Programme-specific Annex to the Teaching and Examination Regulations for the Bachelor's programme in Technical Computer Science

The rules in this Annex are part of the programme portion of the Student Charter, including the Teaching and Examination Regulations for the Bachelor's programme in Technical Computer Science offered by the Faculty of Electrical Engineering, Mathematics and Computer Science of the University of Twente.

1. CONTENTS AND STRUCTURE OF THE PROGRAMME

1.1 General objectives of the programme (Article 7.13, paragraph 2c of the Higher Education and Research Act)

The objective of the Bachelor's degree programme in Technical Computer Science is to train students at the Bachelor's level, instilling in them a solid foundation in mathematics and a thorough basic knowledge and understanding of the field of Computer Science. The programme is comprehensive and focuses not only on software and information systems, but also on computer systems and communication networks. The programme addresses skills and the societal context, and offers students the opportunity to explore another field by taking a minor. Students complete the programme by conducting an individual research project and a group design project.

Most graduates will continue their education by enrolling in a Master's programme, although the expertise and skills they acquire during the Bachelor's programme will allow them to find gainful employment in the field.

1.2 The final attainment targets of the programme (Article 7.13, paragraph 2c of the Act)

Knowledge and experience as relevant to the domain of Technical Computer Science
The graduate has knowledge and understanding of the field of Technical Computer Science. This knowledge includes:

1. Software: programming languages, principles of software development, software engineering, formal methods
2. Computers: architecture and organization, management systems
3. Networks: networks and communications, principles of communication systems
4. Fundamentals of Computer Science: algorithms and complexity, discrete structures, parallel and distributed computing
5. Human Media Interaction: computational science, human-computer interaction, intelligent systems
6. Information management: databases
7. Information security: fundamentals of security, network security, cryptography
8. Mathematics: discrete mathematics, calculus, linear algebra, probability and statistics

Design

1. The graduate is capable of the integrated application of relevant, field-specific knowledge to systems design.
2. The graduate is capable of specifying a problem and devising a solution based on a general description of the problem.
3. The graduate is capable of devising solutions/designing systems by selecting and implementing methods, models and techniques.
4. The graduate is capable of evaluating the properties of solutions/systems and of making a substantiated choice between different solutions based on his/her evaluation.

Research

1. The graduate is capable of critically analysing field-specific problems.
2. The graduate is capable of systematically setting up and implementing a research project.
3. The graduate is capable of contributing to the further development of the field by working in a sub-field.

Organizational ability

1. The graduate is capable of independently acquiring and incorporating new knowledge and skills as required.
2. The graduate is capable of analysing and discussing ethical, social, cultural and societal aspects of problems, solutions and developments in the field.
3. The graduate understands team dynamics and is capable of working in a team and with a variety of stakeholders such as the client and end-users.
4. The graduate is capable of communicating effectively with colleagues and non-specialists, both orally and in writing.
5. The graduate is capable of organizing his/her working processes and reflecting on their effectiveness.
6. The graduate is capable of taking a position on an issue and of substantiating this position with regard to a design or scientific argument.
7. The graduate has a multidisciplinary attitude.
8. The graduate has intercultural skills.

9. The graduate is capable of shaping his/her learning process, his/her competencies and develop his/her professional identity, by deliberately choosing, motivating and completing parts of the programme that match personal capacities, skills, and motives.

1.3 Content of the programme and related examinations (Article 7.13, paragraph 2a of the Act)

The table below shows the units of study comprising the Twente Education Model (TOM) curriculum. Section 1.3.4 of this Annex contains a curriculum that has been adjusted for the combined final degree audit for Technical Computer Science and Applied Mathematics. The Board of Examiners of the relevant programme is to publish details regarding the content of a unit of study in the course catalogue at least six weeks before the start of the teaching period (semester or quarter) in which the unit of study is offered.

1.3.1 The TOM curriculum

The table below shows the subjects in the order in which they are offered, the student's preferred prior knowledge and any additional prerequisites. The associated examination tables are included in Annex 1.

Table 1. Curriculum Technical Computer Science

Course code	Course name	Q	Language	Previous Knowledge
B1 Phase (Year 1)				
201700139	Pearls of Computer Science	1A	EN	
201700117	Software Systems	1B	EN	
201600146	Network Systems	2A	EN	
201700279	Data & Information	2B	EN	
B2 Phase (Year 2)				
201400210	Computer Systems	1A	EN	
201700269	Intelligent Interaction Design	1B	EN	
201700304	Discrete Structures & Efficient Algorithms	2A	EN	
xxxxxxxxx	Minor / Elective module	2B	EN	Requirement for participation in minor module: the B1 phase must be completed upon registration in Osiris
B3 Phase (Year 3)				
xxxxxxxxx	Minor / Elective module	1A	EN	Requirement for participation in minor module: the B1 phase must be complete upon registration in Osiris
xxxxxxxxx	Minor / Elective module	1B	EN	Requirement for participation in minor module: the B1 phase must be complete upon registration in Osiris
201500121	Design Project	1A of 2A	EN	Required: 120 credits (consisting out of compulsory modules + max. one elective/in-depth module) upon registration in Osiris
201500120	Research Project	1B of 2B	EN	Required: 120 credits (consisting out of compulsory modules + max. one elective/in-depth module) upon registration in Osiris

