Engineering degree	Chemical/Process engineering	M2	60,0	450h + 6month training	French	1						1		1	1	1		3
TLSE	INP-ENSIACET	Engineering degree	Industrial engineering	M2	60,0	450h + 6month training	French	1						1		1	1	1	1	4
TLSE	INP-ENSIACET / ENIT / UT3	Master	Materials: Elaboration, characterisation and surface treatments	M2	60,0	450h + 6month training	French	1						1		1	1	1		3
TLSE	INP-ENSIACET / UT3	Master	Process and bioprocess engineering	M2	60,0	450h + 6month training	French	1						1		1	1		1	3
TLSE	INP-ENSIACET / INSA	Master of Science	Industrial & Safety Engineering	M2	60,0	350h + 6month training	French/English	1						1		1	1	1	1	4
TLSE	INP-ENIT	Engineering degree	Mechanical engineering	M2	60,0	350h + 6month training	French	1						1		1	1	1	1	4
TLSE	INP-ENIT	Engineering degree	Structural and process materials engineering	M2	60,0	350h + 6month training	French	1						1		1	1	1	1	4
TLSE	INP-ENIT	Engineering degree	Design of integrated systems	M2	60,0	350h + 6month training	French	1						1	1		1		1	3
TLSE	INP-ENSAT	Engineering degree	Agrogeomatics - Remote sensing, GIS	M2	60,0	450h + 6month training	French	1						1	1		1			2
TLSE	ISAE-SUPAERO	Major	Major in Space Systems & Operations	M2	9,0	140	French	1						1	1	1		1		3
TLSE	ISAE-SUPAERO	Major	Major in Earth Observation and Space Science	M2	16,0	240	French	1						1	1	1		1		3
TLSE	ISAE-SUPAERO	Major	Major in Robotics & Embedded Systems	M2	16,0	240	French	1						1		1	1	1	1	4
TLSE	ISAE-SUPAERO	Major	Major in Systems & Signals	M2	16,0	240	French	1						1		1			1	2
TLSE	ISAE-SUPAERO	Master	Ingénieur SUPAERO	M2	180,0	2000	French	1						1	1	1	1	1	1	5
TLSE	ISAE-SUPAERO	Elective course	Human Spaceflight	M1	2,5	30	French	1						1		1	1			2
TLSE	ISAE-SUPAERO	Elective course	Earth Sciences from Space	M1	2,5	30	French	1						1	1	1				2
TLSE	ISAE-SUPAERO	Elective course	Space Optical Communications	M1	2,5	30	French	1						1		1				1
TLSE	ISAE-SUPAERO	Elective course	Planetoloov/Telescopes and space surveillance/Stellar ohysics	M1	2,5	30	French	1						1			1	1		2
TLSE	ISAE-SUPAERO	Elective course	Mathematics for Space Aoolications	M1	5,0	60	French	1						1		1	1	1		3
TLSE	ISAE-SUPAERO	Master	Master in Aerospace Engineering	M2	120,0	1300	English	1						1	1	1	1	1	1	5
TLSE	ISAE-SUPAERO	Major	Major Space Systems	M2	16,0	270	English	1						1		1	1	1		3
TLSE	ISAE-SUPAERO	Major	Major Space Imaging Navigation & Communication	M2	16,0	240	English	1						1	1	1				2
TLSE	ISAE-SUPAERO	Major	Major in Aerospace Systems & Control	M2	16,0	243	English	1						1		1				1
TLSE	ISAE-SUPAERO	Major	Major in Aerospace Structures	M2	16,0	208	English	1						1		1				1
TLSE	ISAE-SUPAERO	Specialized Master	Space System Engineering	PM	60	350	English	1	1					2		1	1	1		3
TLSE	ISAE-SUPAERO	Specialized Master	Space Applications and Services	PM	60	350	English	1	1					2	1	1				2
TLSE	ISAE-SUPAERO	Specialized Master	Aeronautical & Space Structures	PM	60	350	English	1						1		1				1
TLSE	ISAE-SUPAERO	Specialized Master	Aerospace Project Management	PM	60	350	English	1	1					2		1				1
TLSE	TBS	MBA	Specialized track "Space & Business Applications" (Global Executive MBA)	MBA	4,0	60	English		1				1	2	1	1				2
TLSE	TBS	MSc	MSc Aerospace Management	M2	1,0	15	English		1				1	2	1	1				2
TLSE	TBS	MS	MS Aerospace Management	PM	1,0	15	English		1				1	2	1	1				2

TLSE	TBS	Bachelors	Bachelor Innovation Manacement Path	B3	60,0	6	English		1				1	2	1	1				2
TLSE	TBS	MSc	SESAME projects (Séminaire d'Etudes Supérieures Appliquées au Management d'Entreprise)	M2	4,0	60	French/English	1	1				1	3	1	1	1	1	1	5
TLSE	TBS	MSc	MSc Aerospace Management / Strategic Research Analysis Corporate Projects	M2	4,0	60	English	1	1				1	3	1	1	1	1	1	5
TLSE	UT3 - FSI - OMP / ISAE-SUPAERO	Master	M2 TSI Space Techniques and Instrumentation (Techniques Spatiales et Instrumentation) +Spacemaster with LTU	M2	60,0	433	English	1						1		1		1		2
TLSE	UT3 - FSI	Master	M2 ASEP - Astrophysics, Space Sciences, Planetology (Astrophysique, Sciences de l'Espace, Planétologie) +Spacemasterwith LTU	M2	60,0		French/English	1						1				1		1
TLSE	UT3 - UPSITECH	Diplome Ingenieur (B3-M2)	UPSITECH engineer specializing in robotic and interactive systems (spécialité systèmes robotiques et interactifs, SRI)	DI	180,0		French	1						1	1	1	1	1		4
TLSE	UT3 - IUT Toulouse	Bachelor's degree in technology (BUT)	Mecanical engineering, industrialization, design engineering, industrial management all in the aeronautic and spatial industry	B1-3	180,0		French	1						1					1	1
TLSE	UT3 - FSI	Bachelors	Bachelor in Electronics, Electrical Energy, Automation EEA (Licence Electronique, Energie électrique, Automatique EEA)	B1-3	180,0	494+632+602	French	1						1		1				1
TLSE	UT3 - FSI	Bachelors	Bachelor en Mechanics and Energetic (Licence Mécanique Energétique (LME))	B1-3	180,0	564+805+552	French	1						1					1	1
TLSE	UT3 - FSI - Tarbes	Bachelors	Degree in Physics, Chemistry, Astrophysics, Meteorology and Energy (Licence Physique, Chimie, Astrophysique, Météorologie et Energie LP CAME)	B1-3	180,0	590+534+517	French	1						1	1			1		2
TLSE	UT3 - FSI - Montauban	Specialized Bachelors	Professional Degree in Design and Production of Electronic Systems (Licence Professionnelle Conception et Production de Systèmes Électroniques, LP CPSE)	B3	60,0	419	French	1					1	2		1				1
TLSE	UT3 - FSI	Specialized Bachelors	Professional Degree in Material Treatment and Control (Licence Professionnelle Traitement et Contrôle des Matériaux (TCM)	B3	60,0	450	French	1						1					1	1
TLSE	UT3 - IUT Tarbes	Specialized Bachelors	Professional Degree in Design, Control and Realization of Embedded Electrical Systems (Licence Professionnelle Conception, Commande, Réalisation des Systèmes Électriques Embarqués, CORSEE)	B3	60,0		French	1						1	1					1
TLSE	UT3 - FSI - OMP	Master	M2 Land use planning and remote sensing (Aménagement du territoire et télédétection, ATT)	M2	60,0	360	French	1						1	1					1
TLSE	UT3-FSI / ISAE-SUPAERO /INP	Master	M2in Fluid Dynamics, Energetics and Transfers (en Dynamique des Fluides, Energétique et Transferts, DET)	M2	60,0	248	French	1						1		1				1
TLSE	UT3-FSI / INP ENSIACET	Master	M2 Materials and Structures for Aeronautics and Space (Matériaux et Structures pour l'Aéronautique et le Spatial, MSAS)	M2	60,0	411	French	1						1		1				1
TLSE	UT3-FSI / INP ENSEEIHT	Master	Master Elaboration, Characteristics and Surface Treatment (Master 2 Elaboration, Caractérisation et traitements de Surface (MECTS)	M2	60,0	411	French	1						1					1	1
TLSE	UT3 - FSI	Master	Master (CSA - Master Informatique, parcours) Computer Science for Aerospace	M1-2	120,0	731	English	1						1	1	1	1	1	1	5
TLSE	UT3 - FSI	Master	Master Electronics of Embedded Systems and Telecommunications (EEA - Parcours Electronique des Systèmes Embarqués et Télécommunications, ESET)	M1-2	120,0	478+438	French	1						1	1	1	1	1	1	5
TLSE	UT3 - FSI	Master	Master Real-Time Systems Engineering (EEA - Parcours Ingénierie des Systèmes Temps Réel, ISTR)	M1-2	120,0	511+472	French	1						1	1	1	1	1	1	5
TLSE	UT3 - FSI	Master	Master Medical Radiophysics and Biomedical Engineering (EEA - Parcours Radiophysique médicale, RM et Génie Biomédical, GBM)	M1-2	120,0	619+434	French	1						1	1			1		2
TLSE	UT3 - FSI	Master	Master Robotics: Decision and Command (EEA - Parcours Robotique : Décision et Commande, RODECO)	M1-2	120,0	511+444	French	1						1	1	1	1	1	1	5
TLSE	UT3 - FSI	Master	Master Plasma Sciences and Technologies (EEA - Parcours Sciences et Technologies des Plasmas, STP)	M1-2	120,0	464+316	French	1						1		1	1	1	1	4
TLSE	UT3 - FSI	Master	Master Signal Imaging and Medical and Space Audio-Video Applications (EEA - Parcours Signal Imagerie et Applications Audio-vidéo Médicales et Spatiales, SIA-AMS)	M1-2	120,0	1010	French	1		1				2	1	1				2
TLSE	UT3 - FSI	Master	Master Embedded Systems and Microsystems (EEA - Parcours Systèmes et Microsystèmes Embarqués, SME)	M1-2	120,0	590+432	French	1						1	1	1	1	1	1	5
TLSE	UT3 - FSI	Master	Master in Diagnostic, Instrumentation and Measurement Engineering (Ingénierie du Diagnostic, de l'Instrumentation et de la Mesure, IDM)	M1-2	120,0	580+375	French	1						1		1	1	1	1	4
TLSE	UT3 - FSI	Master	Master in Modeling and Simulation in Mechanics and Energetics(Modélisation et Simulation en Mécanique et Energétique, MSME)	M2	60,0	398	French	1						1		1				1
TLSE	UT3 - FSI	Master	Master in Conversion, Materials, Sustainable development (Master EEA - Parcours Energie Electrique : Conversion, Matériaux, Développement durable (E2-CMD)	M2	120,0	775+456	French	1						1					1	1
TLSE	UT3 - FSI	Master	Master in Computation of Aeronautic Structure (Master Génie mécanique parcours Calcul de structures en aéronautique)	M2	120,0	600+450	French	1						1					1	1
TLSE	UT3 - FSI	Master	Master in Conception in Aeronautics (Master Génie mécanique parcours Conception en aéronautique)	M2	120,0	600+450	French	1						1					1	1
TLSE	UT3 - FSI	Master	Master in Production in Aeronautics (Master Génie Mécanique parcours Productique en aéronautique)	M2	120,0	600+450	French	1						1					1	1
TLSE	UT3-FSI /ENAC	Master	Master Interaction Human Machine (Master Interaction Homme-Machine (IHM)	M2	120,0	500+476	French/English	1						1					1	1
TLSE	UT3 - Medicine Faculty with the support of MEDES (Institut de Médecine et Physiologie Spatiales)	Specific training for Dr. "Capacité".	Aeronautical and Space Medicine Capacity (Capacité de Médecine Aéronautique et Spatiale)	Post Doc	0,0		French			1				1	1			1		2
TLSE	UT2J - Mirail	Master	Cognitive Ergonomics, Technological Innovation and Human Factor (MASTER Psychologie | parcours Ergonomie Cognitive, Innovation Technologique et Facteur Humain (ECIT-FH)	M1-M2	120,0		French				1			1		1	1	1		3
TLSE	UT2J - Mirail	Master	Transdisciplinary Design, Cultures and Territories (MASTER Design | parcours Design Transdisciplinaire, Cultures et Territoires)	M1-M2	120,0		French					1		1			1			1
TLSE	UT2J - Mirail	Master	Social Sciences Applied to Food Studies (MASTER Sciences sociales | parcours Sciences Sociales Appliquées à l'Alimentation (SSAA)	M1-M2	120,0		French				1			1	1	1	1			3
TLSE	UT2J - IUT Blagnac	Vocational bachelor's degree (licence pro)	Aeronautical Maintenance (LP Maintenance Aéronautique)	BUT	180,0		French	1						1	1	1	1	1		4
TLSE	UT2J - IUT Blagnac	Bachelor's degree in technology (BUT)	Industrial Engineering and Maintenance (B.U.T. Génie Industriel et Maintenance)	BUT	180,0		French	1						1	1	1	1	1		4
TLSE	UT2J - IUT Figeac	Bachelor's degree in technology (BUT)	Mechanical and Production Engineering (B.U.T. Génie Mécanique et Productique)	BUT	180,0		French	1						1	1	1	1	1		4
TLSE	UT2J - IUT Figeac	Vocational bachelor's degree (licence pro)	Quality Control Metrology (LICENCE PRO Métier de l'industrie : conception et amélioration de processus et procédés industriels | parcours Qualité Contrôle Métrologie)	BUT	180,0		French	1						1	1	1		1		3
TLSE	UT2J - ENSAV	Vocational bachelor's degree (licence pro)	Computer graphics creation applied to the audiovisual industry (LICENCE PRO Techniques du son et de l'image | parcours Création infographique appliquée à l'audiovisuel)	B1-B3	60,0		French					1		1	1	1	1			3
TLSE	UT2J - ISCID	Master	Spatial Design, Color, Lighting (MASTER Design | parcours Design d'espace, couleur, lumière (DECLE)	M1-M2	120,0		French					1		1	1	1	1	1		4
TLSE	UT2J - ISCID	Master	Object design, experimentation and development (MASTER Design | parcours Design d'objet, expérimentation et développement)	M1-M2	120,0		French					1		1	1	1	1	1		4
TLSE	UT2J - Mirail	Master	Digital Arts & Design (Master Mention Création numérique)	M1-M2	120,0		French					1		1	1	1	1			3
TLSE	UT2J - Mirail	Master	Industrial Project Management and Innovation (MASTER Innovation, entreprise et société | parcours Management de Projet Industriel (MPI)	M1-M2	120,0		French				1			1	1	1	1	1		4
TLSE	UT2J - ISCID	Master	Sensory Design (MASTER Design| parcours Design sensoriel)	M1-M2	120,0		French					1		1	1	1	1			3
TLSE	UT2J - Mirail	Master	History and Heritage of Aeronautics and Space (MASTER Histoire et Civilisations Modernes et Contemporaines | parcours Histoire et patrimoine de l'aéronautique et de l'espace)	M1-M2	120,0		French				1			1	1	1	1			3
LTU	Department of Computer Science, Electrical and Space Engineering, Division of Space Technology	Master	Joint Master Programme in Space Science and Technology- SpaceMaster	M2	120,0		English	1					1	2	1	1	1	1		4
LTU		Master	Master Programme in Spacecraft Design	M2	120,0		English	1					1	2	1	1	1	1		4
LTU		Master	Master Programme in Space Engineering	M2	300,0		English/ Swedish	1					1	2	1	1	1	1		4
LTU		Master	Master Programme in Applied Artificial Intelligence	M2	300,0		English/ Swedish	1		1				2	1		1		1	3
LTU		Master	Master Programme in Applied Artificial Intelligence	M2	120,0		English	1		1				2	1		1		1	3
LTU	Department. of Civil, Environmental and Natural Resources Engineering	Master	Master Programme in Exploration and Environmental Geosciences	M2	120,0		English	1						1			1			1
LTU		Master	Master Programme in Georesources Engineering	M2	120,0		English	1						1			1			1
LTU		Summer School	Climate, Landscape and Build-up Areas, Technical Assessments	M	7,5		English	1						1			1			1
LTU	Department of Engineering Sciences and Mathematics	Master	EEIGM - Master Programme in Materials Science & Engineering (EEIGM	M1+M2	300,0		English	1					1	2	1	1	1		1	4
LTU		Master	AMASE - Master Programme in Materials Engineering,	M2	120,0		English	1					1	2	1	1	1		1	4
LTU		Master	Master Programme in Composite Materials	M2	120,0		English	1					1	2	1	1	1		1	4
UDUS	Physics	Master course	Introduction to Astronomy	M1	3,0	90	English	1						1	1					1
UDUS	Physics	Master course	Astrophysics	M1	6,0	180	English	1						1	1					1
UDUS	Entrepreneurship	Master course	Financial Management in Entrepreneurial Firms	M1	4		English						1	1					1	1

