

Appendix C

CLUSTER Dual Master Agreement between

Instituto Superior Técnico (IST) and KTH-Royal institute of Technology (KTH)

Duration: Academic Year 14/15 to 19/20

Degree programme at IST:	Master Programme in Electrical and Computer Engineering (MEEC) Major in Systems, Decision and Control (120 ECTS). Minimum: 60 ECTS.
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
Entrance admission criteria:	Bachelor of science in Engineering (180 ECTS) or equivalent level.
Application deadline	June 15
Degree programme at KTH:	Master Programme in Systems, Control and Robotics (SCR) (120 ECTS) Minimum: 60 ECTS.
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
Entrance admission criteria:	Bachelor's degree, equivalent to a Swedish Bachelor's degree (180 ECTS), from a university recognized by government or accredited by other recognized organization. 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 university will exchange the list of admitted students in time of the deadlines of admittance. After having been recommended by IST, students will apply to KTH according to the regular procedure for exchange students. Information is available at http://www.kth.se/en/studies/exchange
Application deadline	April 15
Number of students	2 per year

Notes: 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

The Master's Thesis 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 + Master Thesis (co-supervised)	30+30 ECTS
Option 2			
Year	Institution	Studies	Remarks
1	KTH	Mandatory and elective courses	60 ECTS
2	IST	Courses + Master Thesis (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.			

Contacts:

<i>Academic responsible for the programme (MEEC):</i> Prof. Pedro Lima	<i>Academic responsible for the programme (SCR)</i> Prof. Patric Jensfelt
<i>Contact person:</i> Silvia Santos, International Office (silvia.santos@ist.utl.pt)	<i>Contact person</i> Manja Schubert, International Coordinator

Signatures:

Date:	Date:
For IST	For KTH
Prof. Arlindo Oliveira President, Instituto Superior Técnico	Prof. Stefan Östlund Dean, School of Electrical Engineering - KTH
Prof. Isabel Trancoso, Chairman of Department	Prof. Per Berglund, Vice Dean of Faculty, KTH Cluster Dual Masters coordinator

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FIRST YEAR STUDIES	
IST	<p>KTH - <u>Specific requirements</u>: A Bachelor's degree in Science or Engineering including at least 1.5 years of in depth studies within one main subject area. In addition, the degree must include a project work corresponding to approximately 10 weeks of full-time work. The student should have taken courses equivalent to the following KTH courses:</p> <ul style="list-style-type: none"> - SF 1624 Algebra and Geometry - SF 1625 Calculus in One Variable - SF 1626 Calculus in Several Variables - SF 1901 Probability Theory and Statistics - SF 1634 Differential Equations II - EL 1110 Automatic Control, General Course - DD 1343 Computer Science and Numerical Methods , part 1 <p>Exceptions can be made for the required course in automatic control if such a course is instead taken during the first semesters of the Master programme.</p>
Students must obtain a minimum of 60 ECTS in courses	
<u>Autumn Semester</u> (minimum of 30 ECTS)	
<p>Mandatory Courses (12 ECTS):</p> <ul style="list-style-type: none"> • Image Processing and Vision (6 ECTS) • Optimization and Algorithms (6 ECTS) 	<p>Mandatory Courses (15 ECTS):</p> <ul style="list-style-type: none"> • EL1820 Modeling and Dynamic Systems (6 ECTS) • EL2221 Sustainable Systems and Control Eng. (1,5 ECTS) • AK 2036 Theory and Methodology of Science (7,5 ECTS)
<p>Elective Courses (choose 18 ECTS from the list below):</p> <ul style="list-style-type: none"> • Engineering Management Projects (6 ECTS) • Machine Learning (6 ECTS) • Computer Controlled Systems and Identification (6 ECTS) • Artificial Intelligence and Decision Systems (6 ECTS) • Distributed real time Control Systems (6 ECTS) • Entrepreneurship, Innovation and technology Transfer (6 ECTS) 	<p>Elective Courses (choose 15 ECTS from the list below):</p> <ul style="list-style-type: none"> • DD2380 Artificial Intelligence (6 ECTS) • DD2431 Machine Learning (6 ECTS) • EH2720 Management of Projects (7,5 ECTS) • EL2320 Applied Estimation (7,5 ECTS) • DD2423 Image Analysis and Computer Vision (7,5 ECTS) • EL2620 Nonlinear Control (7,5 ECTS)
<u>Spring Semester</u> (minimum of 30 ECTS)	
<p>Mandatory Courses (6 ECTS):</p> <ul style="list-style-type: none"> • Robotics (6.0 ECTS) 	<p>Mandatory Courses (pick at least one of) (7,5 - 15 ECTS):</p> <ul style="list-style-type: none"> • EL2450 Hybrid and Embedded Control Systems (7,5 ECTS) • EL2520 Control Theory and Practice (7,5 ECTS)
<p>Elective Courses (choose 24 ECTS from the list below):</p> <ul style="list-style-type: none"> • Communication Theory (6 ECTS) • Linear and Nonlinear State-Space Control Theory (6 ECTS) • Digital Signal processing (6 ECTS) • Embedded Computational Systems (6 ECTS) • Audio and Video Communications (6 ECTS) 	<p>Elective Courses (15-22,5 ECTS):</p> <ul style="list-style-type: none"> • EL2450 Hybrid and Embedded Control Systems (7,5 ECTS) • SF2950 Applied Mathematical Statistics (7,5 ECTS) • EQ2400 Adaptive Signal Processing (6 ECTS) • EL2520 Control Theory and Practice (7,5 ECTS) • EK2350 Microsystem Technology (7,5 ECTS) • DD2427 Image Bases Recognition and Classification (6 ECTS)

