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AGREEMENT TO ESTABLISH A DOUBLE DEGREE PROGRAMME

Between

"Sapienza" Università di Roma

And

The Instituto Superior Técnico of the Universidade de Lisboa

Preamble

"Sapienza" University of Rome, represented by the Rector Prof. Eugenio Gaudio, Città Universitaria, Piazzale Aldo Moro 5, 00185 Rome, Italy and **The Instituto Superior Técnico of the Universidade de Lisboa**, represented by its President, Prof. Arlindo Oliveira, Av. Rovisco Pais, nº 1, 1049-001 Lisboa,

- Considering the efforts to harmonise higher education and to establish international curricula that foster an international labour market as well as improve student mobility,
- Considering the demonstrated interest by The Instituto Superior Técnico of the Universidade de Lisboa to promote and initiate an international curriculum on Aerospace Engineering with the Department of Mechanical and Aerospace Engineering, of "Sapienza" University of Rome;
- Considering the reciprocal interest of the Department of Mechanical and Aerospace Engineering of "Sapienza" University of Rome to also promote and initiate an international curriculum on Aerospace Engineering with the Instituto Superior Técnico of the Universidade de Lisboa;
- Having regard to the DM 270/2004 (revision of the act 509/1999) of the Minister for Education, University, and Research, that allows Italian universities to independently develop their own curricula (according to the law 341 of the 19-11-1990, art.11);
- Having regard to the course contents of the Mestrado Integrado de Engenharia Aeroespacial at the Instituto Superior Técnico of the Universidade de Lisboa as published in the Despacho 1525/2015 of the official Journal of the Government of Portugal, Série II, number 30, on 12 February of 2015;
- Bearing in mind that both Universities are members of the Pegasus association and share its objectives of student exchange and international cooperation.

"Sapienza" University of Rome - hereafter named "Sapienza"

and

The Instituto Superior Técnico of the Universidade de Lisboa - hereafter named IST both approve the text of this agreement aiming at the establishment of a double degree Programme, between

Laurea Magistrale in Ingegneria Aeronautica (Master degree in aeronautical engineering), delivered by Sapienza, Department of Mechanical and Aerospace Engineering, **Laurea Magistrale in Ingegneria Spaziale e Astronautica (Master degree in space and astronautics engineering)**, delivered by Sapienza, Department of Mechanical and Aerospace Engineering,

and

Article 2 - Programme management

2.1 The two partner institutions will each appoint a Programme coordinator.

2.2 Each partner agrees:

- to participate in a cooperative manner in the meetings of the different bodies under this Agreement;
- to promptly notify any delay in performance or any event that may impact the Programme to the appropriate body;
- to inform the appropriate body of relevant communications it receives from third parties in relation to the Programme;
- to ensure the accuracy of any information it supplies to the other Partners and to promptly correct any error therein of which it is notified, whereas the recipient Partners shall be responsible for the use made of such information;
- to act at all times in good faith and in a manner that reflects the good name, goodwill and reputation of the other Partners and in accordance with good business ethics.

2.3 Each partner will be responsible for its own costs associated with this Inter-Institutional Agreement. Neither partner will have the authority to authorize or incur financial liability on behalf of the other.

2.4 Due consideration should be given to the opportunities offered by the Erasmus+ Programme, or other international Programmes in order to fund scholarships for student and staff mobility.

Article 3 - Teaching Programme

3.1 The curriculum of this Double Degree Programme is presented in Annex 1, which is an integral part of this agreement. Changes to the annex do not affect the whole agreement.


3.2 The two institutions share the organization and the management of this Programme, which can be updated with both institutions' mutual agreement.

Article 4 - Admission requirements and procedures

4.1 The signing institutions will ensure provision of the required number of places. The number of students that will participate in the Double Degree Programme will be jointly determined by both institutions on a yearly basis in the period between February and May. For the first year of the Programme the parties agree to set the maximum number of students to 5 for each of the participating institutions.

4.2 Student admission is separately conducted by each institution. The Programme coordinator of each Institution is responsible for student advising and student selection based on the following minimum requirements:

- Students of Sapienza Master degree must have successfully passed all exams of the first year but one by the end of September (18 ECTS by the end of February to apply);

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- Students of IST Integrated Master Degree must have successfully passed all exams of the fourth year but one by the end of September (18 ECTS by the end of February to apply);
 - The students have to demonstrate their language proficiency in English (equivalent to level B2) or a Bachelor Programme entirely completed in English.

4.3. The Programme coordinator of each university will inform the partner institution about the selected students immediately after the selection process has been completed.