UDUS	Law	State examination	European Business Law	State exam	0		German				1			1					1
UDUS	Computer Science	Master course	Advanced Programming and Algorithms	M1	10		English	1						1					1
UDUS	Computer Science	Master course	Machine Learning	M1	10		English	1						1					1
UniLu	Faculty of Science, Technology and Medicine	Master	Interdisciplinary Space Master	M1+M2	120,0	1178	English	1	1		1		1	4	1	1	1	1	
UniLu	Faculty of Law, Economy and Finance	Master	Master in Space, Communication and Media Law	M2	60,0	240	English/French				1			1	1	1	1	1	
AGH	Faculty of Mechanical Engineering and Mechatronics	Master Course	Nanosatellite Attitude Determination and Control	M1	5,0	45	English	1						1		1			
AGH	Faculty of Mechanical Engineering and Mechatronics	Master Course	Synthetic aperture techniques for earth imaging	M1	5,0	45	English	1						1	1	1			
AGH	Faculty of Mining Surveying an Environmental Engineering	Bachelor Course	Basics of Satellite Radar Interferometry - InSAR	B3	3,0	45	English	1						1	1				
AGH	Faculty of Mining Surveying an Environmental Engineering	Bachelor Course	Applied Earth Observation & Geoinformation Management	B3	5,0	60	English	1						1	1				
AGH	Faculty of Mining Surveying an Environmental Engineering	Bachelor Course	Image processing in Python for remote sensing	B3	5,0	45	English	1						1	1				
AGH	Faculty of Mining Surveying an Environmental Engineering	Bachelor Course	Basics of Satellite and Integrated Geodesy	B2	2,0	45	Polish	1						1	1				
AGH	Faculty of Mining Surveying an Environmental Engineering	Master Course	Satellite Navigation Systems	M1	5,0	45	Polish	1						1	1				
AGH	Faculty of Mining Surveying an Environmental Engineering	Bachelor Course	Application of Unmanned Aerial Vehicles in engineering problems solving	B2	4,0	45	Polish	1						1	1				
AGH	Faculty of Physics and Applied Computer Science	Master Course	General theory of relativity	M	4,0	45	Polish	1						1	1			1	
AGH	Faculty of Physics and Applied Computer Science	Master Course	Introduction to astrophysics and cosmology	M	3,0	45	Polish	1						1				1	
AGH	Faculty of Physics and Applied Computer Science	Bachelor Course	Elements of Modern Cosmology	B	5,0	45	Polish	1						1				1	
AGH	Faculty of Physics and Applied Computer Science	Master Course	Electronics in particle detection systems	M	4,0	60	Polish	1						1			1		
AGH	Faculty of Physics and Applied Computer Science	Master Course	Radiation defects in electronics	M	1,0	14	Polish	1						1			1		
AGH	Faculty of Electrical Engineering, Automatics, Computer Science and Biomedical Engineering	Bachelor-master Course	Fundamentals of space engineering	B3-M2	3,0	56	English	1						1	1	1			
AGH	Faculty of Materials Science and Ceramics	Bachelor Course	Materials Science in Space Technologies	B	3,0	30	English	1						1			1	1	
AGH	Faculty of Metals Engineering and Industrial Computer Science	Master Course	Advanced Technologies for the Materials in Aerospace and Energy Industries	M1	5,0	28	English/Polish	1						1					
AGH	Faculty of Drilling, Oil and Gas	Master Course	Space technologies and commercialization of space	M	4,0	30	English/Polish	1	1				1	3			1	1	
AGH	Department of Non-Ferrous Metals	Master Course	Aerspace Materials and Techologies	M	3,0	45	Polish	1						1		1			
AGH	Faculty of Geology, Geophysics and Environmental Protection	Bachelor Course	Satellite Radar Interferometry	B	3,0	45	English	1						1		1			
					11018,5														

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Annex 2 - Matrix combining academic fields and major application segments for space-based activities considering ECTS credits

	Our Earth and space	Sustainable Space (e.g. earth orbit)	Space Settlement and resources	Space Exploration & discovery
Science & Engineering	1647,6	2053,4	1769,5	1367,5
Economy, Business, Finance	40,0	79,5	18,7	18,7
Medicine & Health	115,0	45,0	85,0	15,0
Social & Human Sciences	132,5	172,5	172,5	92,5
Art & Cultural Studies	160,0	160,0	280,0	60,0
Innovation & Patents, Entrepreneurship	159,5	189,5	143,7	76,2

ECTS Credits
>1000
Between 100 and 1000
<100

Methodology:

Based on the map of the partners' areas of competence (Annex 1), and considering ECTS credits for each programme and each course, this synthetic vision has been built combining the results for the academic fields and for the spatial segments. The ECTS credits have been proportionally divided by the number of crossed combinations of academic field and space segment for each programme. For example, if 60 ECTS are associated to a programme which combines 2 academic fields and 1 spatial segment, the 60 ECTS have been divided by 3 and distributed in the academic fields and spatial segment covered by the programme.

