Agreement on

Dual Degree Bachelor Program in Computer Science

between

Universidade Federal do Rio Grande do Sul

Instituto de Informática

and

Technische Universität Berlin

School of Electrical Engineering and Computer Science

Preamble

Within the scope of this agreement, the term **Institution** describes the following entities, namely, **Technische Universität Berlin (**hereafter referred to as **TUB)** and **Universidade Federal do Rio Grande de Sul (**hereafter referred to as **UFRGS).**

1 Subject of the agreement and aims

This agreement describes the academic and administrative conditions concerning the realization of a dual degree program supporting the exchange of students between UFRGS, Instituto de Informática, and TUB, School of Electrical Engineering and Computer Science. The aim is to enable TUB students and UFRGS students of Computer Science to receive degrees of both universities ("Bachelor of Science in Informatik" and "Bacharel em Ciência da Computação"). This agreement is based on the principle that the participating students have to fulfill the requirements of both study programs.

1.1 Scope of agreement

This agreement applies to TUB students in the Bachelor Program in Computer Science and UFRGS students in the Bachelor Program in Computer Science.

1.2 Acknowledgment of student's achievements on entering the dual degree program

On the assumption of fundamental equivalence and based on mutual trust in the academic quality of the host university's curriculum it is agreed that:

- TUB acknowledges the qualification for university entrance to UFRGS and the successfully completed first five semesters in the UFRGS Computer Science program as the entry requirement for third year's study at TUB.

- UFRGS acknowledges the qualification for university entrance to TUB and the successfully completed first four semesters in the TUB Computer Science program as the entry requirement for fourth's year's study at UFRGS.

To make sure that the obligatory body of knowledge of both universities is covered by all students of that dual-degree-program, missing mandatory subjects of the host university must be made up later (see appendix).

2 Admission procedure

2.1 Selection

Both parties guarantee that participants of the dual degree program will be selected according to their academic, personal, and linguistic qualifications. To enter the dual degree program, students have to be enrolled in the respective CS Bachelor Program at their *home institution*. Applications are evaluated first by the *home institution* and then presented to the partner institution (which will become the student's *host institution*) for review and approval.

2.2 Admission requirements

Students from UFRGS can be admitted, if

- they have successfully completed the coursework of the first 5 semesters of the UFRGS study program
- they have achieved an average grade of B

- they have proved sufficient knowledge of German (DSH or TestDaF level TDN4)[1].

Students from TUB can be admitted, if

- they have successfully completed the coursework of the first 4 semesters of the TUB study program
- they have achieved an average grade of at least 2.5
- they have proved sufficient knowledge of Portuguese according to the requirements of the Brazilian Ministry of Eduation (CELPE-Bras, level "Intermediário Superior")[2].

3 Curricular conditions

3.1 General conditions

Students from both sides are required to study 2/3 of their respective study program at their home institution. At least 3 semesters must be spent at the host institution. That means, UFRGS students study 6 semester at UFRGS and 3 semesters at TUB, TUB students study 4 semesters at TUB and 3 semesters at UFRGS. TUB students will therefore need one semester more to obtain the dual degree compared to obtaining TUB degree only.

Credit points: If a conversion of credit points is necessary, the following conversion rate is used: 1 credit (UFRGS) = 1.2 ECTS (TUB).[3]

Course overlap. The courses attended at both institutions may overlap only slightly.

Seminar and project course (TUB) and Final Project I (UFRGS). The intention of the inclusion of a project and seminar in the TUB curriculum is to prepare the students for the Bachelor thesis. Likewise, the Final Project I of the UFGRS curriculum prepares for the Final Project II. Therefore, TUB recognizes the Final Project I as equivalent to a combined project / seminar module at TUB.

Bachelor thesis and Final Project II. The Bachelor thesis (TUB) and the Final Project II are considered equivalent. TUB acknowledges the successful completion of the Final Project II as fulfillment of all requirements of a Bachelor thesis. Before starting the Final Project II, the TUB coordinator should approve the title and the task description. The Project document can be written in Portuguese, in German or in English. In case of Portuguese or German, an English summary must be provided.

Specialization area of TUB Program. UFRGS students may choose Communication Technology (CT) or Software Technology (ST) as the specialization area at TUB. TUB students must choose Software Technology (ST).

