



PARTICULAR COOPERATION AGREEMENT
CONCERNING THE DUAL DEGREE PROGRAMME BETWEEN
NORWEGIAN UNIVERSITY OF SCIENCE AND
TECHNOLOGY
AND
TECHNISCHE UNIVERSITÄT BERLIN

In accordance with the cooperation agreement signed between *Norwegian University of Science and Technology* (hereafter called NTNU) and *Technische Universität Berlin* (hereafter called TUB) on February 2017, this particular agreement regulates the integrated teaching programme leading to the award of the following degrees:

- Master's degree in Electronic Systems Design from NTNU and Master of Science (M.Sc.) degree in Computer Engineering from TUB to the students of both institutions enrolled in the programme

This agreement starts in the Winter Term 2017.

1. Candidates' selection:

This agreement applies to:

- TUB students, who hold a three-year bachelor degree in Computer Science, Computer Engineering, Digital Media and Media Technology, or Electrical Engineering (or international equivalent).
- NTNU students, who hold a three-year bachelor degree in Computer Science, Computer Engineering, Digital Media and Media Technology, or Electrical Engineering (or international equivalent).

The home university proposes a list of selected students to the host university. Both institutions agree on the final list of selected students. In case of problems, the partners will make consensual regulations via their International Offices.

Both parties guarantee that the candidates to the dual degree programme will be selected according to their academic qualifications, English proficiency, personal motivation letters, and interviews.

According to the above mentioned criteria, up to 5 students from each institution will participate in the program every year.

Language requirements before departure:

- TUB students are required to demonstrate English skills according to the prerequisites for master courses at TUB School IV - Electrical Engineering and Computer Science (currently, this corresponds to CEFR level B2).
- NTNU students will have achieved a score of English language test as required by the "English language requirements" at NTNU for international master's programmes.

2. Programme of study

2.1 Duration of the programme

In order to obtain the two degrees, the participants of the programme must complete at least 2 semesters at the partner institution.

The studies structure for TUB students and for NTNU students are described in Annex 1 and Annex 2 of this agreement.

2.2 Contents of the programme

The courses will be offered in English at NTNU and partly in English at TUB (as specified in Annex 1). The study programme that NTNU students must complete at TUB is described in Annex 1 of this agreement. The study programme that TUB students must complete at NTNU is described in Annex 2 of this agreement.

All students generally need to complete 60 ECTS at TUB (Annex 1) and 60 ECTS at NTNU (Annex 2). 30 ECTS out of the total 120 ECTS are gained by the master's thesis.

The list of elective courses (Annex 1 and Annex 2) can be extended by NTNU and TUB.

Students receive 30 ECTS for their master's thesis. Each student has two supervisors, one from each institution. The master's thesis will be written in English. The master's thesis may be written at either the home or the host university.

2.3 Learning agreement

The home institution will issue a learning agreement for each of its students enrolled in this program, detailing the courses to attend at each institution. The learning agreement shall be signed by the student, the host institution and the home institution.

2.4. Validation of studies

Both parties should inform each other regularly of the results and progress obtained by the students. After successful completion of the full programme at the host institution as defined in the learning agreement and after receipt of the final transcript of records, the home institution will transfer the credits earned by the student at the host institution.

2.5. Award of degrees

The students are awarded a dual degree, which is composed of a master's degree in Electronic Systems Design from NTNU and master's degree in Computer Engineering from TUB.

2.6. Quality Management

Quality management of the dual degree will be ensured by TUB and NTNU. Both partners will hold regular meetings, according to §3.2 to discuss quality issues if necessary. The program will follow the existing quality management system at both institutions.

3. Execution of the program

3.1 Coordination

A joint program committee will be established. Each institution shall appoint a coordinator for this program who:

- supervises the exchanges

- defines the number of students pursuing the dual degree program every year
- interviews the candidates to the program
- promotes the dual degree program
- organizes the necessary meetings with the coordinator from the partner institution
- transmits all the necessary documents to the partner institution (learning agreement transcript of records...)
- updates this particular agreement and its attachments

The joint committee will comprise the 2 coordinators and the Deans of Studies or their representatives from both institutions.

3.2 Meetings

The 2 coordinators should meet at least once a year at each institution. The joint committee should meet at least once a year and also include quality management according to § 2.6.

4. Rights and duties of students

4.1 Rights of the students

The exchange students will be fully registered at the host institution and remain registered at the home institution. The students from NTNU and TUB will be informed of registration procedures at each institution. The students will receive a copy of the regulations at each institution concerning the graduation procedure (application rules, documents to produce).

4.2 Duties of the students

The host institution waives tuition, apart from any special fees incurred at the host university. The host institution may require the visiting students to prove a personal insurance for medical coverage under the local Social Security scheme and for third-party liability. Students shall assume expenses connected with travelling abroad (i.e. passport and visa costs, international transportation, health insurance, accommodation and other living costs). TUB and NTNU will not guarantee student's accommodation, but will support students as best as possible. Throughout the study period the visiting student is subject to the administrative and academic regulations of the host institution. Students shall respect the learning agreement signed to obtain both degrees.