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Annex 3: Matrix combining academic fields and major application segments for space-based activities: Associated list and concise description of identified partners' programmes/courses in the red and yellow boxes.

Methodology:

To build a map of the partners' areas of competence, the WP3 team carried out an investigation among partners to list and collect specific information regarding existing programmes/courses directly or indirectly linked to Space. **(Annex 1)**

Considering ECTS credits for each programme or each course, a synthetic vision has been built combining the results for the academic fields and for the spatial segments. **(Annex 2)**

This **Annex 3** provides a deeper analysis for the programmes identified in the red and yellow cases, where just a few areas of competence were represented. These identified programmes have been listed, with a concise description, a short presentation of contents, and associated areas of competence. This list helps to analyse in detail what are the areas of competence already covered (even partially) and deduce what are the missing ones.

NB: this lsit focuses on the red and yellow boxes where just a few areas of competence are covered. Indeed, the green boxes already cover a wide range of topics and areas of competence, and the main objective of task 3,1 was to establish an overview on what is already done and what could be developed.

List of identified programmes and courses in the red and yellow boxes of the matrix

University	Structure	Type	Programme	Level	ECTS	Languages	Short description	General contents	Areas of competences	Our Earth and Space	Sustainable Space	Space Settlment and resources	Space Exploration and discovery	Syllabus or program's webpage	Comments
TLSE	ISAE-SUPAERO	Specialized Master	Space Applications and Services	PM	60	English	Co-designed with Airbus Defense and Space, the master provides the required skills to develop space applications in Earth's environment monitoring and telecommunications, which play a predominant role today for sustainable development.	Space systems : Earth observation, telecommunications, navigation Design of space applications, space communications, navigation and positionning, digital techniques... **Space economics and regulations - Services and integrated applications (46h)** Students will propose and design tools and solutions in areas such as the Earth's environment, agriculture, transport or urban planning	Space systems, telecommunications, signal and image processing, machine learning, big data, cloud computing, digital communications, software radio. Cross disciplinary use of space data (observation of the earth and its atmosphere, telecommunications, data positioning, data from scientific missions and exploration)	x	x			Link	link in French
TLSE	ISAE-SUPAERO	Specialized Master	Space System Engineering	PM	60	English	The Master allows students to develop a high level of multidisciplinary skills in space science, space systems engineering and space project management.	Modules in the Part 2 (total part 2: 160h): Space programs: **Space programs bid for tender, Financial & legal aspects:** debris situation , new space (nanosatellites and launchers)	Space systems, management of space projects, technical, economic and legal aspects		x	x	x	Link	
TLSE	ISAE-SUPAERO	Specialized Master	Aerospace Project Management	PM	60	English	The Master prepares students for successfully leading Project or Program teams in global aerospace and defence industry, and provides students with current techniques and tools in project management considering industrial, economical or legal specificities of the Aerospace business.	**Part 1: Overall overview of aerospace industry (50h):** enables students to have an overall understanding of technologies, products, innovation and strategy stakes in the global civil and defence market. **Part 3: Economic and financial aspects (150h):** economical stakes for nations or industries and the role of politics. How to evaluate the cost of a long term program, the investment return hope, but also how to manage costs during development or manufacturing phase.	Space project management, Economic and financial aspects of the aerospace industry, Budget and cost managment, Knowledge management, Multicultural team project management.		x			Link	
TLSE	TBS	MSc	MSc Aerospace Management	M2	1,0	English	The Aerospace Management MSc prepares and trains participants to hold managerial positions in aeronautics, space and airline industries. The MSc addresses the full value chain of Aeronautics and Space from design, to aircraft and space systems delivery, including services and operations	***The Aerospace market: terminology and key economic and technological issues** Objective: The successful student will be able to analyze the global aerospace environment and to meet professionals in the Aerospace industry: product, project, market, management and organizational dimensions. ***Integrating HR, Marketing & Sales Functions in Aerospace management** Objective: The successful student will be able to make sound and sustainable decisions regarding HRM, Marketing and Sales including elementary financial knowledge and practices that are specific to the aerospace business.	Strategy, Finance, Marketing, Supply chain & procurement, Human Resources, Project Management in the aerospace environment, Aerospace value chain.	x	x			Link	
TLSE	TBS	MS	MS Aerospace Management	PM	1,0	English									
TLSE	TBS	Bachelors	Bachelor - Innovation Management Path or Aviation management Path	B3	60,0	English	The Toulouse Business School Bachelor is regularly distinguished in national rankings as one of the best programs in its category. This training course, perfectly suited to the needs of companies in terms of skills with high potential, takes place over 3 years, with a progressive pedagogy, focused primarily on operational knowledge of the company and the intercultural and international dimension. One of the specificities of the program is to be able to follow differentiated and personalized courses, which give students the opportunity to start their professional career in the best conditions and in the most promising sectors. The TBS Bachelor is a dual vocation training: professional and intercultural. Our mission is to reveal profiles with high potential, called to evolve quickly towards management functions, in France or internationally.	Program fully business oriented. Possible specializations: Aviation management (in English) International business management (in English) Innovation management (in English)	Economics, Management, Sales, Finance, Cost accounting and budgeting, Intercultural and HR management, Marketing, Law and business.	x	x			Link1	Link2
TLSE	TBS	MSc	SESAME projects (Séminaire d'Études Supérieures Appliquées au Management d'Entreprise)	M2	4,0	French/English	Project based learning. Consulting mission for the students: diagnosis of a real problem for a company, and recommendations.	Partners for the consulting missions: Airbus, Excent, Aerospace Valley, Thales Aliena Space,... The consulting missions are generally business oriented. The contents depend on the consulting mission.	Active learning project, Consulting, problem-solving approach, Company strategy	x	x	x	x	Link	

TLSE	TBS	MSc	MSc Aerospace Management / Strategic Research Analysis Corporate Projects	M2	4,0	English	The Aerospace Management MSc prepares and trains participants to hold managerial positions in aeronautics, space and airline industries. The MSc addresses the full value chain of Aeronautics and Space from design to aircraft and space systems delivery, including services and operations.	**8 Course units:** **1. Issues and Trends in Strategy** Objective: The successful student will be able to develop new strategies by analyzing relevant issues and trends impacting organizations. **2. International strategy and organization** Objective: The successful student will be able to analyze the challenges faced by international and internationalizing firms about which products to offer around the world, how to compete in international markets, where to locate and how to coordinate their worldwide activities effectively. **3. The Aerospace market: terminology and key economic and technological issues** Objective: The successful student will be able to analyze the global aerospace environment and to meet professionals in the Aerospace industry: product, project, market, management and organizational dimensions. **4. Strategy and Project Management in Aerospace** Objective: The successful student will be able to elaborate strategic analysis and relevant professional synthesis covering organizational, technical, commercial and financial issues, in order to be able to work as a manager in existing and emerging international projects. **5. Issues and trends in entrepreneurship & innovation** Objective: The successful student will be able to develop new strategies for organizations by analyzing relevant issues and trends in entrepreneurship and innovation. **6. Integrating HR, Marketing & Sales Functions in Aerospace management** Objective: The successful student will be able to make sound and sustainable decisions regarding HRM, Marketing and Sales including elementary financial knowledge and practices that are specific to the aerospace business. **7. Integrating Supply Chain Management and the Management of Operations, including Security and Law**	Strategy, Finance, Marketing, Innovation and Entrepreneurship, Supply chain & procurement, Human Resources, Project Management in the aerospace environment.	x	x	x	x	Link	
UniLu	Faculty of Science, Technology and Medicine	Master	Interdisciplinary Space Master	M1+M2	120,0	English	This collaborative ISM aims to generate a talent pool of professionals able to answer the diverse needs of the booming commercial space industry. Growing innovations in space exploration and exploitation require professional figures able to manage the technical side as well as the business side of complex space missions and operations.	Space project management, Space Economics, Space Business, Entrepreneurial aspects and Space Finance, Entrepreneurship, Practical aspects of taking technology to a start-up.	Space systems Engineering, Space Informatics, Entrepreneurship, Business and project management, Satellite Communications and Security, Space policy, Law and Ethics	x	x	x	x	Link	
AGH	Faculty of Drilling, Oil and Gas	Master Course	Space technologies and commercialization of space	M	4,0	English/ Polish	This Master course's objectives are the following: *To familiarize students with the physical conditions prevailing in the space environment that affect the design of devices operating in this environment *To familiarize students with the basics of space technologies *To familiarize students with the revolution taking place in the field of space technologies, launch systems (the SPACE 4.0 revolution) *To familiarize students with the business opportunities related to the SPACE 4.0 revolution *To develop basic business skills, instilling business thinking and approach in students *To develop student entrepreneurship in the field of space technologies.	Space environment, Start-up, Business models and competitiveness analysis, History of Space, Venture Capital/Crowdfunding, Space drilling, Marketing, Space mining, New Space companies, Satellite technologies	New space, Space Business and Economics, Space technologies and Space 4,0, Entrepreneurship.			x	x	Link	
TLSE	INP-ENSEEIHT / INSA	Master	Electronic Systems for Embedded and Communicating Applications (ESECA)	M1+M2	120,0	English	This master joint program between Toulouse INP - ENSEEIHT and INSA Toulouse is a gateway to jobs or doctoral research in electronics for embedded systems. It is aimed at students with a Bachelor degree in electronics, electrical engineering, telecommunications, computer science, robotics, physics or equivalent.	Link with Medicine and Health not obvious, but can train to Health monitoring application. Conferences on aeronautics might also involve some Medicine related topics?	Aeronautics and Space, Embedded systems, Autonomous / connected vehicle, Robotics, Mechatronics, Renewable energies, Smart grids and Smart city, Mobility, Connected objects, Electric networks, Health monitoring	x	x	x	x	Link	
TLSE	UT3 - FSI	Master	Master Signal Imaging and Medical and Space Audio-Video Applications (EEA - Parcours Signal Imagerie et Applications Audio-vidéo Médicales et Spatiales, SIA-AMS)	M1-2	120,0	French	The master provides a specialized training on the uses of medical and spatial images in sectors such as: earth observation, medical imagery, digital telecommunications, control of industrial process.	M2 - Medical specialisation : Signal treatment, images analyisis, statistical analysis, Imageries techniques and images in Medicine, interactions photons/electrons, extraction of anatomic and pathological data, functional imaging.	Spatial and medical Imagery, Robotics, Electronics, Digital telecommunications, Physics	x	x			Link	