Minor subject at TUB and supplementary credits at UFRGS. With the minor subject at TUB (min. 12 ECTS) students have fulfilled the requirement of supplementary credits (8 CP) at UFRGS

Learning Agreement. After admission to the program, students have to submit an individual study program that needs to be approved by the program coordinator of the home university and the program coordinator of the host university. The program should specify which courses will be taken by the student. In justified cases, the study program can be modified. The changes require the approval of the coordinators of both universities.

3.2 Program description

[1] For selection and admission, a lower language proficiency (level B1) may be sufficient. However, the required certificate must be submitted during the stay at the host university.

[2] For selection and admission, a lower language proficiency (intermediário) may be sufficient. However, the required certificate must be submitted during the stay at the host university.

[3] This conversion rate is based on an average for regular studies of 25 credits per semester at UFRGS compared to 30 ECTS at TUB.

3.2.1 Requirements of UFRGS

The recommended plan of study for regular UFRGS students takes 4 years and a half (9 semesters). To obtain the Bachelor's degree UFRGS students must earn at least 218 UFRGS credits, consisting of

- mandatory courses (37 courses that give 158 credits)
- 32 credits which can be obtained with any selection of elective courses
- 8 credits with supplementary activities obtained with work as a research assistant, traineeship, courses, etc.
- final project (part I - 8 credits, and part II 12 credits) – with a supervisor and defense for a panel of three lecturers

3.2.2 Requirements of TUB

The recommended plan of study for regular TUB students takes 3 years (6 semesters). To obtain the Bachelor's degree TUB students must earn at least 180 ECTS credits, consisting of

- mandatory modules (132 ECTS)
- a Bachelor Thesis (12 ECTS) with a supervisor and defense
- selection of elective courses either in Software or in Communication Technology, worth at least 21 ECTS
- Courses from a minor subject, worth at least 12 ECTS

Included in the courses must be a seminar and a project.

3.3 Requirements for the Double-Degree Program

3.3.1 Students from UFRGS

The program structure is as follows.

- Semester 1-5 in the undergraduate CS program at UFRGS.
- 3 semesters of study in CS Bachelor program at TUB according to the appendix

3.3.2 Students of TU Berlin

The program structure is as follows.

- Semesters 1-4 in the CS Bachelor program at TU Berlin.
- 3 semesters of study in the undergraduate program at UFRGS according to the appendix.

3.4 Examination regulations

During the studies of UFRGS students at TUB, the examination regulations (Prüfungsordnung) of TUB apply in the current version.

During the studies of TUB students at UFRGS, the examination regulations of UFRGS apply in the current version.

If a student is expelled from the course according to the rules of the host university, she or he is also expelled from the dual-degree program. He or she may, however, finish the program at the home university.

Both partner institutions will hand out a transcript of records in English to students. The Transcript of Records is an official inventory of the courses taken, the achieved number of ECTS credit points, and national grades earned by the students throughout their stay in the host institution. Details of the grading schemes can be found in Appendix B.

After successful completion of the complete program at both universities, the participating students receive the Bachelor's degree of both universities. Students will receive a B.Sc. degree in the field of "Computer Science" from TUB and from UFRGS.

The final certificate and the final grade issued by TUB will be based on the TUB requirements. Mandatory courses of the TUB curriculum can be replaced by equivalent courses of UFRGS (see appendix). Courses exceeding 180 ECTS can be listed in the certificate as supplementary modules,

but are not contributing to the final grade. They, however, could be recognized in a subsequent Master Program if appropriate.

The final certificate issued by UFRGS will be based on the UFRGS requirements. Mandatory courses of the UFRGS can be replaced by equivalent courses of TUB according to the appendix.

4 Organizational arrangements

4.1 Exchange contingent

Up to five students are to be accepted by the host institution per year. This number may be changed with mutual consent of both institutions without the need to change this contract.

4.2 Program coordinator

Both institutions appoint a program coordinator responsible for the implementation of the program. In case of any difficulties the two program coordinators are expected to solve the problems by mutual consent.

4.3 Financial regulations

Students participating in this dual degree program will pay their normal registration fees at their home universities. During the term of the agreement, the host institution agrees to waive all tuition fees for incoming students under this agreement.

However, student may have to pay a small student registration fee at the host institution.

The host university will arrange for accommodation in a student dormitory, if possible.

4.4 Travel and accomodation

Participants of the dual degree program are responsible for their own travel and living expenses during the exchange, if there is no third party funding. The home as well as the host institution will, however, try to get financial support to defray all or part of those expenses.

