Addendum nº1

Annex to the Cooperation Agreement – Dual Master between IST and KTH

Dual Master, IST MEEC and KTH TSCRM
Academic Years 2020/21-2025/26

KTH Royal Institute of Technology, with legal domicile, Kungliga Tekniska Högskolan, SE-100 44 STOCKHOLM (Sweden) and Instituto Superior Técnico, with legal domicile, Avenida Rovisco Pais, 1049-001 Lisboa, hereby agree that:

- Other courses than stated in the agreement can be possible to include in the study plan. With referral to the actual study plan per academic year that can be subject to change.

- Students must set up an individual study plan that needs to be approved by the programme director.

Annex to the Cooperation Agreement – Dual Master between IST and KTH

Dual Master, IST MEEC and KTH TSCRM
Academic Years 2020/21-2025/26

Degree Programme at IST:	**Master Programme in Electrical and Computer Engineering (MEEC), Major: Systems, Decision and Control (120 ECTS), in 20/21 Major: Control, Robotics and Artificial Intelligence (120 ECTS), 21/22-25/26**
Degree awarded:	M.Sc.
Language of instruction:	English
Language requirements:	English language proficiency according to the general admission requirements for master's programmes at IST
Application deadline:	June 15
Entrance admission criteria:	Bachelor of Science (180 ECTS) or equivalent
Degree Programme at KTH:	**Master Programme in Systems, Control and Robotics (120 ECTS).** Minimum 60 credits
Degree awarded:	M.Sc.
Language of instruction:	English
Language requirements:	English language proficiency according to the general admission requirements for master's programmes at KTH
Application deadline:	April 15
Entrance admission criteria:	Bachelor of Science (180 ECTS) or equivalent
Number of students:	Maximum of 2/year in each direction

Application and admission:
Candidates will apply for the dual programmes during their last bachelor year or in the first year of the Master program. The admission will be granted based on a learning agreement of 120 credits. KTH and IST will exchange the list of admitted students in time of the deadlines of admittance.

Students are selected and admitted on the programme on a case-by-case basis based on their academic results, prerequisite requirements, motivation and language skills. The selection is carried out in collaboration between the two institutions. Admission of students is always at the discretion of the receiving institution, subject to approval by the receiving school/department.

Registration:

Students engaged in the dual degree programme will be registered at the both institutions during the period of their Cluster dual master programme. They will pay the regular tuition fee at their home institution during the entire period of their Cluster dual master programme, and will be exempted from the payment of a tuition fee at the host institution.

Students will fill out a study plan for fulfilling the requirements of the programme at both institutions. Changes to the learning agreement must be approved by both institutions according to its regulations.

Master's thesis/Final Degree Project

A Master's Thesis/Final Degree project of 30 credits shall be performed according to the rules and regulations of the institution where is presented.

Deliberations, Transcript of record and diploma

A Transcript of Records will be exchanged between both institutions whenever needed for the validation of studies.

Schematic Study Plan

Option 1			
Year	**Institution**	**Studies**	**Remarks**
1	IST	Mandatory and elective courses	60 ECTS
2	KTH	Courses and Degree project (co-supervised)	30+30 ECTS

Option 2			
Year	**Institution**	**Studies**	**Remarks**
1	KTH	Mandatory and elective courses	60 ECTS
2	IST	Courses and Degree project (co-supervised)	30+30 ECTS

The schematic study plan is applicable to students originated from KTH or IST indifferently. The detailed study plan must be defined by the academic coordinators for each student.