LTU		Master	Master Programme in Applied Artificial Intelligence	M2	300,0	English/ Swedish	This master provides the tools and methods used to solve real problems using AI, as well as to take a leading role in teams that drive technology development forward. It combines knowledge from computer science, neuroscience and brain comprehension. The goal is to develop self-learning intelligent systems to solve real problems. **2 specializations:** Industrial AI: with a choice possible for the area in which the students prefer to apply their competences: health, education, energy, spatial… AI and neuroscience: medical neuroscience, psychology, cognition, biology 1specialization= 75 ECTS **After completing the Master of Science in Applied AI, the student should be able to:** *Demonstrate in-depth knowledge of methods and theories in the field of artificial intelligence and related basic scientific disciplines. *Use AI methods to solve problems and present results, both written and oral, in new problem cases. *Categorize new applied AI problems. *Select appropriate AI methods for specific solutions. *Develop technologies based on human needs as well as ethical considerations and society's goals for sustainable development.	**After graduating from Industrial AI, the student should be able to:** *Develop AI technology and systems based on human needs and on society's goals for sustainable development. *Critically evaluate and compare different AI models and learning algorithms for different issues and quality characteristics. *Analyze the use of industrial AI and suggest adaptation strategies and solutions. *Demonstrate knowledge of practical business models and ecosystems that contain AI. **After graduating from this interdisciplinary specialization that combines neuroscience and AI, the student should be able to:** *Demonstrate knowledge in neuroscience, machine learning, AI and neuromorphic technology. *Combine neuroscience with machine learning methods and vice versa. *Develop and apply simulation models of neural circuits to understand brain function and develop neuromorphic technology.	Applied AI problems, Machine learning, Robotics, Deep learning, Neural networks signals and control technologies, Big data Neurosciences, Cognition, Biology, Neuromorphic computer technology	x		x		Link	Same program
TLSE	UT3 - Medicine Faculty with the support of MEDES (Institut de Médecine et Physiologie Spatiales)	Specific training for Dr. "Capacité".	Aeronautical and Space Medicine Capacity (Capacité de Médecine Aéronautique et Spatiale)	Post Doc		French	The Aerospace Medicine Capacity is compulsory (requested by the General Directorate of Civil Aviation) for doctors who want to request approval to practice medical aptitude examinations for professional and non-professional flight personnel (private pilots). The courses are given by experts in each of the fields in order to guarantee the quality of the teaching, in particular by doctors from the Airline Personnel Medical Expertise Centers for aeronautical expertise. This course also includes a module in space medicine and physiology in collaboration with MEDES (Institute of Space Medicine and Physiology) located in Toulouse.	Courses or themes: - Presentation of the aeronautical environment - Physiology and physiopathology related to the constraints of the aeronautical environment (general, sensory, respiratory and cardiovascular physiology applied to aeronautics; sensory illusions, effects of accelerations, vibrations, decrease in barometric pressure, etc.) - Principles of the selection and medical supervision of flight crew - General physical fitness of flight crew in the various fields (cardiovascular, respiratory, digestive, urology, endocrinology, ENT, ophthalmology, etc.) - Mental fitness of flight crew - Regulation and organization medical-administrative in aviation medicine - Health aspects, travel advice - Human factors and aviation safety - Air transport, EVASAN - Presentation of the space environment - Physiology and pathophysiology related to the constraints of the space environment (cardiovascular deconditioning, bone and muscle modifications, effects of radiation and confinement, etc.) - Selection and medical monitoring of astronauts …	Spatial Medicine, Physiology, Health of astronauts and of the flight crew, Aviation safety, Regulation for aerospatial medicine	X		X		Link	
TLSE	UT2J - Mirail	Master	Cognitive Ergonomics, Technological Innovation and Human Factor (MASTER Psychologie | parcours Ergonomie Cognitive, Innovation Technologique et Facteur Humain (ECIT-FH)	M1-M2	120,0	French	On the professional level, the objective of the ECIT-FH master is to train executives / psychologists specialized in the analysis of activities and human factors and able to contribute to projects of evaluation, design and improvement of technologies - by providing skills in ergonomics, in collaboration with other professionals, in particular engineers, computer scientists, designers. On the scientific level, the objective is to train specialists capable of producing and mobilizing theoretical and methodological knowledge in the fields of cognitive psychology and cognitive ergonomics, and abble to analyze complex information systems, work situations and activities, and organizations in order to optimize the use of professional technologies and all types of public.	Psychology and Ergonomy, Environment and Health at work, Statistics, Human factor and new technologies	Cognitive Ergonomics, Psychology, Design and improvement of new technologies.	x	x	x	Link1	Link 2
TLSE	UT2J - Mirail	Master	Social Sciences Applied to Food Studies (MASTER Sciences sociales | parcours Sciences Sociales Appliquées à l'Alimentation (SSAA)	M1-M2	120,0	French	The training allows to deepen the disciplinary, thematic but also functional fundamentals of the socio-anthropological approach to "food" while putting the acquired knowledge into context. The training offers observation, analysis, diagnostic, engineering and foresight tools aimed at acquiring know-how and skills in the field of food. The master is part of a logic of broadening skills and aims to offer students from different backgrounds in the agro-food sphere, nutrition, the tools allowing them to take into account social dimensions and cultural aspects of food in their professional practices.	Socio-anthropology of nutrition, Psychology of nutrition, Agro-alimentary business and economics, Social sciences applied to food, Social challenges	Nutrition, International agronomy, Agro-industrial development, Food industry, Anthropology, Psychology.	x	x	x		Link	
TLSE	UT2J - Mirail	Master	Industrial Project Management and Innovation (MASTER Innovation, entreprise et société | parcours Management de Projet Industriel (MPI)	M1-M2	120,0	French	The objective of the Master "Management of industrial projects" is to prepare students for professions centered on the management of technological innovation (innovative project management, marketing of technological innovation, consulting / evaluation of innovative projects …).	Accounting and financial management, Digital marketing, HR management, Web 2,0 and 3,0 challenges, Web design, Digital and Space, Project management, Management of production.	Project management, R&D, Finance, Management of innovation, Strategy, Economics	x	x	x	x	Link	
TLSE	UT2J - Mirail	Master	History and Heritage of Aeronautics and Space (MASTER Histoire et Civilisations Modernes et Contemporaines | parcours Histoire et patrimoine de l'aéronautique et de l'espace)	M1-M2	120,0	French	The curriculum of this Master is designed for students interested in history, heritage, archives and museography. It aims to train students in the research professions related to these domains. Following this broad program, students will be prepared for numerous career opportunities such as teaching, journalism, and research, not to mention jobs such as curators, archivists, librarians, guides, etc.	The students in this Master's Degree are called to place their chosen subject in a political, economic and social perspective. To do so, they will attend seminars on a regular basis. They will then have the opportunity to discuss their research project with seasoned researchers in French or in English (historians, economists, sociologists, geographers, etc.). Compulsory seminars: Economics, science and techniques History of aeronautics and space	History, Social Sciences, Sociology, Geography	x	x	x		Link	
UniLu	Faculty of Law, Economy and Finance	Master	Master in Space, Communication and Media Law	M2	60,0	English/ French	The programme equips students with essential theoretical, practical and analytical skills to excel in the fast-paced legal world of a continuously developing field. It provides ample opportunities for development in the public and private sector, as well as in academia. Over the course of this programme, students acquire complete expertise in the regulatory aspects of space, communication, ICT and media law within an exciting and developing field.	The master combines a range of courses on Space law, international and European satellite communication law, Media law, Electronic communications and E-commerce law, Intellectual property law, as well as Data protection law. It covers these areas on international, European and national level.	Space and telecommunication law, Media and Tech law, Data protection/intellectual property/ E-commerce Law	x	x	x	x	Link	