5. Changes to this agreement

The equivalence tables in the appendix can be changed by mutual accordance without changing this agreement.

Technische Universität Berlin	UFRGS
Date:	Date:
_____	_____
Prof. Dr. Kurt Kutzler President	Rector
_____	_____
Prof. Dr. Hans-Ulrich Heiß Dean of Studies, School of EE&CS	Director of Institute

APPENDIX A

PROGRAM DETAILS

A.1 Mutual recognition of mandatory courses / modules

In this section, it is explained, how the subjects of the mandatory courses of both programs are covered by respective courses of the partner university. It is understood that there is no exact correspondence neither in the subject nor in the depth of coverage. Nevertheless, the tables make clear that all major topics are covered by both programs. Table A-1 lists the mandatory courses of UFRGS and shows the respective TUB modules. Table A-2 lists the mandatory modules of TUB and shows the respective UFRGS courses. To compile the final degree certificate of TUB, this correspondence table A-2 will be used including the calculation of grades. If a TUB module corresponds to 2 UFGRS courses, the arithmetic mean of both UFRGS grades will be used to build the corresponding TUB grade.

Courses taken at TUB or UFRGS that are in excess of the required 180 ECTS for the TUB degree can be listed in the TUB degree certificate as supplementary modules on the student's request. They may be recognized in a subsequent Master's program at TUB. Courses taken at TUB or UFRGS that are in excess of the required 218 credits for the UFRGS degree will be listed in the UFRGS degree certificate as complementary credits.

UFRGS-Code	CP	English title	TUB-Code	TUB courses
INF01202	6	Algorithms and Programming	BINF-GL-MPGI2	*Datenstrukturen und Algorithmen im imperativen Stil* Data Structures and Algorithms in Imperative Style
MAT01353	6	Calculus and Analytic Geometry I	BINF-GL-Ana1	Analysis I
INF05008	4	Introduction to Algorithms	BINF-GL-MPGI1	*Algorithmische und funktionale Lösung diskreter Probleme* Algorithmic and Functional Solution of Discrete Problems
INF01107	4	Introduction to Computer Architecture	BINF-GL-TechGI1 BINF-GL-TechGI2	*Digitale Systeme* Digital Systems + *Rechnerorganisation* Computer Organization
MAT01375	4	Discrete Mathematics	BINF-GL-TheGI1	*Grundlagen und algebraische Strukturen* Foundations and Algebraic Structures
MAT01355	4	Linear Algebra	BINF-GL-LA	*Lineare Algebra* Linear Algebra
INF01108	4	Computer Architecture and Organization I	BINF-GL-TechGI2	*Rechnerorganisation* Computer Organization
MAT01354	6	Calculus and Analytic Geometry II	BINF-GL-Ana2	Analysis II
INF01203	6	Data Structures	BINF-GL-MPGI2	*Datenstrukturen und Algorithmen im imperativen Stil* Data Structures and Algorithms in Imperative Style
INF05508	4	Logic for Computer Science	BINF-GL-TheGI3	*Logik und Kalküle* Logic and Calculi
INF05512	4	Graph Theory and Combinatorial Analysis		-

INF01112	4	Computer Architecture and Organization II	BINF-GL-TechGI2 BINF-GL-TechGI3	*Rechnerorganisation* Computer Organization + *Systemprogrammierung* System Programming
INF01124	4	Data Sorting and Searching	BINF-GL-MPGI4	*Praxis der Programmentwicklung* Practical Program development
INF05512	4	Symbolic and Numeric Computation		-
INF05005	4	Formal Languages and Automata	BINF-GL-TheGI2	*Automaten und Komplexität* Automata and Complexity
MAT02219	4	Probability and Statistics	BINF-GL-StochInf	*Stochastik für Informatiker* Stochastics
INF01118	6	Digital Techniques for Computer Science	BINF-GL-TechGI1	*Digitale Systeme* Digital Systems
INF05501	4	Theory of Computation	BINF-GL-TheGI2	*Automaten und Komplexität* Automata and Complexity
INF05006	4	Computational Categories	BINF-GL-TheGI1	*Grundlagen und algebraische Strukturen* Foundation and Algebraic Structures
INF05515	4	Algorithmic Complexity	BINF-GL-MPGI2 BINF-GL-TheGI1	*Datenstrukturen und Algorithmen im imperative Stil* Data Structures and Algorithms in Imperative Style + *Grundlagen und Algebraische Strukturen* Found. & Algebraic Structures
INF01145	4	Introduction to Databases	BINF-GL-MPGI5	*Datenbanksysteme* Database Systems
INF01046	4	Introduction to Image Processing	BINF-SWT-CGCV	Computer Graphics / Computer Vision (Elective)
INF01113	4	Computer Organization		-
INF01120	4	TCP Programming Project	BINF-GL-MPGI3	Software Project
INF01127	4	Software Engineering I	BINF-GL-MPGI3	*Softwaretechnik* Software Engineering
INF01047	4	Introduction to Computer Graphics	BINF-SWT-CGCV	Computer Vision / Computer Graphics (Elective)
INF01048	4	Artificial Intelligence	BINF-SWT-KI	*Künstliche Intelligenz: Grundlagen und Anwendungen* Artificial Intelligence (Elective)
INF01121	4	Programming Language Paradigms		-
INF05010	4	Combinatorial Optimization		-
INF05516	4	Formal Semantics of Programming Languages	BINF-GL-TheGI4 BINF-KT-SuK	*Spezifikation und Semantik* Specification and Semantics + *Semantik und Kalküle* Semantic and Calculi (Elective)
INF01142	4	Operating Systems I	BINF-GL-TechGI3	*Systemprogrammierung* System Programming