FIRST YEAR OF STUDIES	
Students must obtain a minimum of 60 ECTS in courses	
IST	**KTH**
Autumn Semester (minimum 30ECTS)	**Autumn Semester**
Mandatory Courses (12 ECTS):	**Mandatory courses** (15 ECTS):
Image Processing and Vision – 6 ECTS	EL1820 Modelling of dynamical systems 6.0 ECTS
Optimization and Algorithms – 6 ECTS	EL2221 Sustainable Systems and Control Eng 1.5 ECTS
	AK2036 Theory and Methodology of Science 7.5 ECTS
Elective Courses (choose 18 ECTS from the list below):	
Engineering Management Projects – 6 ECTS	**Elective Courses** (choose 15 ECTS from below):
Machine Learning – 6 ECTS	DD2380 Artificial Intelligence – 6 ECTS
Computer Controlled Systems and Identification – 6 ECTS	DD2431 Machine Learning – 6 ECTS
Artificial Intelligence and Decision Systems – 6 ECTS	EH2720 Management of projects – 7.5 ECTS
Distributed Real Time Control Systems - 6 ECTS	EL2320 Applied Estimation – 7.5 ECTS
Entrepreneurship, Innovation and Technology Transfer - 6 ECTS	DD2423 Image Analysis and Computer Vision 7.5 ECTS
	EL2620 Nonlinear control – 7.5 ECTS
Spring Semester (minimum 30ECTS)	**Spring Semester**
Mandatory Courses (6 ECTS):	**Mandatory courses** (pick 1 of) (7.5 ECTS):
Robotics – 6 ECTS	EL2450 Hybrid and Embedded Control Syst 7.5 ECTS
	EL2520 Control Theory and Practice – 7.5 ECTS
Elective Courses (choose 24 ECTS from the list below):	
Communication Theory – 6 ECTS	**Elective Courses** (22.5 ECTS):
Linear and Nonlinear State-Space Control Theory – 6 ECTS	EL2450 Hybrid and Embedded Ctrl Systems – 7.5 ECTS
Digital Signal Processing – 6 ECTS	SF2950 Applied Mathematical Statistics – 7.5 ECTS
Computer Networks and Internet – 6 ECTS	EQ2400 Adaptive signal processing – 6 ECTS
Embedded Computational Systems - 6 ECTS	EL2520 Control Theory and Practice – 7.5 ECTS
Audio and Video Communications - 6 ECTS	EK2350 Microsystem Technology – 7.5 ECTS
	DD2424 Deep Learning in Data Science- 7,5 ECTS

SECOND YEAR OF STUDIES

Students must obtain a minimum of 60 ECTS
consisting of 30 ECTC courses and a 30 ECTS thesis project

IST	KTH
Autumn Semester:	**Autumn Semester:**
Mandatory courses *(6 ECTS):*	**Mandatory courses** *(16.5 ECTS):*
Autonomous Systems – 6 ECTS	DD2425 Robotics and autonomous systems – 9 ECTS
	AK2036 Theory and Methodology of Science 7.5 ECTS
Elective Courses *(choose 24 ECTS from the list below):*	
Image Processing and Vision – 6 ECTS	**Elective Courses** *(choose 13.5 ECTS from below):*
Computer Controlled Systems and Ident. – 6 ECTS	DD2380 Artificial Intelligence – 6 ECTS
Optimization and Algorithms – 6 ECTS	DD2431 Machine Learning – 6 ECTS
Artificial Intelligence and Decision Systems – 6 ECTS	EH2720 Management of projects – 7.5 ECTS
Machine Learning – 6 ECTS	EL2320 Applied Estimation – 7.5 ECTS
	DD2423 Image Analysis and Computer Vision 7.5 ECTS
	EL2620 Nonlinear control – 7.5 ECTS
Spring Semester: Preferably none, but at most one of the following courses in parallel with the thesis work (subject to approval by the supervisor)	**Spring Semester:** Preferably none, but at most one of the following courses in parallel with the thesis work (subject to approval by the supervisor)
Communication Theory – 6 ECTS	EL2450 Hybrid and Embedded Ctrl Systems – 7.5 ECTS
Linear and Nonlinear State-Space Ctrl Theory 6 ECTS	SF2950 Applied Mathematical Statistics – 7.5 ECTS
Robotics – 6 ECTS	EQ2400 Adaptive signal processing – 6 ECTS
Digital Signal Processing – 6 ECTS	EL2520 Control Theory and Practice – 7.5 ECTS
Embedded Computational Systems – 6 ECTS	EK2350 Microsystem Technology – 7.5 ECTS
Computer Networks and Internet – 6 ECTS	DD2424 Deep Learning in Data Science -7,5 ECTS
Other courses can be chosen with the agreement of the supervisor	*Other courses can be chosen with the agreement of the supervisor*