5. Duration

Upon signing by each institution, this agreement shall remain in effect for a period of five (5) years unless terminated by either institution. Such termination by one institution shall be effected by giving the other institution at least one year advance written notice of its intention to terminate. In all cases, teachers and students involved in an exchange at the moment of withdrawal will conserve the rights and duties accorded under the present agreement.

6. Modification of the agreement and supplements:

The parties may, by mutual consent, modify the present agreement, by having a protocol signed by their legal representatives. Supplements to the above mentioned points may be signed with explicit reference to the present agreement.

7. Disagreement

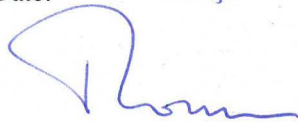
Any problems related to the interpretation or the carrying out of this contract will be settled out of court. Otherwise, each case will be settled by the Norway or German legal body competent in such matters.

8. List of annexes

- Annex 1: Studies structure (expressed in semesters) of an NTNU student at TUB.
- Annex 2: Studies structure (expressed in semesters) of a TUB student at NTNU.
- Annex 3: Grading scheme

Technische Universität Berlin

Date: 11.5.2017



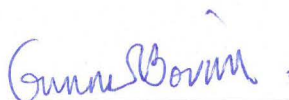
Prof. Dr.-Ing. Christian Thomsen
President



Prof. Dr.-Ing. Sebastian Möller
Dean School IV

Norwegian University of Science and Technology

Date: 17.8.2017



Prof. Dr. med. Gunnar Bovim
President



Prof. Dr.ing Geir Egil Øien
Dean IE

Annex 1: TUB elective course list

Courses	ECTS
3D Computer Vision	12
Advanced Computer Vision	12
Automatic Image Analysis	6
Biometric identification	3
Computer Vision	12
Digital Communities	6
Digital Image Processing	6
Game Programming	9
Introduction to Physiological Computing	6
Mobile Interaction	6
Multimodal Interaction	3 or 6
Project Hot Topics in Computer Vision A	6
Project Hot Topics in Computer Vision B	6
Seminar Quality & Usability	3
Speech and Audio Technology	9
Speech Interaction	12
Speech Signal Processing and Speech Technology	6
Study Project Quality and Usability	6 or 9
Usability	9
Usability Engineering	6
Usability in Multimodal Interaction	12
Vision and Imaging	9

Semantic Search	12
Seminar Hot Topics in Computer Vision	3
Web Technologies	6
Writing and Publishing a Scientific Paper	6
Compiler Constructions I	6
Embedded Operating Systems	6
Computer Arithmetic: Circuit Perspective	6
Robotics I+II	12
Robotics-Projekt	9
Digitale Signalverarbeitung(*)	6
Empirisch-wissenschaftliches Arbeiten(*)	6
Audiotechnik I(*)	6
Musikinformatik I(*)	6
Virtuelle Akustik(*)	6

(*) Courses are taught in German, but English material is provided.

Annex 2: NTNU elective course list

Each course at NTNU values 7.5 ECTS.

		Suiting for the specialization for TUB (MSc. Computer Engineering)
TFE4130	Electromagnetic and Acoustic Waves	Studium Generale (Wahlbereich)
TTT4175	Marine Acoustics	Studium Generale (Wahlbereich)
TTT4185	Speech Technology	Communication Systems, Digital Media and Human-Computer Interaction
TTT4197	Musical Acoustics and Audiology	Digital Media and Human-Computer Interaction
TTT4180	Technical Acoustics	Digital Media and Human-Computer Interaction
TTT4120	Digital Signal Processing	Communication Systems, Digital Media and Human-Computer Interaction
TTT4170	Audio Technology	Communication Systems, Digital Media and Human-Computer Interaction
TTT4250	Acoustical Measurement Techniques	Digital Media and Human-Computer Interaction
TTT4125	Information Theory Coding and Compression	Communication Systems , Digital Media and Human-Computer Interaction

TTT4135	Multimedia Signal Processing	Communication Systems, Digital Media and Human-Computer Interaction
TFE4152	Design of Integrated Circuits	Electronics, Photonics and Integrated Systems
TFE4187	Analog CMOS 1	Electronics, Photonics and Integrated Systems
TTT4205	Microwave Techniques	Communication Systems
TTT4212	RF/Microwave Design and Measurement Techniques	Communication Systems
TFE4141	Design of Digital Systems 1	Embedded Systems and Computer Architectures
TFE4145	Semiconductor Physics and Electronic Devices (Introduction)	Electronics, Photonics and Integrated Systems
TFE4171	Design of Digital Systems 2	Embedded Systems and Computer Architectures
TTT4115	Communication Theory	Communication Systems, Distributed Systems and Networks
TTT4145	Radio Communications	Communication Systems
TTT4215	Antenna Engineering	Communication Systems
TTT4150	Navigation Systems	Communication Systems
TTT4235	Space Technology II	Communication Systems