Article 5 - Student mobility

5.1 All the students enrolled in this Double Degree from both institutions will attend the second year of the Master's at the partner institution according to the description given in Annex 1. Courses at partner university will be taught in English.

5.2 To obtain the Double Degree the student must have at least 60 ECTS at each of the two universities of Roma and Lisbon.

5.3 Student shall present the same final thesis at both institutions.

Article 6 - Tuition fees

6.1 Registration and tuition fees will be paid to the home institution and be exempted by the host institution, which will guarantee a fee waiver upon condition of reciprocity.

Article 7 - Degree

7.1 Upon successful completion of the Double Degree requirements (120 ECTS for Sapienza students and 120 ECTS for IST students), two separate diplomas are conferred to the student according to the local regulations:

- The degree from the IST: "Mestrado em Engenharia Aeroespacial" together with diploma supplement, if available.
- The diploma from the Sapienza - University of Rome: "Laurea Magistrale" in "Ingegneria Aeronautica" or "Ingegneria Spaziale e Astronautica" together with diploma supplement, if available.

7.2 These degrees are recognized in Europe as research masters degrees allowing the student to start a Ph. D. Programme.

Article 8 - Student enrollment, credit recognition and transfer

8.1 Each partner will keep appropriate records of the students registered on the Programme and provide all students and partners with the official transcript of records.

8.2 Transferring credits between the partner institutions will be made using the system as described in Annex 1, Tables 1 and 2.

8.3 Courses transferred between the institutions must have a minimum grade of *Pass* or equivalent (see Annex 1, Table 3).

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8.4 Courses will be transferred to the partner institution as soon as the grades in the partner institution are posted.

Article 9 - Thesis, evaluation, composition jury and transfer of documents

9.1 The final thesis must be presented at partner university according to current regulations and procedures of that university and to any other provision required to match the regulations of home university. Whenever possible, thesis should be co-supervised by professors or researchers of both institutions. The Jury at partner university will provide the final marks according to its rules and taking into account the evaluation made by an assessor appointed by home university, who will join the Jury attending in person or by video-conference. After discussion at the partner university, a pro-forma presentation will be given at the home university. Home university will ratify the mark given to the thesis discussion by the partner university and convert into its own grading system.

9.2 The double degree is obtained after presentation of the final thesis at both universities.

9.3 Students have to write the final thesis in English. A copy of the final thesis will be submitted to both institutions.

9.4 The Partners agree to mutually recognize the thesis done at a partner university, to accept the results of the examination and the grades given.

Article 10 - Conversion of grades of exams

10.1 The European Credit Transfer System (ECTS) will be used for grading the results of any exam (see Annex 1, Tables 1-3).

Article 11 - Students' rights and duties

11.1 Each student will be enrolled at the home institution while they will be registered at the host institution for the mobility period (see Article 6.1).

11.2 Students are granted full access to both the institutions' facilities (such as Library, Laboratories, etc.) during their studies. Insurance is regulated by the rules of each University.

Article 12 – Contact Persons / Programme Coordinators

12.1 Each university appoints a Programme coordinator who will be in charge of the administrative execution of this agreement and who will serve as the contact person for the Sapienza and IST students who are participating in the outlined double degree Programme.

12.2 The contact persons / Programme coordinators from IST are:

Prof. Luís Manuel Braga da Costa Campos

and

Prof. Fernando José Parracho Lau

12.3 The contact persons / Programme coordinators from Sapienza are:

Prof. Guido de Matteis.

and



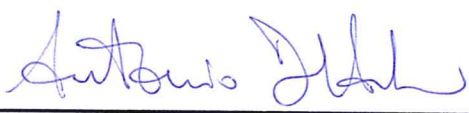



Prof. Francesco Nasuti

Article 13 - Duration and renewal

13.1 The agreement will be effective from the date of the last approval, is valid for 5 years, but may be terminated by either party with six months' written notice. If such termination is made, the Programme will be active until all students already enrolled in this double degree Programme have completed their studies. The parties may also extend this agreement for any mutually agreed period of time.

Article 14 - Final regulations

14.1 In the event of a dispute the parties shall endeavor to reach an amicable settlement. Should these attempts fail, the dispute/s shall be referred for settlement to an agreed upon third party. Made in 4 original copies, each party receiving 2 original copies.

