

# School of Engineering Sciences: Strategy for Internationalisation in Education

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Version 2017-03-01

## 1 Background

Both KTH and SCI consider it to be an important aim to be an active member of the international higher education landscape. This has been formulated in the development plans. In the development plan of KTH for the period 2013 — 2017 it is stated:

KTH:s studenter kommer idag från ett flertal länder och våra campus har en internationell och mångkulturell prägel, vilket bidrar till att höja kvaliteten i såväl programutbud som i själva utbildningen. KTH ska därför eftersträva att bibehålla och utveckla internationaliseringen av utbildningen.

In particular, the following goals are formulated:

- Fler betalande studenter.
- Fler utresande utbytesstudenter.
- Under perioden ska KTH också sträva efter att ingå fler strategiska allianser med internationella lärosäten. Prioriterade regioner är EU, USA, Brasilien, Indien, Kina och Sydostasien.

SCI's development plan for the period 2013 — 2017 emphasizes concrete problems:

Skolan har tidigare legat i topp på KTH när det gäller utresande utbytesstudenter men det finns tecken som tyder på att färre av våra studenter reser ut. Målet är att 80% av våra studenter har tillbringat minst en termin utomlands under sina studier när de tar civilingenjörsexamen.

## 2 State

### 2.1 Exchange agreements

During the previous years, the exchange agreements have been revised heavily in order to enhance the balance of incoming and outgoing students. This meant in particular to identify partners which have the potential to attract SCI students. The balance of incoming to outgoing students has been stabilized to around 3:2 (HST: 4:3).

## **2.2 Double Degree (civil engineering and master)**

SCI has a number of double diploma and other dual degree agreements. Most of these agreements have been signed with KTH strategic partners. The school's administration capacity has reached a limit with respect to the number of incoming students. The structure of the agreements is very good with respect to quality and quantity. New agreements should only be signed in exceptional situations. However, the number of incoming students exceeds by far the number of outgoing students. This fact requires a critical evaluation of the existing agreements.

A particularly important activity is the creation of double master programmes with strategic partners (ex "Railway Engineering" with University of Illinois Urbana-Champaign).

The existing cooperation within N5T has been of varying success so far. The programme in "Applied and Engineering Mathematics" has been stopped because of a too small number of applicants. The programme in "Maritime Engineering" has reasonable success. We do not expect that the situation with respect to N5T programmes will change.

## **2.3 Projects within Erasmus+**

In the latest call, two projects within the Capacity Building action have been accepted where teachers at SCI are partners ("International Diploma for School Teachers in STEM Education", "IT-Based International Diploma and Professional Certificate in Clinical Toxicology").

The school was the coordinator of the Erasmus Mundus Joint Master Degree programme "Computer Simulation for Science and Engineering" (COSSE). COSSE has been developed very successfully during the support period. Since this programme is well established at the market, it will be continued as a joint master programme.

## **2.4 European Institute of Innovation and Technology (EIT)**

KTH and, in particular, SCI is a partner in the KIC InnoEnergy. Although the corresponding master programme is managed by EES, a larger number of students (2015: 16) is in fact following the Nuclear Engineering master programme. A number of courses in the area of Nuclear Engineering received the KIC label thus being officially acknowledged as part of the educational activities.

In December 2014, two new KICs with KTH participation have been elected: InnoLife (Health of an aging population) and Raw Materials (Material Science). If the need arises, SCI will contribute to the creation of master courses within these programmes.

## **2.5 Incoming paying students**

The number of paying students enrolled in our master programmes in 2016 is 62. This is a huge increase from the previous years (13 in 2013, 38 in 2014, 32 in 2015).<sup>1</sup> This number is larger than the already high expectation in the president's contract. The most attractive programmes for paying students so far are Vehicle Engineering, Engineering Mechanics, Aerospace Engineering.

Recently, an agreement with the University of the Chinese Academy of Sciences (UCAS) on Study Abroad activities in the area of physical sciences has been established on request of UCAS. Since this partner is an excellence university, it is a promising

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<sup>1</sup>These numbers do not include EMINE students who are registered at EES.

activity with great potential: We expect highly capable students, and the marketing potential of SCI in China is great.

### 3 Strategic Goals

SCI has the following strategic goals:

- Balance the number of incoming and outgoing students.
- Attractivity for paying students! We expect that there is a lot of potential for the programmes in Mathematics and Physics. However, some programmes have already reached their capacity limits.
- Identify possible partner countries for both student/staff mobility. So far, only a minor number of exchange agreements include staff mobility. An even smaller number of exchanges with teaching aims have been carried out.
- Identify possible member countries for Erasmus+ advanced instruments.
- Identify HEIs in partner countries for inclusion. These HEIs must be attractive to our students. A starting point are the strategic partners of KTH. This may also include that some agreements will not be renewed.
- Strengthen cooperation with stakeholders, in particular industry and public partners.
- Summer Study-Abroad courses, internships and summer courses are a unique possibility for marketing SCI. We intend to support and initiate such actions.

