

Appendix 1 to the
Cooperation agreement between IST and KTH
Concerning
DUAL MASTER'S DEGREE

Dual Master in

**Electrical and Computer Engineering (MEEC),
Major: Telecommunications
at IST Lisboa**

and

**Information and Network Engineering (TINNM)
at KTH Royal Institute of Technology**

KTH/School of Electrical Engineering

Master's Degree in Information and Network Engineering
2 year programme (120 credits), language of instruction: English

Admission criteria

Basic eligibility requirements

A completed Bachelor's degree, equivalent to a Swedish Bachelor's degree (180 university credits), from a university recognized by government or accredited by other recognized organisation. A good knowledge of written and spoken English. Applicants must provide proof of their proficiency in English.

Specific eligibility requirements

A Bachelor's degree of 180 ECTS credits, or equivalent, including:

- at least 6 months of studies (corresponding to 30 ECTS) within electrical engineering, electronics, computer engineering or computer science.
- basic mathematics courses within single variable and multivariable calculus, linear algebra and mathematical statistics or probability theory.
- at least one course in computer programming (preferably C or Python) with a passing grade.
- a course on signals and systems with a passing grade, including material about time-continuous and time-discrete systems, sampling, linear filters and systems, and transform methods (Fourier, Laplace and Z).

It is recommended that the applicant has experience of problem solving using numerical computing languages like MATLAB.

Selection process

Students are selected and admitted to the program 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.

The nomination and application to KTH has to be done by April 15 for the upcoming academic year.

The admission of up to two students per academic year is possible.

Specific requirements for second year students

Second year 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 program or propose a second year program fulfilling the KTH degree requirements. The student must have selected a track in agreement with the program coordinator at KTH.

KTH degree requirements

The minimum requirements for conferring KTH degree are the following:

- **60 credits** in KTH according to approved Study plan, which do not necessarily include the thesis.
- in practice first year or second year students at KTH are possible.
- thesis: 30 ECTS

IST Lisboa

Electrical and Computer Engineering (MEEC), Major: Telecommunications

2 year programme (120 credits), language of instruction: English

Language of instruction: English

Admission criteria

Basic eligibility requirements

A Bachelor of science in engineering (180 ECTS) or equivalent level.

Selection process

Students are selected and admitted to the program 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.

The number of students for studies within the program in each direction needs to be communicated by October 1st for the coming academic year.

The admission of up to two students per academic year is possible.

Specific requirements for second year students

Second year students entering IST must satisfy first year's admission requirements. Additionally, students must have obtained the courses equivalent to the mandatory courses of the program or propose a second year program 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 first master year.

IST degree requirements

- the minimum requirements for conferring the above mentioned degrees are the following:
 - o **60 ECTS** in IST, which do not necessarily include the master thesis.
- in practice first year or second year at IST are possible.

FIRST YEAR OF STUDIES

Students must obtain a minimum of 60 ECTS in courses

IST	KTH
Autumn Semester (minimum 30ECTS)	Mandatory courses:
Mandatory Courses (24 ECTS):	EP2120 Internetworking (7.5 credits)
Radio Wave Propagation (6 ECTS)	EQ1220 Signal Theory (7.5 credits)
Wireless Telecommunications Systems (6 ECTS)	EQ2223 The Sustainable Information and Network Engineer (1.5 credits) – covers one year!
Data Coding and Compression (6 ECTS)	EQ2310 Digital Communications (9 credits)
Telecommunication Networks (6 ECTS)	AK2036 Theory and Methodology of Science with Applications (7.5)
Elective Courses (choose a minimum of 6 ECTS from the list below):	4 tracks within the program to be selected:
Audio and Video Communications (6 ECTS)	Communications Engineering (COE):
Microwaves (6 ECTS)	Mandatory Courses:
Networks and Internet Services (6 ECTS)	EQ2300 Digital Signal Processing (7.5 credits)
Entrepreneurship, Innovation and Technology Transfer (6 ECTS)	EQ2411 Advanced Digital Communications (7.5 credits)
Communication Theory (6 ECTS)	EP2950 Wireless Networks (7.5 credits)
Optimization and Algorithms (6 ECTS)	Information Engineering (INF):
Spring Semester (minimum 30ECTS)	Mandatory Courses:
Mandatory Courses (18 ECTS):	EQ2300 Digital Signal Processing (7.5 credits)
Digital Transmission (6 ECTS)	EQ2401 Adaptive Signal Processing (7.5 credits)
Mobile Communication Systems (6 ECTS)	EQ2341 Pattern Recognition and Machine Learning (7.5 credits)
Optical Fibre Telecommunications Systems (6 ECTS)	Multimedia Processing and Analysis (MMB):
	Mandatory Courses:
Elective Courses (choose a minimum of 12 ECTS from the list below):	EQ2330 Image and Video Processing (7.5 credits)
Telecommunications Systems (6 ECTS)	EQ2321 Speech and Audio Processing (7.5 credits)
Computer Networks and Internet (7.5 ECTS)	EQ2341 Pattern Recognition and Machine Learning (7.5 credits)
Network Algorithms and Performance (6 ECTS)	Networked Systems (NWS)
Object Oriented Programming (6 ECTS)	Mandatory Courses:
Antennas (6 ECTS)	EP2500 Networked Systems Security (7.5 credits)
	EP2200 Queuing Theory and Teletraffic Systems (7.5 credits)
	EP2950 Wireless Networks (7.5 credits)
	In addition to the mandatory courses there is a range of recommended courses in the program https://www.kth.se/student/kurser/program/TINNM/20172/arskurs1?l=en