TLSE	UT2J - ENSAV	Vocational bachelor's degree (professional bachelor)	Computer graphics creation applied to the audiovisual industry (Professional bachelor Techniques du son et de l'image | parcours Création Infographique appliquée à l'audiovisuel)	B1-B3	60,0	French	The Professional Bachelor "Infographic Creation applied to the audiovisual" offers a training in computer graphics intimately linked to the audiovisual professions, and in relation to the evolution of the field: new media, new broadcasts, new ways to understand cinema, which has become entirely digital, its possibilities for special effects, etc. This professional bachelor trains to the entire panel of computer graphics (Compositing, 3D, Web, Print, etc.).	Cinematography, workshops (Illustrator, Photoshop) creations in 3D, sound/ acoustic workshops and transmedia installation…	Communication, audio-visual, Culture, Cinema, Practical skills related to technological tools (software, creations, commands), Graphism. In-depth artistic skills (knowledge and original reflection on creation).	x	x	x		Link	
TLSE	UT2J - ISCID	Master	Spatial Design, Color, Lighting (MASTER Design | parcours Design d'espace, couleur, lumière (DECLE)	M1-M2	120,0	French	The DECLE Master of the Color, Image, Design Superior Institute focuses on the practices of spaces and coloring specific to planning, architecture, scenography and lighting design. He is dedicated to creation-research and action research in the fields of space design, and the design of perennial or ephemeral environments.	Theory and models in Arts and Design, Human sciences, Methodology for Space, Color, Light, Innovation thanks to Design.	Architecture and Space, Lighting conception, Colors codifications and modelisation, Special Events lighting,Theoritical and critical approach in Arts, Design and social and human sciences. Creation process.	x	x	x	x	Link	
TLSE	UT2J - ISCID	Master	Object design, experimentation and development (MASTER Design | parcours Design d'objet, expérimentation et développement)	M1-M2	120,0	French	This Design master explores the ecosystem of objects with a critical and research oriented approach. It provides a training on the different Design tools, and methodology to form future designers able to formulate relevant solutions and to ensure their development and their achievement.	Eco-conception, design care, up-cycling, innovation, 3D modelisation…	Object design, Eco-conception, 3D models, Innovation, Theoritical and critical approach in Arts, Design and social and human sciences. Creation process.	x	x	x	x	Link	
TLSE	UT2J - Mirail	Master	Digital Arts & Design / Digital Creation (Master Mention Création numérique)	M1-M2	120,0	French	The digital creation master's degree is a diploma for specialists in the fields of digital creation and innovative technologies. It allows the development of innovative practices, as part of a creative process, in relation to contemporary issues. It anticipates emerging professions in the fields of art, industry, research and development. It is open to image practices, in situ or remotely via a network, of the object, the product, the installation, the service and the live performance. With its technological and engineering dimensions, the master is part of a creation-research-profession approach that articulates: university, scientific, artistic and technical training, practice of individual and collective projects, practice of internship in companies or institutions.	It offers courses in 2D, 3D, real-time 3D digital imaging, virtual editing, multimedia integration, real-time interactive event management, sensor technologies, IT, electronics, sound, robotics, Virtual Reality...	Digital creation imagery, Digital Arts, Multimedia project management, 3D imagery, Sound and sensor technologies, Robotics, Connected objects, Creation process.	x	x	x		Link	
TLSE	UT2J - ISCID	Master	Sensory Design (MASTER Design| parcours Design sensoriel)	M1-M2	120,0	French	The "Sensory Design" master aims to question and master, different levels of the design project chain, and the sensory aspects related to a material, an object, a space or a service, as it combines material characteristics (physical, plastic and sensitive), subjective parameters (experiential, cognitive) and social and cultural constructions.	Methodology of Sensory Design projects, Metrology, Notation/classification systems for Sensory design, Sensory Cultures, Prospective, Social and Cultural constructions of sensoriality.	Sensory Design (sound, Color, Taste, materials…), Immersive experiences, Metrology, Lighting, Colors, Theoritical and critical approach in Arts, Design and social and human sciences. Creation process.	x	x	x		Link	
TLSE	UT2J - Mirail	Master	Transdisciplinary Design, Cultures and Territories (MASTER Design | parcours Design Transdisciplinaire, Cultures et Territoires)	M1-M2	120,0	French	The Master Design Transdisciplinary Culture and Territory approaches with an analytical and creative perspective the environments in which humans evolve. Connected to all the disciplines of the human sciences, the diversity of aesthetics as well as the technologies at its disposal, it integrates socio-cultural, political, economic, philosophical and ethical issues. In resonance with our contemporary society, the Master DTCT highlights the growing role of design in the development of territories, particularly for their social and cultural cohesion and in their economic development. It offers a designer training which questions society, its imaginations, its modes of organization and governance.	Areas in which students develop services or solutions : * Ecological and energy transition * Philosophy and metaphysics of design, new industries and utopian thought * Interaction design, digital humanities and emerging technologies (blockchain, AI, etc.) * Social justice, feminist and LGBTQI + policies, queer theories , issues of race, class, gender, "validity", etc.	Design projects development and management, interdiscplinary approach for design projects, Social and Human Sciences, Creation process, Graphism, Arts events			x		Link	
TLSE	TBS	MBA	Specialized track "Space & Business Applications" (Global Executive MBA)	MBA	4,0	English	This Specialized Track aims at providing knowledge, tools and techniques allowing participants to leverage the changes in space business (New space) as well as to participate in Main Space business.	Fundamentals of space business and applications Strategic and economic review of space markets New Space business Innovation strategy in space sector: the case of Space X and CubeSats Emergence of a space markets and analysis of threat for incumbents Space applications and downstream services Main space business Partnering in Space: Challenges and opportunities Defense and acquisition: application to space Presentation of international turnkey contracts for telecommunication satellites or Business plan and financing Space funding	Space business and its complex value chain, Innovation strategies, Market analysis, Partnership in space, Space funding, Defense acquisition	x	x			Link	
LTU	Department of Computer Science, Electrical and Space Engineering, Division of Space Technology	Master	Joint Master Programme in Space Science and Technology- SpaceMaster	M2	120,0	English	The Space Master offers cross-disciplinary research-oriented education with first-hand and hands-on experience in space science, technology and engineering. The Program has a common first year in Kiruna, Sweden. During the second year the students are at one of the European partner universities, which have different expertise in space. It allows the students to receive knowledge from a number of fundamental academic disciplines within one educational program, i.e. aerospace engineering, atmospheric science, signal processing, space science, space technology and robotics. The students can apply for five engineering and three scientific tracks.	Space physics, Space Communication, Spacecraft Systems, Space propulsion, Aerospace Navigation and Sensors, Control systems, Robotics… **The main learning outcomes are:** *fundamental and advanced knowledge in the academic subjects studied; *holistic approach to and comprehensive view of advanced space projects; *management skills required for space projects, e.g. systems on-board aircraft or satellites, techniques for satellite launch, interplanetary missions, earth observation, space data management; ***transferable skills, e.g. entrepreneurship,** scientific writing, social competence, communication skills, leadership in an international and intercultural environment.	Aerospace engineering, Atmospheric science,Signal processing, Space science, Space technology, Robotics	x	x	x	x	Link	
LTU		Master	Master Programme in Spacecraft Design	M2	120,0	English	This program is adapted to the rapid development in the space industry towards smaller spacecrafts with short development times. First year courses are necessary for second year studies as students develop a spacecraft in a computer environment. Students who have completed the program have continued with research studies or continued within space industry or space organisations.	Electronics in Space, Spacecraft deisgn, Space communication, Space materials and structures, Orbit and altitude dynamics, Space systems, Propulsion	Space technology, Electronics, Space systems, Navigation and control, Space Communications	x	x	x	x	Link	
LTU		Master	Master Programme in Space Engineering	M2	300,0	English/ Swedish	This master provides a training to develop new technology in the field of space: build satellites, study the earth's climate or explore the solar system...	Industrial Economics with a Sustainability Perspective, Electromechanical Systems, Space Engineering, Chemistry for sustainable development, Mathematics,Space and Atmospheric Science / Space instrument, Control Engineering	Electronics, Space technology, Physics, Mathematics, Mechanics, Space and atmospheric Science	x	x	x	x	Link	

LTU	Department of Engineering Sciences and Mathematics	Master	Master Programme in Materials Science & Engineering (EEIGM)	M1+M2	300,0	English	The master aims to train materials engineers, for industrial companies with international operations and who can, for example, work with the development of new materials in a research laboratory.	Physics, Physical Chemistry, Materials Engineering, Statistics, Technical Mechanics, Production Engineering, Material selection and Ecodesign, Advanced Processing and CyberLab, Composite material, Biocomposites, Machine design	Physics, Materials engineering, Machine design, Production engineering	x	x	x		Link	
LTU		Master	AMASE - Master Programme in Materials Engineering	M2	120,0	English	The first year of this master will cover basic areas such as structure and properties of materials. The basic courses are then complemented with a specialization. The students are given the opportunity to excel in the experimental techniques used within material science. During the second year, they will train their skills to work as an engineer or scientist. (Two major projects which are based on subprojects on on-going university research or product development in collaboration with industrial partners.)	Materials technology, Modeling, Surface engineering, Metal working, Nanotechnology, Composite materials, Materials selection and Eco-design, Biocomposites, Laser material processing, Advanced processing and CyberLab	Materials Science and engineering, Nanotechnology, Composite materials.	x	x	x		Link	
LTU		Master	Master Programme in Composite Materials	M2	120,0	English	This master program in materials technology provides students with a unique competence in important aspects of composites manufacturing and design technologies. The education is strongly connected to companies such as RISE SICOMP and ABB Composites who have announced a need for composite experts.	Materials Science and engineering, Biocomposites, Aerospace materials, Nanotechnology, Materials modeling, Material selection and Eco-design.	Composites manufacturing and design technologies, Materials Science and engineering, Nanotechnology	x	x	x		Link	

Economy, Business, Finance															
University	**Structure**	**Type**	**Programme**	**Level**	**ECTS**	**Languages**	**Short description**	**General contents and contents potentially linked to Economy, Business, Finance**	**Areas of competences**	Our Earth and Space	Sustainable Space	Space Settlment and resources	Space Exploration and discovery	**Syllabus or program's webpage**	**Comments**
TLSE	ISAE-SUPAERO	Specialized Master	Space Applications and Services	PM	60	English	Co-designed with Airbus Defense and Space, the master provides the required skills to develop space applications in Earth's environment monitoring and telecommunications, which play a predominant role today for sustainable development.	Space systems : Earth observation, telecommunications, navigation Design of space applications, space communications, navigation and positionning, digital techniques... **Space economics and regulations - Services and integrated applications (46h)** Students will propose and design tools and solutions in areas such as the Earth's environment, agriculture, transport or urban planning	Space systems, telecommunications, signal and image processing, machine learning, big data, cloud computing, digital communications, software radio. Cross disciplinary use of space data (observation of the earth and its atmosphere, telecommunications, data positioning, data from scientific missions and exploration)	x	x			Link	link in French
TLSE	ISAE-SUPAERO	Specialized Master	Space System Engineering	PM	60	English	The Master allows students to develop a high level of multidisciplinary skills in space science, space systems engineering and space project management.	Modules in the Part 2 (total part 2: 160h): Space programs: **Space programs bid for tender, Financial & legal aspects:** debris situation , new space (nanosatellites and launchers)	Space systems, management of space projects, technical, economic and legal aspects		x	x	x	Link	
TLSE	ISAE-SUPAERO	Specialized Master	Aerospace Project Management	PM	60	English	The Master prepares students for successfully leading Project or Program teams in global aerospace and defence industry, and provides students with current techniques and tools in project management considering industrial, economical or legal specificities of the Aerospace business.	**Part 1: Overall overview of aerospace industry (50h):** enables students to have an overall understanding of technologies, products, innovation and strategy stakes in the global civil and defence market. **Part 3: Economic and financial aspects (150h):** economical stakes for nations or industries and the role of politics. How to evaluate the cost of a long term program, the investment return hope, but also how to manage costs during development or manufacturing phase.	Space project management, Economic and financial aspects of the aerospace industry, Budget and cost managment, Knowledge management, Multicultural team project management.		x			Link	
TLSE	TBS	MBA	Specialized track "Space & Business Applications" (Global Executive MBA)	MBA	4,0	English	This Specialized Track provides the students with knowledge, tools and techniques allowing participants to leverage the changes in space business (New space) as well as to participate in Main Space business.	*Fundamentals of space business and applications *Global history of space *Strategic and economic review of space markets *New Space business *Innovation strategy in space sector: the case of Space X and CubeSats *Emergence of a space markets and analysis of threat for incumbents *Space applications and downstream services *Main space business *Partnering in Space: Challenges and opportunities *Defense and acquisition: application to space *Presentation of international turnkey contracts for telecommunication satellites or *Business plan and financing *Space funding *Company visit	*Understand space business and its complex value chain *Elaborate innovation strategies *Conduct a dynamic market analysis *Taking part in partnership in space *Participate to international turnkey contracts *Understand the space funding *Be involved in defense acquisition	x	x			Link	
TLSE	TBS	MSc	MSc Aerospace Management	M2	1,0	English	The Aerospace Management MSc prepares and trains participants to hold managerial positions in aeronautics, space and airline industries. The MSc addresses the full value chain of Aeronautics and Space from design, to aircraft and space systems delivery, including services and operations	***The Aerospace market: terminology and key economic and technological issues** Objective: The successful student will be able to analyze the global aerospace environment and to meet professionals in the Aerospace industry: product, project, market, management and organizational dimensions. ***Integrating HR, Marketing & Sales Functions in Aerospace management** Objective: The successful student will be able to make sound and sustainable decisions regarding HRM, Marketing and Sales including elementary financial knowledge and practices that are specific to the aerospace business.	Strategy, Finance, Marketing, Supply chain & procurement, Human Resources, Project Management in the aerospace environment, Aerospace value chain.	x	x			Link	
TLSE	TBS	MS	MS Aerospace Management	PM	1,0	English									
TLSE	TBS	Bachelors	Bachelor - Innovation Management Path or Aviation management Path	B3	60,0	English	The Toulouse Business School Bachelor is regularly distinguished in national rankings as one of the best programs in its category. This training course, perfectly suited to the needs of companies in terms of skills with high potential, takes place over 3 years, with a progressive pedagogy, focused primarily on operational knowledge of the company and the intercultural and international dimension. One of the specificities of the program is to be able to follow differentiated and personalized courses, which give students the opportunity to start their professional career in the best conditions and in the most promising sectors. The TBS Bachelor is a dual vocation training: professional and intercultural. Our mission is to reveal profiles with high potential, called to evolve quickly towards management functions, in France or internationally.	Program fully business oriented. Possible specializations: Aviation management (in English) International business management (in English) Innovation management (in English)	Economics, Management, Sales, Finance, Cost accounting and budgeting, Intercultural and HR management, Marketing, Law and business.	x	x			Link1	Link2