Sapienza University of Rome For the Department of Mechanical and Aerospace Engineering The Director Rome, Italy,  <hr/> Prof. Paolo Gaudenzi	Instituto Superior Técnico The Coordinator of the Integrated Master in Aerospace Engineering  <hr/> Prof. Luís Braga Campos
Sapienza University of Rome For the Faculty of Civil and Industrial Engineering The Dean Rome, Italy,  <hr/> Prof. Antonio D'Andrea	
For Sapienza University of Rome The Rector Rome, Italy,  <hr/> Prof. Eugenio Gaudio 	Instituto Superior Técnico The president Lisbon, Portugal  <hr/> Prof. Arlindo Oliveira

ROME 29.5.2017

Annex 1

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PART 1 – Structure and courses of the double degree programme between **Sapienza Master Degree in Aeronautical Engineering** (*Laurea Magistrale in Ingegneria Aeronautica*) and **IST Master Degree in Aerospace Engineering** (*Mestrado em Engenharia Aeroespacial*)

Table 1a – Structure of the double diploma

Students of	Sapienza Laurea Magistrale in Ingegneria Aeronautica <i>Students must select the curriculum "Flight systems and air transport"</i>	IST Maestrado em Engenharia Aeroespacial	ECTS
1st year	Courses taken at Sapienza and transferrable to IST (table 1b)	Courses taken at IST and transferrable to Sapienza (table 1c)	60
2nd year	Courses taken at IST and thesis held at IST transferrable to Sapienza (table 1b)	Courses taken at Sapienza and thesis held at Sapienza transferrable to IST (table 1c)	60
Total ECTS			120

Table 1b – Courses for students originally enrolled at Sapienza

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First year held at Sapienza and courses recognized by IST			
Courses held at Sapienza	ECTS	Courses recognized by IST	ECTS
1st semester		1st semester	
Gasdinamica (Gas dynamics)	9	Coupled Phenomena	6
Strutture aeronautiche (Aircraft structures)	9	Telecommunications	6
Control systems	9	Vibrations and Noise	6
2nd semester		Electronics	6
Dinamica del volo (Aircraft flight dynamics)	9	Sensors and systems	6
Motori aeronautici (Aircraft engines)	9	2nd semester	
Controllo del traffico aereo (Air traffic Control)	9	Space Environment	6
Sistemi di assistenza al volo (Radio navigation aids)	6	Antennas and propagation	6
		Aerodynamics II	6
		Project Management	6
		Aeroacoustics	6
Total ECTS 1st year	60	Total ECTS 1st year	60

Second year held at IST and courses recognized by Sapienza			
Courses recognized by Sapienza		Courses held at IST	ECTS
Altre conoscenze utili per l'inserimento ...	1	Students must select any 5 courses among the following¹:	30
Artificial intelligence I	6	Artificial Intelligence and Decision Systems (1)	6
Controllo delle vibrazioni e del rumore	6	Autonomous Systems (1)	6
Digital control systems	6	Computational Fluid Mechanics (1)	6
Enviromental impact of aircraft engines	6	Computer Control (1)	6
Meccanica del volo dell'elicottero	6	Coupled phenomena (1)	6
Guida e navigazione aerea	6	Digital Systems Design (1)	6
Thesis	23	Distributed Real Time Control Systems (1)	6
		Electronics (1)	6
		Emissions (1)	6
		Helicopters (1)	6
		Microelectronics (1)	6
		Sensors and systems (1)	6
		Vibrations and Noise (1)	6
		Aeroacoustics (2)	6
		Fundamental Course in Mechanical Proc...(2)	6
		Maintenance and safety (2)	6
		Navigation systems (2)	6
		Instrumentation and measurements (2)	7,5
		Thesis	30
Total ECTS 2nd Year	60	Total ECTS 2nd Year	60

¹ The number within parentheses indicates the course semester.

Table 1c – Courses for students originally enrolled at IST

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First year held at IST and courses recognized by Sapienza			
Courses held at IST	ECTS	Courses recognized by Sapienza	ECTS
1st semester			
Aerospace structures	6	Gasdinamica (Gas dynamics)	9
Air traffic control systems	6	Strutture aeronautiche (Aircraft structures)	9
Heat transfer	6	Control systems	9
Solid Mechanics	6		
Thermodynamics II	6	Dinamica del volo (Aircraft flight dynamics)	9
2nd semester			
Aerodynamics II	6	Motori aeronautici (Aircraft engines)	9
Fundamental Course in Mechanical Processing of Materials	6	Controllo del traffico aereo (Air traffic control)	9
Project management	6	Sistemi di assistenza al volo (Radio navigation aids)	6
Propulsion	6		
Structural mechanics	6		
Total ECTS 1st Year	60	Total ECTS 1st Year	60