INF01147	4	Compilers	MINF-SE-ÜBB1	*Compilerbau 1* Compiler construction 1 (Master program)
INF01209	4	Introduction to Fault Tolerance	MINF-SE-EOS	Dependable Systems (Master Program)
INF01043	4	Human-Machine Interaction	BINF-KT-Usability	Usability Engineering
INF01154	6	Computer Networks	BINF-GL-TechGI4	*Rechnernetze und Verteilte Systeme* Computer Networks and Distributed Systems
INF01151	4	Operating Systems II	BINF-GL-TechGI3 BINF-GL-TechGI4	*Systemprogrammierung* System Programming + *Rechnernetze und Verteilte Systeme* Computer Networks and Distrib. Systems
INF01032	4	Entrepeneur in Informatics	B-GL-GdM	*Grundlagen des Management* Management
INF99001	8	Graduation Project I		Seminar + Project at TUB
INF99002	12	Graduation Project II		Bachelor's thesis at TUB

Table A-1: Correspondence of TUB modules to mandatory UFRGS courses

TUB-Code	ECTS	TUB courses	UFRGS-Code	UFRGS Course Name
BINF-GL-Ana1	8	Analysis I	MAT01353	CÁLCULO E GEOMETRIA ANALÍTICA I - A Calculus and Analytic Geometry I
BINF-GL-Ana2	8	Analysis II	MAT01354	CÁLCULO E GEOMETRIA ANALÍTICA II - A Calculus and Analytic Geometry II
BINF-GL-LA	6	Linear Algebra	MAT01355	ÁLGEBRA LINEAR I - A Linear Algebra
BINF-GL-Prop	2	Informatik-Propädeutikum	MAT01375	MATEMÁTICA DISCRETA B Discrete Mathematics
BINF-GL-MPGI1	9	Algorithmic and Functional Solution of Discrete Problems	INF05008	FUNDAMENTOS DE ALGORITMOS Introduction to Algorithms
BINF-GL-MPGI2	9	Data Structures and Algorithms in Imperative Style	INF01202	ALGORÍTMOS E PROGRAMAÇÃO - CIC Algorithms and Programming
			INF01203	ESTRUTURAS DE DADOS Data Structures
BINF-GL-MPGI3	6	Software Engineering	INF01127	ENGENHARIA DE SOFTWARE N Software Engineering I
	6	Software-Project	INF01120	TÉCNICAS DE CONSTRUÇÃO DE PROGRAMAS TCP Programming Project
BINF-GL-MPGI4	6	Practical Program Development	INF01124	CLASSIFICAÇÃO E PESQUISA DE DADOS Data Sorting and Searching