TLSE	TBS	MSc	SESAME projects (Séminaire d'Études Supérieures Appliquées au Management d'Entreprise)	M2	4,0	French/English	Project based learning. Consulting mission for the students: diagnosis of a real problem for a company, and recommendations.	Partners for the consulting missions: Airbus, Excent, Aerospace Valley, Thales Aliena Space,... The consulting missions are generally business oriented. The contents depend on the consulting mission.	Active learning project, Consulting, problem-solving approach, Company strategy	x	x	x	x	Link	
TLSE	TBS	MSc	MSc Aerospace Management / Strategic Research Analysis Corporate Projects	M2	4,0	English	The Aerospace Management MSc prepares and trains participants to hold managerial positions in aeronautics, space and airline industries. The MSc addresses the full value chain of Aeronautics and Space from design to aircraft and space systems delivery, including services and operations.	**8 Course units:** **1. Issues and Trends in Strategy** Objective: The successful student will be able to develop new strategies by analyzing relevant issues and trends impacting organizations. **2. International strategy and organization** Objective: The successful student will be able to analyze the challenges faced by international and internationalizing firms about which products to offer around the world, how to compete in international markets, where to locate and how to coordinate their worldwide activities effectively. **3. The Aerospace market: terminology and key economic and technological issues** Objective: The successful student will be able to analyze the global aerospace environment and to meet professionals in the Aerospace industry: product, project, market, management and organizational dimensions. **4. Strategy and Project Management in Aerospace** Objective: The successful student will be able to elaborate strategic analysis and relevant professional synthesis covering organizational, technical, commercial and financial issues, in order to be able to work as a manager in existing and emerging international projects. **5. Issues and trends in entrepreneurship & innovation** Objective: The successful student will be able to develop new strategies for organizations by analyzing relevant issues and trends in entrepreneurship and innovation. **6. Integrating HR, Marketing & Sales Functions in Aerospace management** Objective: The successful student will be able to make sound and sustainable decisions regarding HRM, Marketing and Sales including elementary financial knowledge and practices that are specific to the aerospace business. **7. Integrating Supply Chain Management and the Management of Operations, including Security and Law** Objective: The successful student will be able to make sound and sustainable decisions regarding the aerospace business value chain and to elaborate and implement operations linked to both local and global strategies in the aerospace sector, including compliance issues on technical, business and societal levels. **8. Strategy, entrepreneurship and innovation research methods and dynamics** Objective: The successful student will be able to design and conduct a research project with state-of-the-art research methods and tools in Strategic Innovation Management.	Strategy, Finance, Marketing, Innovation and Entrepreneurship, Supply chain & procurement, Human Resources, Project Management in the aerospace environment.	x	x	x	x	Link	
UniLu	Faculty of Science, Technology and Medicine	Master	Interdisciplinary Space Master	M1+M2	120,0	English	This collaborative ISM aims to generate a talent pool of professionals able to answer the diverse needs of the booming commercial space industry. Growing innovations in space exploration and exploitation require professional figures able to manage the technical side as well as the business side of complex space missions and operations.	Space project management, Space Economics, Space Business, Entrepreneurial aspects and Space Finance, Entrepreneurship, Practical aspects of taking technology to a start-up.	Space systems Engineering, Space Informatics, Entrepreneurship, Business and project management, Satellite Communications and Security, Space policy, Law and Ethics	x	x	x	x	Link	
AGH	Faculty of Drilling, Oil and Gas	Master Course	Space technologies and commercialization of space	M	4,0	English/ Polish	This Master course's objectives are the following: *To familiarize students with the physical conditions prevailing in the space environment that affect the design of devices operating in this environment *To familiarize students with the basics of space technologies *To familiarize students with the revolution taking place in the field of space technologies, launch systems (the SPACE 4.0 revolution) *To familiarize students with the business opportunities related to the SPACE 4.0 revolution *To develop basic business skills, instilling business thinking and approach in students *To develop student entrepreneurship in the field of space technologies.	Space environment, Start-up, Business models and competitiveness analysis, History of Space, Venture Capital/Crowdfunding, Space drilling, Marketing, Space mining, New Space companies, Satellite technologies	New space, Space Business and Economics, Space technologies and Space 4,0, Entrepreneurship.			x	x	Link	

Medicine & Health														
University	**Structure**	**Type**	**Programme**	**Level**	**ECTS**	**Languages**	**Short description**	**General contents and contents potentially linked to Medecine & Health**	**Areas of competences**	Our Earth and Space	Sustainable Space	Space Settlment and resources	Space Exploration and discovery	**Syllabus or program's webpage**	**Comments**
TLSE	INP-ENSEEIHT / INSA	Master	Electronic Systems for Embedded and Communicating Applications (ESECA)	M1+M2	120,0	English	This master joint program between Toulouse INP - ENSEEIHT and INSA Toulouse is a gateway to jobs or doctoral research in electronics for embedded systems. It is aimed at students with a Bachelor degree in electronics, electrical engineering, telecommunications, computer science, robotics, physics or equivalent.	Link with Medicine and Health not obvious, but can train to Health monitoring application. Conferences on aeronautics might also involve some Medicine related topics?	Aeronautics and Space, Embedded systems, Autonomous / connected vehicle, Robotics, Mechatronics, Renewable energies, Smart grids and Smart city, Mobility, Connected objects, Electric networks, Health monitoring	x	x	x	x	Link	
TLSE	UT3 - FSI	Master	Master Signal Imaging and Medical and Space Audio-Video Applications (EEA - Parcours Signal Imagerie et Applications Audio-vidéo Médicales et Spatiales, SIA-AMS)	M1-2	120,0	French	The master provides a specialized training on the uses of medical and spatial images in sectors such as: earth observation, medical imagery, digital telecommunications, control of industrial process.	M2 - Medical specialisation : Signal treatment, images analyisis, statistical analysis, Imageries techniques and images in Medicine, interactions photons/electrons, extraction of anatomic and pathological data, functional imaging.	Spatial and medical Imagery, Robotics, Electornics, Digital telecommunications, Physics	x	x			Link	
LTU		Master	Master Programme in Applied Artificial Intelligence	M2	300,0	English/ Swedish	This master provides the tools and methods used to solve real problems using AI, as well as to take a leading role in teams that drive technology development forward. It combines knowledge from computer science, neuroscience and brain comprehension. The goal is to develop self-learning intelligent systems to solve real problems. **2 specializations:** Industrial AI: with a choice possible for the area in which the students prefer to apply their competences: health, education, energy, spatial… AI and neuroscience: medical neuroscience, psychology, cognition, biology 1specialization= 75 ECTS **After completing the Master of Science in Applied AI, the student should be able to:** *Demonstrate in-depth knowledge of methods and theories in the field of artificial intelligence and related basic scientific disciplines. *Use AI methods to solve problems and present results, both written and oral, in new problem cases. *Categorize new applied AI problems. *Select appropriate AI methods for specific solutions. *Develop technologies based on human needs as well as ethical considerations and society's goals for sustainable development.					Link	
LTU		Master	Master Programme in Applied Artificial Intelligence	M2	120	English		**After graduating from Industrial AI, the student should be able to:** *Develop AI technology and systems based on human needs and on society's goals for sustainable development. *Critically evaluate and compare different AI models and learning algorithms for different issues and quality characteristics. *Analyze the use of industrial AI and suggest adaptation strategies and solutions. *Demonstrate knowledge of practical business models and ecosystems that contain AI. **After graduating from this interdisciplinary specialization that combines neuroscience and AI, the student should be able to:** *Demonstrate knowledge in neuroscience, machine learning, AI and neuromorphic technology. *Combine neuroscience with machine learning methods and vice versa. *Develop and apply simulation models of neural circuits to understand brain function and develop neuromorphic technology.	Applied AI problems, Machine learning, Robotics, Deep learning, Neural networks signals and control technologies, Big data Neurosciences, Cognition, Biology, Neuromorphic computer technology	x		x		Link2	Same programme
TLSE	UT3 - Medicine Faculty with the support of MEDES (Institut de Médecine et Physiologie Spatiales)	Specific training for Dr. "Capacité".	Aeronautical and Space Medicine Capacity (Capacité de Médecine Aéronautique et Spatiale)	Post Doc		French	The Aerospace Medicine Capacity is compulsory (requested by the General Directorate of Civil Aviation) for doctors who want to request approval to practice medical aptitude examinations for professional and non-professional flight personnel (private pilots). The courses are given by experts in each of the fields in order to guarantee the quality of the teaching, in particular by doctors from the Airline Personnel Medical Expertise Centers for aeronautical expertise. This course also includes a module in space medicine and physiology in collaboration with MEDES (Institute of Space Medicine and Physiology) located in Toulouse.	Courses or themes: - Presentation of the aeronautical environment - Physiology and physiopathology related to the constraints of the aeronautical environment (general, sensory, respiratory and cardiovascular physiology applied to aeronautics; sensory illusions, effects of accelerations, vibrations, decrease in barometric pressure, etc.) - Principles of the selection and medical supervision of flight crew - General physical fitness of flight crew in the various fields (cardiovascular, respiratory, digestive, urology, endocrinology, ENT, ophthalmology, etc.) - Mental fitness of flight crew - Regulation and organization medical-administrative in aviation medicine - Health aspects, travel advice - Human factors and aviation safety - Air transport, EVASAN - Presentation of the space environment - Physiology and pathophysiology related to the constraints of the space environment (cardiovascular deconditioning, bone and muscle modifications, effects of radiation and confinement, etc.) - Selection and medical monitoring of astronauts ...	Spatial Medicine, Physiology, Health of astronauts and of the flight crew, Aviation safety, Regulation for aerospatial medicine	X			X	Link	