### 4 Actions

#### 4.1 Exchange agreements

Given the serious restrictions for Erasmus students exchange, future exchange agreements should be used, in the first place, for supporting Dual Master agreements, and then for establishing collaborations with strategically chosen universities. Here, excellence of the partner and students' interests are the selection criteria. Particular promising is the ongoing creation of a Dual Master programme with UIUC (Railway Engineering). The school has been contacted by two other US universities: University of Washington, Seattle (Aerospace Engineering), and ERAU, Prescott (Vehicle Engineering).

It is not quite clear how to use the N5T and CLUSTER networks.

*Action:* It is important and critical that all PA take their responsibility in maintaining and marketing their Double Degree as well as dual master programmes! (Vice-GA, PA) This includes active marketing. Necessary support will be provided by the exchange coordinators. (kansli)

*Action:* The success of exchange will be evaluated in more detail. Conclusions will be implemented. (kansli)

*Action:* Documents on good practices will be created. In particular, responsibilities will be defined more explicit. (kansli)

*Action:* A particular group of (incoming) students are trainees. Create a good practices document for them (GA, vice-GA, kansli)

## 4.2 Other projects within Erasmus+

### Credit mobility

This has already been discussed in Exchange agreements. The ICM tools are not attractive because of restricted funds.

### Joint Master Degrees

The support of JMD consortia has been reduced from five intakes to three intakes before the application for continuous funding after a successful Quality Review. Given the experiences with the existing EMMC a much steeper startup phase for establishing a programme is necessary. Consequently, the school will encourage existing master programmes which have already many third-country applicants (and students!) to consider the creation of a JMD programme. Existing research cooperations should be used for these purposes.

We should be aware of the fact that most of these collaborations (and also exchange programmes) start with the interest of individual teachers. A good starting point might be the document “Joint programmes from A to Z: A reference guide for practitioners”<sup>2</sup> and the checklist created by IRO.

*Action:* We will make aware our academic staff of the opportunities and procedures for establishing a JMD (vice-GA, IRO)

### Strategic partnerships, Capacity building

*Action:* The vice-GA informs, motivates, and supports PAs for, respectively in, establishing Strategic partnerships.

### Knowledge alliances

*For the time being, they seem to be out of reach.*

### General

*Action:* The vice-GA is responsible for close contact with IRO, UHR, and other actors in education internationalisation.

*Action:* Collecting results and identifying best practices in Erasmus+ projects (vice-GA)

## 4.3 Marketing

### Target: Paying students

- KTH Strategic Alliances (UIUC, Aalto), more to come  
KTH Prioritized regions (Brasilia, China, India, Indonesia, Phillippines!)  
Which research cooperations do exist? (e.g., Railway Engineering, Vehicle Engineering)
- *Action:* Participation in KTH marketing events: Round-trips (vice-GA, GA, PA)

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<sup>2</sup><https://www.nuffic.nl/en/expertise/jdaz>

- *Action:* Participation in pre-departure adventures (vice-GA, PA)
- *Action:* Create an example for including alumni. (vice-GA)
- *Action:* Interview with paying students: Why did they come? (vice-GA) Coordination with IRO
- *Action:* The max 60 cr/year requirement is too restrictive. Find ways to allow for a faster study (this way reducing costs for students). Discussions have to be taken with IRO
- *Action:* We expect the Study Abroad agreement with UCAS to have high potential. A set of best practices on how to handle such activities shall be derived. (kansli, vice-GA, PA Engineering Physics)

For actions to be carried out in cooperation with KTH central administration, a good and timely planning and information from KTH is necessary. It must be taken into account that all our PAs and GAs are actively teaching and researching!

#### **Target: Outgoing students**

- Identify “interesting” universities. Which may be strategic partners? Use your personal contacts! Academic standing?
- Europe is a problematic region: This is our base, economically and academically. We need more dedication from faculty!
- *Action:* Communicate the pros of going abroad. If possible, with concrete examples: alumni
- *Action:* Participate in development of “Global Competence Certificate” (to be developed by ECE?)

#### **Target: Staff mobility**

- *Action:* Identify exchange agreements including staff mobility. Which ones lead really to an exchange? (kansli, vice-GA)
- *Action:* Spread information about exchange possibilities among faculty. (kansli, vice-GA)

## **Appendix:**

### **A Operational assignments from the President’s contract 2017**

The quantitative figures for 2017 are as follows:

- Incoming on central agreements: 90 HST
- Incoming students on local agreements: 22 HST
- Outgoing students: 80 HST

- Paying students: 80 (an increase by 20!)

Based on previous years, SCI will receive a success bonus of 10 kSEK per paying student to be used for supporting quality of work for international exchange.