Thesis project 30 ECTS

Period of 21/22 – 25/26

FIRST YEAR OF STUDIES	
Students must obtain a minimum of 60 ECTS in courses	
IST	**KTH**
Autumn Semester (minimum 30ECTS)	**Autumn Semester**
Mandatory Courses *(12 ECTS):*	**Mandatory courses** *(15 ECTS):*
Image Processing and Vision – 6 ECTS	EL1820 Modelling of dynamical systems 6.0 ECTS
Optimization and Algorithms – 6 ECTS	EL2221 Sustainable Systems and Control Eng 1.5 ECTS
	AK2036 Theory and Methodology of Science 7.5 ECTS
Elective Courses *(choose 18 ECTS from below):*	
Robotics – 6 ECTS	**Elective Courses** *(choose 15 ECTS from below):*
Machine Learning – 6 ECTS	DD2380 Artificial Intelligence – 6 ECTS
Control of Cyber-Physical Systems– 6 ECTS	DD2431 Machine Learning – 6 ECTS
Artificial Intelligence and Decision Systems – 6 ECTS	EH2720 Management of projects – 7.5 ECTS
Systems Programming - 6 ECTS	EL2320 Applied Estimation – 7.5 ECTS
Deep Learning - 6 ECTS	DD2423 Image Analysis and Computer Vision 7.5 ECTS
	EL2620 Nonlinear control – 7.5 ECTS
Spring Semester (minimum 30ECTS)	**Spring Semester**
Mandatory Courses *(6 ECTS):*	**Mandatory courses** *(pick 1 of) (7.5 ECTS):*
Autonomous Systems – 6 ECTS	EL2450 Hybrid and Embedded Control Syst 7.5 ECTS
	EL2520 Control Theory and Practice – 7.5 ECTS
Elective Courses *(choose 24 ECTS from below):*	
Distributed Predictive Control and Estimation - 6 ECTS	**Elective Courses** *(22.5 ECTS):*
Multivariate, Nonlinear, and Optimal Control – 6 ECTS	EL2450 Hybrid and Embedded Ctrl Systems – 7.5 ECTS
Digital Signal Processing – 6 ECTS	SF2950 Applied Mathematical Statistics – 7.5 ECTS
Processing Big Data – 6 ECTS	EQ2400 Adaptive signal processing – 6 ECTS
Distributed Real-Time Control Systems - 6 ECTS	EL2520 Control Theory and Practice – 7.5 ECTS
Modelling and Automation of Industrial Proc. - 6 ECTS	EK2350 Microsystem Technology – 7.5 ECTS
Pick one of "Engineering Management Projects" or "Entrepreneurship, Innovation, and Technology Transfer" – 6 ECTS	DD2424 Deep Learning in Data Science- 7,5 ECTS

SECOND YEAR OF STUDIES	
Students must obtain a minimum of 60 ECTS **consisting of 30 ECTC courses and a 30 ECTS thesis project**	
IST	**KTH**
Autumn Semester:	**Autumn Semester:**
Mandatory courses *(6 ECTS):*	**Mandatory courses** *(16.5 ECTS):*
Robotics – 6 ECTS	DD2425 Robotics and autonomous systems – 9 ECTS
	AK2036 Theory and Methodology of Science 7.5 ECTS
Elective Courses *(choose 24 ECTS from below)*:	
Image Processing and Vision – 6 ECTS	**Elective Courses** *(choose 13.5 ECTS from below):*
Control of Cyber-Physical Systems – 6 ECTS	DD2380 Artificial Intelligence – 6 ECTS
Optimization and Algorithms – 6 ECTS	DD2431 Machine Learning – 6 ECTS
Artificial Intelligence and Decision Systems – 6 ECTS	EH2720 Management of projects – 7.5 ECTS
Machine Learning – 6 ECTS	EL2320 Applied Estimation – 7.5 ECTS
Deep Learning – 6 ECTS	DD2423 Image Analysis and Computer Vision 7.5 ECTS
Systems Programming – 6 ECTS	EL2620 Nonlinear control – 7.5 ECTS
Spring Semester: Preferably none, but at most one of the following courses in parallel with the thesis work (subject to approval by the supervisor)	**Spring Semester:** Preferably none, but at most one of the following courses in parallel with the thesis work (subject to approval by the supervisor)
Distributed Predictive Control and Estimation 6 ECTS	EL2450 Hybrid and Embedded Ctrl Systems – 7.5 ECTS
Multivariate, Nonlinear, and Optimal Control 6 ECTS	SF2950 Applied Mathematical Statistics – 7.5 ECTS
Processing Big Data – 6 ECTS	EQ2400 Adaptive signal processing – 6 ECTS
Digital Signal Processing – 6 ECTS	EL2520 Control Theory and Practice – 7.5 ECTS
Distributed Real-Time Control Systems – 6 ECTS	EK2350 Microsystem Technology – 7.5 ECTS
Autonomous Systems – 6 ECTS	DD2424 Deep Learning in Data Science -7,5 ECTS
Spoken Language Processing – 6 ECTS	
Other courses can be chosen with the agreement of the supervisor	*Other courses can be chosen with the agreement of the supervisor*
Thesis project 30 ECTS	

Contact persons:

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Academic responsible	**Academic responsible**
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This Annex has been signed in two originals in English; one original is kept at each partner institution.

Date:

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