Social and Human Sciences															
University	**Structure**	**Type**	**Programme**	**Level**	**ECTS**	**Languages**	**Short description**	**General contents and contents potentially linked to Social and Human Sciences**	**Areas of competences**	Our Earth and Space	Sustainable Space	Space Settlment and resources	Space Exploration and discovery	**Syllabus or program's webpage**	**Comments**
TLSE	UT2J - Mirail	Master	Cognitive Ergonomics, Technological Innovation and Human Factor (MASTER Psychologie | parcours Ergonomie Cognitive, Innovation Technologique et Facteur Humain (ECIT-FH)	M1-M2	120,0	French	On the professional level, the objective of the ECIT-FH master is to train executives / psychologists specialized in the analysis of activities and human factors and able to contribute to projects of evaluation, design and improvement of technologies - by providing skills in ergonomics, in collaboration with other professionals, in particular engineers, computer scientists, designers. On the scientific level, the objective is to train specialists capable of producing and mobilizing theoretical and methodological knowledge in the fields of cognitive psychology and cognitive ergonomics, and abble to analyze complex information systems, work situations and activities, and organizations in order to optimize the use of professional technologies and all types of public.	Psychology and Ergonomy, Environment and Health at work, Statistics, Human factor and new technologies	Cognitive Ergonomics, Psychology, Design and improvement of new technologies.		x	x	x	Link1	Link 2
TLSE	UT2J - Mirail	Master	Social Sciences Applied to Food Studies (MASTER Sciences sociales | parcours Sciences Sociales Appliquées à l'Alimentation (SSAA)	M1-M2	120,0	French	The training allows to deepen the disciplinary, thematic but also functional fundamentals of the socio-anthropological approach to "food" while putting the acquired knowledge into context. The training offers observation, analysis, diagnostic, engineering and foresight tools aimed at acquiring know-how and skills in the field of food. The master is part of a logic of broadening skills and aims to offer students from different backgrounds in the agro-food sphere, nutrition, the tools allowing them to take into account social dimensions and cultural aspects of food in their professional practices.	Socio-anthropology of nutrition, Psychology of nutrition, Agro-alimentary business and economics, Social sciences applied to food, Social challenges	Nutrition, International agronomy, Agro-industrial development, Food industry, Anthropology, Psychology.	x	x	x		Link	
TLSE	UT2J - Mirail	Master	Industrial Project Management and Innovation (MASTER Innovation, entreprise et société | parcours Management de Projet Industriel (MPI)	M1-M2	120,0	French	The objective of the Master "Management of industrial projects" is to prepare students for professions centered on the management of technological innovation (innovative project management, marketing of technological innovation, consulting / evaluation of innovative projects ...).	Accounting and financial management, Digital marketing, HR management, Web 2,0 and 3,0 challenges, Web design, Digital and Space, Project management, Management of production.	Project management, R&D, Finance, Management of innovation, Strategy, Economics	x	x	x	x	Link	
TLSE	UT2J - Mirail	Master	History and Heritage of Aeronautics and Space (MASTER Histoire et Civilisations Modernes et Contemporaines | parcours Histoire et patrimoine de l'aéronautique et de l'espace)	M1-M2	120,0	French	The curriculum of this Master is designed for students interested in history, heritage, archives and museography. It aims to train students in the research professions related to these domains. Following this broad program, students will be prepared for numerous career opportunities such as teaching, journalism, and research, not to mention jobs such as curators, archivists, librarians, guides, etc.	The students in this Master's Degree are called to place their chosen subject in a political, economic and social perspective. To do so, they will attend seminars on a regular basis. They will then have the opportunity to discuss their research project with seasoned researchers in French or in English (historians, economists, sociologists, geographers, etc.). Compulsory seminars: Economics, science and techniques History of aeronautics and space	History, Social Sciences, Sociology, Geography	x	x	x		Link	
UniLu	Faculty of Science, Technology and Medicine	Master	Interdisciplinary Space Master	M1+M2	120,0	English	This collaborative ISM aims to generate a talent pool of professionals able to answer the diverse needs of the booming commercial space industry. Growing innovations in space exploration and exploitation require professional figures able to manage the technical side as well as the business side of complex space missions and operations.	Specific courses directly linked to Social and Human Sciences: Space Policy, Law and Ethics, Law & Science and technology, Space project management, Space Economics, Space Business, Entrepreneurial Space Finance, Entrepreneurship, Practical aspects of taking tachnology to a start-up	Space systems Engineering, Space Informatics, Entrepreneurship, Business and project management, Satellite Communications and Secuiryt, Space policy, Law and Ethics	x	x	x	x	Link	
UniLu	Faculty of Law, Economy and Finance	Master	Master in Space, Communication and Media Law	M2	60,0	English/ French	The programme equips students with essential theoretical, practical and analytical skills to excel in the fast-paced legal world of a continuously developing field. It provides ample opportunities for development in the public and private sector, as well as in academia. Over the course of this programme, students acquire complete expertise in the regulatory aspects of space, communication, ICT and media law within an exciting and developing field.	The master combines a range of courses on Space law, international and European satellite communication law, Media law, Electronic communications and E-commerce law, Intellectual property law, as well as Data protection law. It covers these areas on international, European and national level.	Space and telecommunication law, Media and Tech law, Data protection/Intellectual property/ E-commerce Law	x	x	x	x	Link	

Art & Cultural studies															
University	**Structure**	**Type**	**Programme**	**Level**	**ECTS**	**Languages**	**Short description**	**General contents and contents potentially linked to Art and Cultural Studies**	**Areas of competences**	Our Earth and Space	Sustainable Space	Space Settlment and resources	Space Exploration and discovery	**Syllabus or program's webpage**	**Comments**
TLSE	UT2J - ENSAV	Vocational bachelor's degree (professional bachelor)	Computer graphics creation applied to the audiovisual industry Professional Bachelor - Techniques du son et de l'image | parcours Création Infographique appliquée à l'audiovisuel)	B1-B3	60,0	French	The Professional Bachelor "Infographic Creation applied to the audiovisual" offers a training in computer graphics intimately linked to the audiovisual professions, and in relation to the evolution of the field: new media, new broadcasts, new ways to understand cinema, which has become entirely digital, its possibilities for special effects, etc. This professional bachelor trains to the entire panel of computer graphics (Compositing, 3D, Web, Print, etc.).	Cinematography, workshops (Illustrator, Photoshop) creations in 3D, sound/ acoustic workshops and transmedia installation…	Communication, audio-visual, Culture, Cinema, Practical skills related to technological tools (software, creations, commands), Graphism. In-depth artistic skills (knowledge and original reflection on creation).	x	x	x		Link	
TLSE	UT2J - ISCID	Master	Spatial Design, Color, Lighting (MASTER Design | parcours Design d'espace, couleur, lumière (DECLE)	M1-M2	120,0	French	The DECLE Master of the Color, Image, Design Superior Institute focuses on the practices of spaces and coloring specific to planning, architecture, scenography and lighting design. He is dedicated to creation-research and action research in the fields of space design, and the design of perennial or ephemeral environments.	Theory and models in Arts and Design, Human sciences, Methodology for Space, Color, Light, Innovation thanks to Design.	Architecture and Space, Lighting conception, Colors codifications and modelisation, Special Events lighting,Theoritical and critical approach in Arts, Design and social and human sciences. Creation process.	x	x	x	x	Link	
TLSE	UT2J - ISCID	Master	Object design, experimentation and development (MASTER Design | parcours Design d'objet, expérimentation et développement)	M1-M2	120,0	French	This Design master explores the ecosystem of objects with a critical and research oriented approach. It provides a training on the different Design tools, and methodology to form future designers abble to formulate relevant solutions and to ensure their development and their achievement.	Eco-conception, design care, up-cycling, innovation, 3D modelisation…	Object design, Eco-conception, 3D models, Innovation, Theoritical and critical approach in Arts, Design and social and human sciences. Creation process.	x	x	x	x	Link	
TLSE	UT2J - Mirail	Master	Digital Arts & Design / Digital Creation (Master Mention Création numérique)	M1-M2	120,0	French	The digital creation master's degree is a diploma for specialists in the fields of digital creation and innovative technologies. It allows the development of innovative practices, as part of a creative process, in relation to contemporary issues. It anticipates emerging professions in the fields of art, industry, research and development. It is open to image practices, in situ or remotely via a network, of the object, the product, the installation, the service and the live performance. With its technological and engineering dimensions, the master is part of a creation-research-profession approach that articulates: university, scientific, artistic and technical training, practice of individual and collective projects, practice of internship in companies or institutions.	It offers courses in 2D, 3D, real-time 3D digital imaging, virtual editing, multimedia integration, real-time interactive event management, sensor technologies, IT, electronics, sound, robotics, Virtual Reality...	Digital creation imagery, Digital Arts, Multimedia project management, 3D imagery, Sound and sensor technologies, Robotics, Connected objects, Creation process.	x	x	x		Link	
TLSE	UT2J - ISCID	Master	Sensory Design (MASTER Design| parcours Design sensoriel)	M1-M2	120,0	French	The "Sensory Design" master aims to question and master, different levels of the design project chain, and the sensory aspects related to a material, an object, a space or a service, as it combines material characteristics (physical, plastic and sensitive), subjective parameters (experiential, cognitive) and social and cultural constructions.	Methodology of Sensory Design projects, Metrology, Notation/classification systems for Sensory design, Sensory Cultures, Prospective, Social and Cultural constructions of sensoriality.	Sensory Design (sound, Color, Taste, materials…), Immersive experiences, Metrology, Lighting, Colors, Theoritical and critical approach in Arts, Design and social and human sciences. Creation process.	x	x	x		Link	
TLSE	UT2J - Mirail	Master	Transdisciplinary Design, Cultures and Territories (MASTER Design | parcours Design Transdisciplinaire, Cultures et Territoires)	M1-M2	120,0	French	The Master Design Transdisciplinary Culture and Territory approaches with an analytical and creative perspective the environments in which humans evolve. Connected to all the disciplines of the human sciences, the diversity of aesthetics as well as the technologies at its disposal, it integrates socio-cultural, political, economic, philosophical and ethical issues. In resonance with our contemporary society, the Master DTCT highlights the growing role of design in the development of territories, particularly for their social and cultural cohesion and in their economic development. It offers a designer training which questions society, its imaginations, its modes of organization and governance.	Areas in which students develop services or solutions : * Ecological and energy transition * Philosophy and metaphysics of design, new industries and utopian thought * Interaction design, digital humanities and emerging technologies (blockchain, AI, etc.) * Social justice, feminist and LGBTQI + policies, queer theories , issues of race, class, gender, "validity", etc.	Design projects development and management, interdiscplinary approach for design projects, Social and Human Sciences, Creation process, Graphism, Arts events			x		Link	