TTT4130	Digital Communication	Communication Systems
TTT4234	Space Technology I	Communication Systems
TFE4177	Semiconductor Physics with Lab	Electronics, Photonics and Integrated Systems
TTT4280	Sensors and Instrumentation	Electronics, Photonics and Integrated Systems, Automation and Control
TTK4160	Medical Imaging	Digital Media and Human-Computer Interaction
TMA4145	Linear Methods	Studium Generale (Wahlbereich)
TMA4180	Optimization I	Embedded Systems and Computer Architectures, Automation and Control
TTK4165	Signal Processing in Medical Imaging	Digital Media and Human-Computer Interaction
FY3201	Atmospheric Physics and Climate Change	Studium Generale (Wahlbereich)
TBA4245	Geodesy	Studium Generale (Wahlbereich)
TDT4120	Algorithms and Data Structures	Embedded Systems and Computer Architectures
TDT4136	Introduction to Artificial Intelligence	Embedded Systems and Computer Architectures

TDT4258	Low Level Programming	Embedded Systems and Computer Architectures, Electronics, Photonics and Integrated Systems
TDT4260	Computer Architecture	Embedded Systems and Computer Architectures, Electronics, Photonics and Integrated Systems
TMA4140	Discrete Mathematics	Studium Generale (Wahlbereich)
TTK4105	Control Systems	Automation and Control
TTK4115	Linear System Theory	Communication Systems
TTK4145	Real time Programming	Embedded Systems and Computer Architectures, Electronics, Photonics and Integrated Systems
TTK4147	Real time Systems	Embedded Systems and Computer Architectures, Electronics, Photonics and Integrated Systems
TTK4155	Industrial and Embedded Computer Systems Design	Embedded Systems and Computer Architectures, Electronics, Photonics and Integrated Systems, Automation and Control
TTM4105	Access and Transport Networks	Automation and Control, Embedded Systems and Computer Architectures, Electronics, Photonics and Integrated Systems

TTM4115	Design of Reactive Systems 1	Automation and Control, Embedded Systems and Computer Architectures, Electronics, Photonics and Integrated Systems
TTM4135	Information Security	Automation and Control, Embedded Systems and Computer Architectures, Electronics, Photonics and Integrated Systems, Communication Systems

List of K-Courses (Complementary courses)

		Suiting for the specialization for TUB (MSc. Computer Engineering)
FI5205	Corporate Responsibility and Ethics	Studium Generale (Wahlbereich)
MFEL3010	Medicine for Students of Natural Sciences and Technology	Studium Generale (Wahlbereich)
SPRÅK3501	Scientific Communication for Engineers	Studium Generale (Wahlbereich)
TIØ4146	Finance for Science and Technology Students	Studium Generale (Wahlbereich)
TIØ4215	Contract Law and Negotiations	Studium Generale (Wahlbereich)

TIØ4230	Entrepreneurship and Market Oriented Product Development	Studium Generale (Wahlbereich)
TIØ4295	Managerial Economics	
TIØ5200	Project Organizations	
TMM4220	Innovation	
TMM4225	Engineering Collaboration in Distributed Teams: Management and Smart Use	
TTM4165	ICT, Organization and Market	

Annex 3: Grading scheme

Grade NTNU to grade TUB translation:

Grade NTNU	Description NTNU	Grade TUB
A (excellent)	An excellent performance, clearly outstanding. The candidate demonstrates excellent judgement and a high degree of independent thinking.	1,0 (sehr gut)
B (very good)	A very good performance. The candidate demonstrates sound judgement and a very good degree of independent thinking.	1,7 (gut)
C (satisfactory)	A good performance in most areas. The candidate demonstrates a reasonable degree of judgement and independent thinking in the most important areas.	2,3 (gut)
D (satisfactory)	A satisfactory performance, but with significant shortcomings. The candidate demonstrates a limited degree of judgement and independent thinking.	3,3 (befriedigend)
E (sufficient)	A performance that meets the minimum criteria, but no more. The candidate demonstrates a very limited degree of judgement and independent thinking.	4,0 (ausreichend)
F (fail)	A performance that does not meet the minimum academic criteria. The candidate demonstrates an absence of both judgement and independent thinking.	5,0 (ungenügend)

Grade TUB to grade NTNU translation:

Grade TUB	Description NTNU	Grade NTNU
1,0; 1,3 (sehr gut)	An excellent performance, clearly outstanding. The candidate demonstrates excellent judgement and a high degree of independent thinking.	A (excellent)
1,7; 2,0 (gut)	A very good performance. The candidate demonstrates sound judgement and a very good degree of independent thinking.	B (very good)
2,3; 2,7; 3,0 (gut)	A good performance in most areas. The candidate demonstrates a reasonable degree of judgement and independent thinking in the most important areas.	C (satisfactory)
3,3; 3,7 (befriedigend)	A satisfactory performance, but with significant shortcomings. The candidate demonstrates a limited degree of judgement and independent thinking.	D (satisfactory)
4,0 (ausreichend)	A performance that meets the minimum criteria, but no more. The candidate demonstrates a very limited degree of judgement and independent thinking.	E (sufficient)
5,0 (ungenügend)	A performance that does not meet the minimum academic criteria. The candidate demonstrates an absence of both judgement and independent thinking.	F (fail)