BINF-GL-MPGI5	6	Database Systems	INF01145	FUNDAMENTOS DE BANCO DE DADOS Introduction to Databases
BINF-GL-StochInf	6	Stochastics	MAT02219	PROBABILIDADE E ESTATÍSTICA Probability and Statistics
BINF-GL-TechGI1	6	Digital Systems	INF01107	INTRODUÇÃO À ARQUITETURA DE COMPUTADORES Introduction to Computer Architecture
			INF01118	TÉCNICAS DIGITAIS PARA COMPUTAÇÃO Digital Techniques for Computer Science
BINF-GL-TechGI2	6	Computer Organization	INF01108	ARQUITETURA E ORGANIZAÇÃO DE COMPUTADORES I Computer Architecture and Organization I
			INF01112	ARQUITETURA E ORGANIZAÇÃO DE COMPUTADORES II Computer Architecture and Organization II
BINF-GL-TechGI3	4	System Programming	INF01142	SISTEMAS OPERACIONAIS I N Operating Systems I
BINF-GL-TechGI4	6	Computer Networks and Distrib. Systems	INF01154	SISTEMAS OPERACIONAIS I N Computer Networks
			INF01151	SISTEMAS OPERACIONAIS II N Operating Systems II
BINF-GL-TheGI1	6	Found. & Algebraic Structures	INF05006	CATEGORIAS COMPUTACIONAIS N Computational Categories
BINF-GL-TheGI2	6	Automata and Complexity	INF05005	LINGUAGENS FORMAIS E AUTÔMATOS N Formal Languages and Automata
			INF05501	TEORIA DA COMPUTAÇÃO N Theory of Computation
BINF-GL-TheGI3	6	Logic and Calculi	INF05508	LÓGICA PARA COMPUTAÇÃO Logic for Computer Science
BINF-GL-TheGI4	6	Specification and Semantics	INF05516	SEMÂNTICA FORMAL N Formal Semantics of Programming Languages
B-GL-GdM	4	Management	INF01032	EMPREENDIMENTO EM INFORMÁTICA Entrepeneur in Informatics
BINF-GL-IR	6	Informatik und Gesellschaft	INF01140	COMPUTADOR E SOCIEDADE Computers and Society
	9	Seminar + Project at TUB	INF99001	TRABALHO DE GRADUAÇÃO I Graduation Project I
	12	Bachelor's thesis at TUB	INF99002	TRABALHO DE GRADUAÇÃO II Graduation Project II

Table A-2: Correspondence of UFRGS courses to mandatory TUB modules

A.2 Requirements of Students from UFRGS coming to TUB

This section lists the recommended course of studies for students from UFRGS coming to TUB. UFRGS students coming to TUB after 5 semesters have already collected at least 132 CP as mandatory courses. Since they will finish their studies back at UFRGS with the Graduation Project II (12 CP), they will need to take 74 CP, corresponding to 89 ECTS, at TUB. These credits must be composed such that they cover so far missing mandatory courses. Some of these mandatory courses are also mandatory at TUB.
The UFRGS students can choose from the following options:

- 6 mandatory courses (30 CP / 36 ECTS) (Table A-3)
- 2 courses (10 CP / 12 ECTS) from an application area (Requirement of TUB, recognized as "supplementary credits" at UFRGS) (Table A-4)
- 26 CP from the list of elective courses offered by TUB (Table A-5)
- Seminar + Project and Bachelor's thesis (Table A-2)

UFRGS student have to complete the following courses, which are mandatory, either at TUB or at UFRGS (Table A-3).

Course work	ECTS	Usage for TU Berlin	Usage for UFRGS (recognized as equivalent to ...)	CP
TechGI4 (Introduction to Computer Networks and Distributed Systems)	6	mandatory	mandatory (Computer Networks)	5
Grundlagen des Management	6	mandatory	mandatory (Entrepreneur in Informatics)	5
Informatik und Gesellschaft	6	mandatory	elective (Computers and Society)	5
Compilerbau 1 (CS Master's program)	6	supplementary	mandatory (Compilers)	5
Embedded Operating Systems (CS Master's program)	6	supplementary	mandatory (Fault Tolerance)	5
Usability Engineering	6	supplementary	mandatory (Human-Machine Interaction)	5

Table A-3: Mandatory courses of UFRGS students at TUB

In addition to these mandatory courses, UFRGS students have to choose one field of application, from which they have to take courses to the amount of at least 12 ECTS and at most 15 ECTS. The currently offered fields of application are listed in Table A-4.

Mathematics
Electrical Engineering
Traffic Systems
IT for Developing Countries
Economics
Production Engineering
Statistics
Sociology
Empirical Social Sciences

Table A-4: Offered application areas students at TUB

In addition, they may choose from the following list of elective modules (Table A-5) to meet the credit point requirements of UFRGS.