Second year held at Sapienza and courses recognized by IST			
Courses recognized by IST*	ECTS	Courses held at Sapienza	ECTS
		Students must select any 4 courses among the following²:	24
Aerospace Design	6	Aeroelasticity (2)	6
Space Mission Analysis and Design	6	Aircraft aerodynamics and design (2)	6
Integrated Avionic Systems	6	Combustion (1)	6
Laminated Composite Materials	6	Computational gas dynamics (2)	6
Aerospace	6	Environmental impact of aircraft engines (2)	6
		Experimental aerodynamics (1)	6
		Experimental testing for aerospace structures (1)	6
<i>*As an alternative, equivalences can be given to other courses that are present in the MEAer curricula.</i>		Students must select one course among the following:	6
		Nonlinear analysis of structures (2)	6
		Aerospace Materials (2)	6
		Artificial intelligence I (1)	6
		Robust Control (1)	6
		Digital control systems (1)	6
Thesis	30	Students must select one course among those offered by Sapienza	6
		Thesis	23
		Other training activities	1
Total ECTS 2nd Year	60	Total ECTS 2nd Year	60

² The number within parentheses indicates the course semester.

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PART 2 – Structure and courses of the double degree programme between Sapienza Master Degree in Space and Astronautics Engineering (*Laurea Magistrale in Ingegneria Spaziale e Astronautica*) and **IST Master Degree in Aerospace Engineering** (*Mestrado em Engenharia Aeroespacial*)

Table 2a – Structure of the double diploma

Students of	Sapienza Laurea Magistrale in Ingegneria Spaziale e Astronautica <i>Students must select the curriculum "Missions" or "Aerospace Engineering"</i>	IST Maestrado em Engenharia Aeroespacial (Space)	ECTS
1st year	Courses taken at Sapienza and transferrable to IST (table 2b)	Courses taken at IST and transferrable to Sapienza (table 2c)	60
2nd year	Courses taken at IST and thesis held at IST transferrable to Sapienza (table 2b)	Courses taken at Sapienza and thesis held at Sapienza transferrable to IST (table 2c)	60
Total ECTS			120

Table 2b.1 – Courses for students originally enrolled at Sapienza – Curriculum “Missions”

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First year held at Sapienza and courses recognized by IST			
Courses held at Sapienza	ECTS	Courses recognized by IST	
1st semester		1st semester	
Gasdinamica (Gas dynamics)	9	Coupled Phenomena	6
Meccanica del volo spaziale (Space flight mechanics)	9	Telecommunications	6
Control systems	9	Vibrations and Noise	6
2nd semester		Electronics	6
Costruzioni spaziali (Space structures)	9	Sensors and Systems	6
Propulsione Spaziale (Rocket Propulsion)	9	2nd semester	
Space missions and systems	9	Space Environment	6
Elettronica (Electronics)	6	Antennas and Propagation	6
		Aerodynamics II	6
		Project Management	6
		Aeroacoustics	6
Total ECTS 1st Year	60	Total ECTS 1st Year	60

Second year held at IST and courses recognized by Sapienza			
Courses recognized by Sapienza		Courses held at IST	ECTS
Altre conoscenze utili per l'inserimento ...	1	Students must select any 5 courses among the following³:	30
Artificial intelligence I	6	Artificial Intelligence and Decision Systems (1)	6
Space robotic systems	6	Autonomous Systems (1)	6
Space guidance and navigations systems	6	Computational Fluid Mechanics (1)	6
Elettronica dei sistemi spaziali	6	Computer Control (1)	6
Digital control systems	6	Coupled phenomena (1)	6
Traiettorie interplanetarie	6	Digital Systems Design (1)	6
Thesis	23	Distributed Real Time Control Systems (1)	6
		Microelectronics (1)	6
		Radar Systems (1)	6
		Sensors and systems (1)	6
		Space Mission Analysis and Design (1)	6
		Stand-Alone Power Supply Systems (1)	6
		Vibrations and Noise (1)	6
		Aeroacoustics (2)	6
		Antennas and Propagation (2)	6
		High frequency electronics (2)	6
		Instrumentation and measurements (2)	7,5
		Navigation systems (2)	6
		Space environment (2)	6
		Systems Programming (2)	7,5
		Thesis	30
Total ECTS 2nd Year	60	Total ECTS 2nd Year	60

³ The number within parentheses indicates the course semester.