SECOND YEAR STUDIES	
IST – <u>Specific requirements</u> : students entering IST must satisfy first year's admission requirements. Additionally, students must have obtained the courses equivalent to mandatory courses of the programme or propose a 2 nd year programme fulfilling the degree requirements. The student should have chosen a master thesis topic in agreement with one supervisor at IST. The list of proposed topics is made available during the spring semester of the 1 st master year.	KTH – <u>Specific Requirements</u> : students entering KTH must satisfy first year's admission requirements. Additionally, students must have obtained the ECTS of courses equivalent to the mandatory courses of the KTH programme or propose a second year programme fulfilling the KTH degree requirements. The student must have selected a track in agreement with the programme coordinator at KTH.
Students must obtain a minimum of 60 ECTS consisting of 30 ECTS courses and a 30 ECTS thesis project	
<u>Autumn Semester</u>	
Mandatory Courses (6 ECTS):	Mandatory Courses (16,5 ECTS):
<i>Autonomous Systems</i> (6 ECTS)	<ul style="list-style-type: none"> • 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): <ul style="list-style-type: none"> • Image Processing and Vision (6 ECTS) • Computer Controlled Systems and Ident. (6 ECTS) • Optimization and Algorithms (6 ECTS) • Artificial Intelligence and Decision Systems(6 ECTS) • Machine Learning (6 ECTS) 	Elective Courses (13,5 ECTS): <ul style="list-style-type: none"> • DD2380 Artificial Intelligence (6 ECTS) • DD2431 Machine Learning (6 ECTS) • EH2720 management of Projects (7,5 ECTS) • EL2320 Applied estimation (7,5 ECTS) • DD2423 Image analysis and Computer Vision (7,5 ECTS) • EL2620 nonlinear Control (7,5 ECTS)
<u>Spring Semester</u>	
<ul style="list-style-type: none"> • Communication Theory (6 ECTS) • Linear and Nonlinear State-Space Ctrl. Theory (6 ECTS) • Robotics (6 ECTS) • Digital Signal processing (6 ECTS) • Computer Networks and Internet (6 ECTS) 	<ul style="list-style-type: none"> • EL2450 Hybrid and Embedded Ctrl. Systems (7,5 ECTS) • SF2950 Applied Mathematical Statistics (7,5 ECTS) • EQ2400 Adaptive Signal Processing (6 ECTS) • EL2520 Control Theory and Practice (7,5 ECTS) • EK2350 Microsystem Technology(7,5 ECTS) • DD2427 Image Based Recog. And Class. (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	