Course work	ECTS	Usage for TU Berlin	Usage for UFRGS	CP
Bachelor-Projekt CIT mit Seminar	9	elective (CT)	elective	7
Semantik und Kalküle (Semantics and Calculi)	6	elective (CT)	elective	5
Modellierung und Entwicklung offener verteilter System (Modeling and development of open distributed systems)	12	elective (CT)	elective	10
Betriebsystempraktikum (Operating System Lab)	6	elective (CT)	elective	5
Sicherheit (Computer Security)	6	elective (CT)	elective	5
Verteilte Systeme (Distributed Systems)	6	elective (CT)	elective	5
KBS-Bachelor-Projekt	9	elective (CT)	elective	7
Kommunikationsnetze (Communication Networks)	6	elective (CT)	elective	5
Kommunikationsnetze-Praktische Vertiefung (Communication Networks + Lab)	9	elective (CT)	elective	7
Netzwerkarchitekturen- Bachelor Praxis	9	elective (CT)	elective	7
Praktikum Rechnersicherheit (Computer Security Lab)	6	elective (CT)	elective	5
Einführung in die Kognitionswissenschaft (Introduction to Cognitive Science)	6	elective (CT)	elective	5
Mobile Interaction	6			5
Agentenorientierte Techniken (Agent Technology)	6	elective (ST)	elective	5
Service Engineering	12	elective (ST)	elective	10
Datenbankprojekt (Database Project)	6	elective (ST)	elective (Database Project)	5
Datenbankpraktikum (Database Lab)	6	elective (ST)	elective	5
Data Warehousing und Business Intelligence	6	elective (ST)	elective	5
Implementation of Database Systems	12	elective (ST)	elective	10
Advanced Information Modeling	6	elective (ST)	elective	5
Intelligente Datenanalyse (Intelligent data analysis)	6	elective (ST)	elective	5
Projekt Intelligente Datenanalyse	9	elective (ST)	elective	7
Objektorientierte Softwareentwicklung (Object Oriented Software Development)	6	elective (ST)	elective	5
Qualitätssicherungs-Praxis (Software Quality Assurance)	6	elective (ST)	elective	5
Einführung in die Systemanalyse (Introduction to System Analysis)	6	elective (ST)	elective	5
Systemanalyse Kleinprojekt (System Analysis Small Project)	6	elective (ST)	elective	5
Visuelle Sprachen (Visual Languages)	6	elective (ST)	elective	5
Visuelle Sprachen (Visual Languages+ Seminar)	9	elective (ST)	elective	5
Formale Modellierung und Kompositionalität - prozessorientierter Systeme	6	elective (ST)	elective	5
Formale Modellierung und Kompositionalität- prozessorientierter Systeme- SE	9	elective (ST)	elective	7
Software Horror Stories	6	elective (ST)	elective	5

Table A-5: Elective courses for UFRGS students at TUB

In addition to the Bachelor's program courses, UFRGS may also select from the CS Master's program. This selection is subject to approval of the two program' coordinators. The courses already attended by UFRGS students in the first five semesters at UFRGS, can be recognized for the Computer Science electives at TUB according to table A-6.

A.3 Requirements of Students from TUB coming to UFRGS

TUB students coming to UFRGS are expected to complete 1/3 of the UFRGS curriculum at UFRGS, which amounts to 72 CP. They also have to take mandatory subjects of the UFRGS program that are not covered by the TUB program studied so far. These 72 CP are composed in the following way:

- 9 courses (36 CP) that are mandatory for UFRGS (Table A-6)
- 8 supplementary CP at UFRGS. These credits points must be chosen from a minor subject as required by TUB and are recognized as 12 ECTS for the minor (Anwendungsfach) at TUB
- Graduation project I (8 CP) which is recognized by TUB as Seminar + Project (Table A-6)
- Graduation project II (12 CP) which is recognized by TUB as Bachelor Thesis (Table A-6)
- Additional courses (8 CP) to be selected from the elective courses offered at UFRGS (Table A-7)