Table 2b.2 – Courses for students originally enrolled at Sapienza – Curriculum “Aerospace Engineering”

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First year held at Sapienza and courses recognized by IST			
Courses held at Sapienza	ECTS	Courses recognized by IST	
1st semester		1st semester	
Compressible flows	9	Coupled Phenomena	6
Spaceflight mechanics	9	Telecommunications	6
Control systems	9	Vibrations and Noise	6
2nd semester		Electronics	6
Aerospace structures	9	Sensors and Systems	6
Space propulsion	9	2nd semester	
Space missions and systems	9	Space Environment	6
Students must select one course among the following:	6	Antennas and Propagation	6
Combustion	6	Aerodynamics II	6
Liquid rocket engines	6	Project Management	6
Solid rocket motors	6	Aeroacoustics	6
Total ECTS 1st Year	60	Total ECTS 1st Year	60

Second year held at IST and courses recognized by Sapienza			
Courses recognized by Sapienza		Courses held at IST	ECTS
Altre conoscenze utili per l'inserimento ...	1	Students must select any 5 courses among the following⁴:	30
Artificial intelligence I	6	Artificial Intelligence and Decision Systems (1)	6
		Autonomous Systems (1)	6
		Computational Fluid Mechanics (1)	6
		Computer Control (1)	6
Space robotic systems	6	Coupled phenomena (1)	6
		Digital Systems Design (1)	6
		Distributed Real Time Control Systems (1)	6
		Electronics (1)	6
Space guidance and navigations systems	6	Emissions (1)	6
		Microelectronics (1)	6
		Radar Systems (1)	6
		Sensors and systems (1)	6
Computational gas dynamics	6	Space Mission Analysis and Design (1)	6
		Stand-Alone Power Supply Systems (1)	6
		Vibrations and Noise (1)	6
Digital control systems	6	Aeroacoustics (2)	6
		Antennas and Propagation (2)	6
		High frequency electronics (2)	6
Aeroelasticity	6	Instrumentation and measurements (2)	7,5
		Navigation systems (2)	6
		Space environment (2)	6
Thesis	23	Systems Programming (2)	7,5
		Thesis	30
Total ECTS 2nd Year	60	Total ECTS 2nd Year	60

⁴ The number within parentheses indicates the course semester.

Table 2c – Courses for students originally enrolled at IST

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First year held at IST and courses recognized by Sapienza			
Courses held at IST	ECTS	Courses recognized by Sapienza	ECTS
1st semester			
Aerospace structures	6	Gasdinamica (Gas dynamics)	9
Space mission analysis and design	6	Costruzioni aerospaziali (Space structures)	9
Electronics	6	Control systems	9
Solid Mechanics	6		
Thermodynamics II	6	Meccanica del volo spaziale (Spaceflight mechanics)	9
2nd semester			
Aerodynamics II	6	Propulsione spaziale (Rocket Propulsion)	9
Space environment	6	Sistemi e missioni spaziali (Space missions & system	9
Project management	6	Elettronica (Electronics)	6
Propulsion	6		
Structural mechanics	6		
Total ECTS 1st Year	60	Total ECTS 1st Year	60

Second year held at Sapienza and courses recognized by IST			
Courses recognized by IST*	ECTS	Courses held at Sapienza	ECTS
		Students must select any 4 courses among the following⁵:	24
Aerospace Design	6	Liquid rocket engines (1)	6
Space Mission Analysis and Design	6	Multi-body space structures (2)	6
Integrated Avionic Systems	6	Solid rocket motors (2)	6
Laminated Composite Materials	6	Space guidance and navigations systems (2)	6
Aerospace Structures	6	Space robotic systems (1)	6
		Spacecraft design (1)	6
<i>*As an alternative, equivalences can be given to other courses that are present in the MEAer curricula.</i>		Students must select one course among the following:	6
		Aerospace Materials (2)	6
		Artificial intelligence I (1)	6
		Robust Control (1)	6
		Digital control systems (1)	6
Thesis	30	Students must select one course among those offered by Sapienza	6
		Thesis	23
		Other training activities	1
Total ECTS 2nd Year	60	Total ECTS 2nd Year	60

⁵ The number within parentheses indicates the course semester.

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Table 3 – Equivalence between the Italian and the Portuguese grading systems

Sapienza, Italy	IST, Portugal
≤17	≤9
18-22	10-13
23-25	14-15
26-27	16-17
28-29	18-19
30-30 cum laude	19-20

Table 4 – Equivalence between the Italian and the Portuguese University grading systems for final dissertation

Sapienza, Italy	IST, Portugal
Fail	
Less than 90 and 90	Sufficient
between 91 and 100: 91 92-94 95-96 97-98 99-100	Good
between 101 and 109: 101-102 103-104 105-106 107-109	Very good
110 and 110 cum laude.	Excellent

Information about the courses taught at Sapienza are available at web page:
<http://www.ingaero.uniroma1.it>.

Information about the courses taught at IST are available at www.tecnico.ulisboa.pt.