Innovations & Patents, Entrepreneurship														
Universi	Structure	Type	Programme	Level	ECTS	Languages	Short description	General contents and contents potentially linked to Innovations & Patents, Entrepreneurship	Areas of competences	Our Earth and Space	Sustainable Space	Space Settlment and resources	Space Exploration and discovery	Syllabus or program's webpage	Comments
TLSE	TBS	MBA	Specialized track "Space & Business Applications" (Global Executive MBA)	MBA	4,0	English	This Specialized Track aims at providing knowledge, tools and techniques allowing participants to leverage the changes in space business (New space) as well as to participate in Main Space business.	Fundamentals of space business and applications Strategic and economic review of space markets New Space business Innovation strategy in space sector: the case of Space X and CubeSats Emergence of a space markets and analysis of threat for incumbents Space applications and downstream services Main space business Partnering in Space: Challenges and opportunities Defense and acquisition: application to space Presentation of international turnkey contracts for telecommunication satellites or Business plan and financing Space funding	Space business and its complex value chain, Innovation strategies, Market analysis, Partnership in space, Space funding, Defense acquisition	x	x			Link	
TLSE	TBS	MSc	MSc Aerospace Management	M2	1	English	The Aerospace Management MSc prepares and trains participants to hold managerial positions in aeronautics, space and airline industries. The MSc addresses the full value chain of Aeronautics and Space from design to aircraft and space systems delivery, including services and operations.	**The Aerospace market: terminology and key economic and technological issues** Objective: The successful student will be able to analyze the global aerospace environment and to meet professionals in the Aerospace industry: product, project, market, management and organizational dimensions. **Integrating HR, Marketing & Sales Functions in Aerospace management** Objective: The successful student will be able to make sound and sustainable decisions regarding HRM, Marketing and Sales including elementary financial knowledge and practices that are specific to the aerospace business.	Strategy, Finance, Marketing, Supply chain & procurement, Human Resources, Project Management in the aerospace environment.	x	x			Link	
TLSE	TBS	MS	MS Aerospace Management	PM	1,0	English									
TLSE	TBS	Bachelors	Bachelor Innovation Management Path	B3	60,0	English	The Toulouse Business School Bachelor is regularly distinguished in national rankings as one of the best programs in its category. This training course, perfectly suited to the needs of companies in terms of skills with high potential, takes place over 3 years, with a progressive pedagogy, focused primarily on operational knowledge of the company and the intercultural and international dimension. One of the specificities of the program is to be able to follow differentiated and personalized courses, which give students the opportunity to start their professional career in the best conditions and in the most promising sectors. The TBS Bachelor is a dual vocation training: professional and intercultural. Our mission is to reveal profiles with high potential, called to evolve quickly towards management functions, in France or internationally.	Program fully business oriented. Possible specializations: Innovation management (in English) Aviation management (in English) International business management (in English)	Economics, Management, Sales, Finance, Cost accounting and budgeting, Intercultural and HR management, Marketing, Law and business.	x	x			Link1	Link2
TLSE	TBS	MSc	SESAME projects (Séminaire d'Études Supérieures Appliquées au Management d'Entreprise)	M2	4,0	French/English	Project based learning. Consulting mission for the students: diagnosis of a real problem for a company, and recommendations	Partners for the consulting missions: Airbus, Excent, Aerospace Valley, Thales Aliena Space,... The consulting missions can be more or less linked to innovation, patents and entrepreneurship.	Active learning project, Consulting, problem-solving approach, Company strategy	x	x	x	x	Link	
TLSE	TBS	MSc	MSc Aerospace Management / Strategic Research Analysis Corporate Projects	M2	4,0	English	The Aerospace Management MSc prepares and trains participants to hold managerial positions in aeronautics, space and airline industries. The MSc addresses the full value chain of Aeronautics and Space from design to aircraft and space systems delivery, including services and operations.	**8 Course units:** **1. Issues and Trends in Strategy** Objective: The successful student will be able to develop new strategies by analyzing relevant issues and trends impacting organizations. **2. International strategy and organization** Objective: The successful student will be able to analyze the challenges faced by international and internationalizing firms about which products to offer around the world, how to compete in international markets, where to locate and how to coordinate their worldwide activities effectively. **3. The Aerospace market: terminology and key economic and technological issues** Objective: The successful student will be able to analyze the global aerospace environment and to meet professionals in the Aerospace industry: product, project, market, management and organizational dimensions. **4. Strategy and Project Management in Aerospace** Objective: The successful student will be able to elaborate strategic analysis and relevant professional synthesis covering organizational, technical, commercial and financial issues, in order to be able to work as a manager in existing and emerging international projects. **5. Issues and trends in entrepreneurship & innovation** Objective: The successful student will be able to develop new strategies for organizations	Strategy, Finance, Marketing, Innovation and Entrepreneurship, Supply chain & procurement, Human Resources, Project Management in the aerospace environment..	x	x	x	x	Link	

								by analyzing relevant issues and trends in entrepreneurship and innovation. **6. Integrating HR, Marketing & Sales Functions in Aerospace management** Objective: The successful student will be able to make sound and sustainable decisions regarding HRM, Marketing and Sales including elementary financial knowledge and practices that are specific to the aerospace business. **7. Integrating Supply Chain Management and the Management of Operations, including Security and Law** Objective: The successful student will be able to make sound and sustainable decisions regarding the aerospace business value chain and to elaborate and implement operations linked to both local and global strategies in the aerospace sector, including compliance issues on technical, business and societal levels. **8. Strategy, entrepreneurship and innovation research methods and dynamics** Objective: The successful student will be able to design and conduct a research project with state-of-the-art research methods and tools in Strategic Innovation Management.						
LTU	Department of Computer Science, Electrical and Space Engineering, Division of Space Technology	Master	Joint Master Programme in Space Science and Technology-SpaceMaster	M2	120,0	English	The Space Master offers cross-disciplinary research-oriented education with first-hand and hands-on experience in space science, technology and engineering. The Program has a common first year in Kiruna, Sweden. During the second year the students are at one of the European partner universities, which have different expertise in space. It allows the students to receive knowledge from a number of fundamental academic disciplines within one educational program, i.e. aerospace engineering, atmospheric science, signal processing, space science, space technology and robotics. The students can apply for five engineering and three scientific tracks.	Space physics, Space Communication, Spacecraft Systems, Space propulsion, Aerospace Navigation and Sensors, Control systems, Robotics… **The main learning outcomes are:** *fundamental and advanced knowledge in the academic subjects studied; *holistic approach to and comprehensive view of advanced space projects; *management skills required for space projects, e.g. systems on-board aircraft or satellites, techniques for satellite launch, interplanetary missions, earth observation, space data management; ***transferable skills, e.g. entrepreneurship,** scientific writing, social competence, communication skills, leadership in an international and intercultural environment.	Aerospace engineering, Atmospheric science,Signal processing, Space science, Space technology, Robotics	x	x	x	x	Link	
LTU		Master	Master Programme in Spacecraft Design	M2	120,0	English	This program is adapted to the rapid development in the space industry towards smaller spacecrafts with short development times. First year courses are necessary for second year studies as students develop a spacecraft in a computer environment. Students who have completed the program have continued with research studies or continued within space industry or space organisations.	Electronics in Space, Spacecraft deisgn, Space communication, Space materials and structures, Orbit and altitude dynamics, Space systems, Propulsion	Space technology, Electronics, Space systems, Navigation and control, Space Communications	x	x	x	x	Link	
LTU		Master	Master Programme in Space Engineering	M2	300,0	English/ Swedish	This master provides a training to develop new technology in the field of space: build satellites, study the earth's climate or explore the solar system...	Industrial Economics with a Sustainability Perspective, Electromechanical Systems, Space Engineering, Chemistry for sustainable development, Mathematics,Space and Atmospheric Science / Space instrument, Control Engineering	Electronics, Space technology, Physics, Mathematics, Mechanics, Space and atmospheric Science	x	x	x	x	Link	
LTU	Department of Engineering Sciences and Mathematics	Master	Master Programme in Materials Science & Engineering (EEIGM)	M1+M2	300,0	English	The master aims to train materials engineers, for industrial companies with international operations and who can, for example, work with the development of new materials in a research laboratory.	Physics, Physical Chemistry, Materials Engineering, Statistics, Technical Mechanics, Production Engineering, Material selection and Ecodesign, Advanced Processing and CyberLab, Composite material, Biocomposites, Machine design	Physics, Materials engineering, Machine design, Production engineering	x	x	x		Link	
LTU		Master	AMASE - Master Programme in Materials Engineering	M2	120,0	English	The first year of this master will cover basic areas such as structure and properties of materials. The basic courses are then complemented with a specialization. The students are given the opportunity to excel in the experimental techniques used within material science. During the second year, they will train their skills to work as an engineer or scientist. (Two major projects which are based on subprojects on on-going university research or product development in collaboration with industrial partners.)	Materials technology, Modeling, Surface engineering, Metal working, Nanotechnology, Composite materials, Materials selection and Eco-design, Biocomposites, Laser material processing, Advanced processing and CyberLab	Materials Science and engineering, Nanotechnology, Composite materials.	x	x	x		Link	
LTU		Master	Master Programme in Composite Materials	M2	120,0	English	This master program in materials technology provides students with a unique competence in important aspects of composites manufacturing and design technologies. The education is strongly connected to companies such as RISE SICOMP and ABB Composites who have announced a need for composite experts.	Materials Science and engineering, Biocomposites, Aerospace materials, Nanotechnology, Materials modeling, Material selection and Eco-design.	Composites manufacturing and design technologies, Materials Science and engineering, Nanotechnology	x	x	x		Link	
UniLu	Faculty of Science, Technology and Medicine	Master	Interdisciplinary Space Master	M1+M2	120,0	English	This collaborative ISM aims to generate a talent pool of professionals able to answer the diverse needs of the booming commercial space industry. Growing innovations in space exploration and exploitation require professional figures able to manage the technical side as well as the business side of complex space missions and operations.	Space project management, Space Economics, Space Business, Enrepreneurial Space Finance, Entrepreneurship, Practical aspects of taking technology to a start-up	Space systems Engineering, Space Informatics, Entrepreneurship, Business and project management, Satellite Communications and Security, Space policy, Law and Ethics	x	x	x	x	Link	

AGH	Faculty of Drilling, Oil and Gas	Master Course	Space technologies and commercialization of space	M	4,0	English/Polish	This Master course's objectives are the following: *To familiarize students with the physical conditions prevailing in the space environment that affect the design of devices operating in this environment *To familiarize students with the basics of space technologies *To familiarize students with the revolution taking place in the field of space technologies, launch systems (the SPACE 4.0 revolution) *To familiarize students with the business opportunities related to the SPACE 4.0 revolution *Development of basic business skills, instilling business thinking and approach in students *Development of student entrepreneurship in the field of space technologies	Space environment, Start-up, business models and competitiveness analysis, History of Space, Venture Capital/Crowdfunding, Space drilling, Marketing, Space mining, New Space companies, Satellite technologies	New space, Space Business and Economics, Space technologies and Space 4,0, Entrepreneurship and Innovation			x	x	Link	