SECOND YEAR OF STUDIES	
Students must obtain a minimum of 60 ECTS consisting of 30 ECTS courses and a 30 ECTS thesis project	
IST	KTH
Autumn Semester:	Mandatory courses (ECTS):
Engineering Management Projects (6 ECTS)	EQ2223 The Sustainable Information and Network Engineer (1.5 credits) – covers one year!
Autonomous Systems (6 ECTS)	Course of one of the offered tracks:
Entrepreneurship, Innovation and Technology Transfer (6 ECTS)	Communications Engineering (COE): EQ2444 Project in Communication Engineering (7.5 credits)
Radio Wave Propagation (6 ECTS)	Information Engineering (INF): EQ2443 Project in Information Engineering (7.5 credits)
Wireless Telecommunications Systems (6 ECTS)	
Data Coding and Compression (6 ECTS)	Multimedia Processing and Analysis (MMB): EQ2445 Project in Multimedia Processing and Analysis (7.5 credits)
Telecommunication Networks (6 ECTS)	
Audio and Video Communications (6 ECTS)	Networked Systems (NWS): At least one of the courses: EP2520 Networked Systems Security (7.5 credits), EP2410 – Network Analytics IK2213 Network Services and Internet-based Applications (7.5 credits)
Microwaves (6 ECTS)	
Communication Theory (6 ECTS)	
Networks and Internet Services (6 ECTS)	
Optimization and Algorithms (6 ECTS)	
Spring Semester:	
Digital Transmission (6 ECTS)	Recommended courses: https://www.kth.se/student/kurser/program/TINNM?l=en
Mobile Communication Systems (6 ECTS)	
Optical Fibre Telecommunications Systems (6 ECTS)	
Telecommunications Systems (6 ECTS)	
Antennas (6 ECTS)	
Object Oriented Programming (6 ECTS)	
<i>Other courses can be chosen with the agreement of the supervisor</i>	<i>Other courses can be chosen with the agreement of the supervisor</i>
Thesis project 30 ECTS	

KTH, School of Electrical Engineering,

Detailed information on the courses can be found in our web site. Please, click on the selected subject at

<https://www.kth.se/student/kurset/program/TINNM?l=en>

IST Lisboa

Detailed information on the courses in the field of X can be found in our web site:

<https://fenix.tecnico.ulisboa.pt/cursos/meec/curriculo>

Validity of the Agreement

The agreement is valid from intake in the academic year 2017/18 to the last intake for the academic year 2019/2020.

This Annex has been signed in two originals in English, one original is kept at each partner institution.

Date:

Lisboa



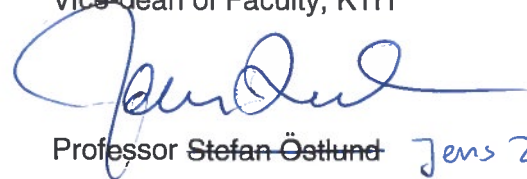
Professor Arlindo Oliveira
Dean, IST Lisboa

Date: 21 March 2018

Stockholm



Professor Per Berglund
Vice-dean of Faculty, KTH



Professor ~~Stefan Östlund~~ Jens Zander
Dean, School of Electrical Engineering,
KTH and Computer Science