UFRGS Code	Course work	CP	Usage for UFRGS	Usage for TUB (recognized as equivalent to ...)	ECTS
INF01047	FUNDAMENTOS DE COMPUTAÇÃO GRÁFICA Introduction to Computer Graphics	4	mandatory	elective (ST)	5
INF01048	INTELIGÊNCIA ARTIFICIAL Artificial Intelligence	4	mandatory	elective (ST)	5
INF01043	INTERAÇÃO HOMEM-COMPUTADOR Human-Machine Interaction	4	mandatory	elective (ST)	5
INF01121	MODELOS DE LINGUAGEM DE PROGRAMAÇÃO Programming Language Paradigms	4	mandatory	elective (ST) or supplementary	5
INF05010	OTIMIZAÇÃO COMBINATÓRIA Combinatorial Optimization	4	mandatory	elective (ST) or supplementary	5
INF01147	COMPILADORES Compilers	4	mandatory	elective (ST) or supplementary	5
INF01209	FUNDAMENTOS DE TOLERÂNCIA A FALHAS Introduction to Fault Tolerance	4	mandatory	elective (ST) or supplementary	5
INF01032	EMPREENDIMENTO EM INFORMÁTICA Entrepeneur in Informatics	4	mandatory	mandatory (equiv. to Management)	5
INF01140	COMPUTADOR E SOCIEDADE Computers and Society	4	elective	mandatory	5
INF99001	TRABALHO DE GRADUAÇÃO I Graduation Project I	8	mandatory	mandatory (equiv. to Project + Seminar)	10
INF99002	TRABALHO DE GRADUAÇÃO II Graduation Project II	12	mandatory	mandatory (equiv. to Bachelor thesis)	12
	Special Topic from chosen application area (minor subject) I	4	Elective Supplementary credits	mandatory	6
	Special Topic from chosen application area (minor subject) II	4	elective Supplementary credits	mandatory	6

Table A-6: Mandatory courses of TUB students at UFRGS

UFRGS Code	Course Name	CP	Usage for TUB	ECTS
INF01003	ENGENHARIA DE SOFTWARE II Software Engineering II	4	elective (ST) or supplementary	5
INF01001	ESPECIFICAÇÃO FORMAL N Formal Specification	4	elective (ST) or supplementary	5
INF01049	INTRODUÇÃO À PESQUISA EM INFORMÁTICA Introduction to Informatics Research	2	elective (ST) or supplementary	2
INF01017	REDES NEURAIS E SISTEMAS FUZZY Neural Networks and Fuzzy Systems	4	elective (ST) or supplementary	5
INF01038	SISTEMAS ESPECIALISTAS N Expert Systems	4	elective (ST) or supplementary	5
INF01191	ARQUITETURAS AVANÇADAS DE COMPUTADORES Advanced Computer Architectures	4	elective (ST) or supplementary	5
INF01146	AVALIAÇÃO DE DESEMPENHO High Availability	4	elective (ST) or supplementary	5
INF01205	CAD PARA SISTEMAS DIGITAIS CAD for Digital Systems	4	elective (ST) or supplementary	5
INF01037	COMPUTAÇÃO EVOLUTIVA Evolutionary Algorithms	4	elective (ST) or supplementary	5
INF01009	COMPUTAÇÃO GRÁFICA Computer Graphics	4	elective (ST) or supplementary	5
INF01005	COMUNICAÇÃO DE DADOS Data Communication	4	supplementary	5
INF01056	DESAFIOS DE PROGRAMAÇÃO Programming Challenges	4	elective (ST) or supplementary	5
INF05001	LABORATÓRIO DE PROGRAMAÇÃO EM LÓGICA Logical Programming Laboratory	4	elective (ST) or supplementary	5
INF01008	PROGRAMAÇÃO DISTRIBUÍDA E PARALELA Parallel and Distributed Programming	4	supplementary	5
INF01006	PROJETO DE BANCO DE DADOS Database Project	4	elective (ST) or supplementary	5
INF01002	PROTOCOLOS DE COMUNICAÇÃO Communication Protoclos	4	supplementary	5
INF01034	ROBÓTICA II Robotics II	4	elective (ST) or supplementary	5
INF01179	TÓPICOS ESPECIAIS EM COMPUTAÇÃO I Special Topics in Computing	2	elective (ST) or supplementary	5
INF01182	TÓPICOS ESPECIAIS EM COMPUTAÇÃO II Special Topics in Computing	2	elective (ST) or supplementary	5
INF05009	TÓPICOS ESPECIAIS EM COMPUTAÇÃO IX Special Topics in Computing	4	elective (ST) or supplementary	5
INF05504	TÓPICOS ESPECIAIS EM COMPUTAÇÃO V Special Topics in Computing	2	elective (ST) or supplementary	5
INF01054	TÓPICOS ESPECIAIS EM COMPUTAÇÃO VII Special Topics in Computing	4	elective (ST) or supplementary	5
INF01065	TÓPICOS ESPECIAIS EM COMPUTAÇÃO X Special Topics in Computing	2	elective (ST) or supplementary	5
INF01064	TÓPICOS ESPECIAIS EM COMPUTAÇÃO XI Special Topics in Computing	2	elective (ST) or supplementary	5
INF01063	TÓPICOS ESPECIAIS EM COMPUTAÇÃO XII Special Topics in Computing	4	elective (ST) or supplementary	5
INF05011	TÓPICOS ESPECIAIS EM COMPUTAÇÃO XIII Special Topics in Computing	2	elective (ST) or supplementary	5
INF05012	TÓPICOS ESPECIAIS EM COMPUTAÇÃO XIV Special Topics in Computing	2	elective (ST) or supplementary	5
INF05013	TÓPICOS ESPECIAIS EM COMPUTAÇÃO XV Special Topics in Computing	4	elective (ST) or supplementary	5
INF01016	GERÊNCIA E ADMINISTRAÇÃO DE PROJETOS Project Management	4	elective (ST) or supplementary	5
INF01015	GERÊNCIA E APLICAÇÕES EM REDES	4	supplementary	5

	Network Applications			
INF05004	INTELIGÊNCIA ARTIFICIAL AVANÇADA Advanced Artificial Intelligence	4	elective (ST) or supplementary	5
INF01022	LABORATÓRIO DE SISTEMA DE SOFTWARE Software System Laboratory	4	elective (ST) or supplementary	5
INF01021	PROJETO DE HIPERDOCUMENTOS Hyperdocument Project	4	elective (ST) or supplementary	5
INF01019	PROJETO EM COMPUTAÇÃO GRÁFICA Computer Graphics Project	4	elective (ST) or supplementary	5
INF01045	SEGURANÇA EM SISTEMAS DE COMPUTAÇÃO Computer Security	4	elective (ST) or supplementary	5
INF01014	SISTEMAS DE BANCO DE DADOS DISTRIBUÍDOS Distributed Database Systems	4	elective (ST) or supplementary	5
INF01059	SISTEMAS EMBARCADOS Embedded Systems	4	elective (ST) or supplementary	5
INF01018	SISTEMAS OPERACIONAIS DISTRIBUÍDOS E DE REDES Distributed and Network Operating Systems	4	supplementary	5
INF05003	TEORIA DA COMPUTAÇÃO DISTRIBUÍDA Theory of Distributed Computing	4	supplementary	5
INF01188	TÓPICOS ESPECIAIS EM COMPUTAÇÃO III Special Topics in Computing	2	elective (ST) or supplementary	2
INF01198	TÓPICOS ESPECIAIS EM COMPUTAÇÃO IV Special Topics in Computing	2	elective (ST) or supplementary	2
INF05505	TÓPICOS ESPECIAIS EM COMPUTAÇÃO VI Special Topics in Computing	2	elective (ST) or supplementary	2
INF01055	TÓPICOS ESPECIAIS EM COMPUTAÇÃO VIII Special Topics in Computing	4	elective (ST) or supplementary	5
INF05014	TÓPICOS ESPECIAIS EM COMPUTAÇÃO XIX Special Topics in Computing	2	elective (ST) or supplementary	2
INF01062	TÓPICOS ESPECIAIS EM COMPUTAÇÃO XVI Special Topics in Computing	2	elective (ST) or supplementary	2
INF01061	TÓPICOS ESPECIAIS EM COMPUTAÇÃO XVII Special Topics in Computing	2	elective (ST) or supplementary	2
INF01060	TÓPICOS ESPECIAIS EM COMPUTAÇÃO XVIII Special Topics in Computing	4	elective (ST) or supplementary	5
INF05015	TÓPICOS ESPECIAIS EM COMPUTAÇÃO XX Special Topics in Computing	4	elective (ST) or supplementary	5
INF05016	TÓPICOS ESPECIAIS EM COMPUTAÇÃO XXI Special Topics in Computing	4	elective (ST) or supplementary	5

Table A-7: Elective courses of TUB students at UFRGS

Appendix B

Grading Scheme:

UFRGS uses three marks A (excellent), B (good), and C (satisfactory). TUB uses numerical marks between 1.0 (excellent) and 4.0 (passed).
The conversion will be as follows:

From UFRGS to TUB:

UFRGS	TUB
A:	1.0
B:	2.0
C:	3.0

From TUB to UFRGS:

TUB	UFRGS
1.0-1.9:	A
2.0-2.9:	B
3.0-4.0:	C