1.3.2 Elective section

1. The elective section consists of an elective module and two minor modules;
2. One of the elective modules listed in Table 2 must be chosen;
3. Approved minors are listed on the minors site: www.utwente.nl/minor;
4. In addition to (2), a maximum of one additional elective module listed in Table 2 may be taken as a minor;

5. For a minor outside the listed possibilities of the University of Twente, a so-called individual minor, approval of the Examination Board is needed prior to beginning of the minor.
6. The Examination Board uses the following guidelines to assess the student's request:
    a. The educational component of the minor must be at an academic level;
    b. At least 15 of the 30 credits must involve a paradigm shift;
        i. The contents of the minor must not fall within the field of computer science; or
        ii. The contents of an exchange minor may fall within the field of computer science, business administration or industrial engineering and management, provided that the minor is taken at an institute of higher education abroad and the educational component of the minor is at an academic level.
    c. The educational component of the minor may not overlap with the contents of the programme;
    d. Up to five credits may be devoted to courses on the language and culture of the host country.

Table 2. Elective modules / can also be taken as a minor module

Course code	Course name	Q	Prerequisites
201500057	Smart Spaces	1A	
201700273	Cyber-Physical Systems	1B	
201700271	Web Science	1B	
201400537	Programming Paradigms	2B	

See https//www.utwente.nl/ewi/intranet/onderwijs/commissies_en_raden/exciealg/Request/ for how to submit a request. Once approval has been granted, the Bureau of Educational Affairs (BOZ) is responsible for the administrative procedure involved in enrolling the student in the relevant minor.

1.3.3 Sequence requirements (Article 7.13, paragraph 2s of the Act)

1. A student may enrol in the minor through the Minor Bureau once he/she has completed the B1-fase upon registration in Osiris;
2. A student may only enrol in the final semester modules Design Project (201500121) and Research Project (201500120) once he/she has earned at least 120 credits, excluding minors;

1.4 Programme format (Article 7.13, paragraph 2i of the Act)

The programme is only offered on a full-time basis.

2. Language of tuition (Article 3.3, paragraph 1 of the Teaching and Examination Regulations)

The programme is taught in English.

3. TEACHING AND ASSESSMENT

3.1 Assessment and examination formats (Article 7.13, paragraph 2l of the Act)

Annex 1 details the examination format for each unit of study.

3.2 Registration of results

In addition to Article 4.1, Guideline TER:

1. Exemptions for examinations are indicated with the code 'VR'.
2. Exemptions are assigned a numerical value of 6.
3. The examination results of sufficient (V) and insufficient (NVD) have no numerical values.

3.3 Participation in tests (Art. 4.3(3), TER Guideline)

1. If attendance in designated educational activities is a prerequisite for participation in a test, then the module coordinator must decide on granting exemptions to students resitting the test or defining an alternative method to satisfy the attendance requirement.
2. If a module has been changed and the non-divisible component is no longer clearly identifiable, then the module coordinator must decide which tests must be passed in order to complete the former non-divisible component.
3. Participation in tests that are offered, either scheduled or on-demand, after the module has finished is only allowed if a substantiated request by the student to the Examination Board is granted by the Examination Board.

3.4 Third attempt

If a student requires more than two consecutive academic years to pass a module, then the student must agree on a study plan together with the Study Advisor at least two weeks prior to the start of the relevant module. The study plan must include agreements on time keeping, active participation in tutorials and other aspects.

3.5 Examination transparency

In addition to Article 4.4 (Guideline TER), the programme is to ensure that information is made available for each examination regarding its level, structure and marking norms, e.g. by providing a sample examination, an examination from a previous year or a collection of sample examination questions.

3.6 Period of validity (Art. 4.7(2) Guideline TER)

The module components are indicated by a Roman numeral in the module descriptions in Annex 1. The results of these module components remain valid indefinitely. A module component only becomes indefinitely valid if the student has received a 5.5 or higher grade in all tests of this particular component. Test results of an indefinitely valid module component may be used in the next academic year for compensation (e.g., for a grade 5.0 to 5.5), as prescribed in the module grading schema.

3.7 Confidentiality

In addition to Article 4.9(2) (Guideline TER):

1. Reports of final assignments are public documents except in the following cases.
2. The Programme Board may deem a report to be confidential for a specific period based on a detailed request:
    a. The first supervisor must submit a request to the Programme Board prior to the start of the final assignment.
    b. The confidential report must be accessible/available to the committee responsible for assessing the final assignment, the Programme Board, and representatives of bodies that have a statutory duty of overseeing the quality of the assessment or the programme as a whole.
    c. The parties mentioned above are required to observe confidentiality with regard to the report.

3. In the case of a confidential report as referred to in point 2, the public presentation of the report may be amended to ensure that no confidential information is made public.

3.8 Teaching evaluations (Art. 4.10(3) Guideline TER)

1. The online Student Experience Questionnaire (SEQ) is used for evaluation purposes at the conclusion of each module;
2. Additionally, the module coordinator may initiate supplementary evaluations, such as additional surveys and panel discussions during the module or at its conclusion;
3. If the SEQ results and/or student complaints give reason for concern, then the programme director is to discuss the matter with the module coordinator either during the module or at its conclusion;
4. They are to use this discussion to develop a plan for improving the remainder of the module or for the subsequent module, including a strategy for evaluating the improvements.

4. FINAL DEGREE AUDIT

4.1 Pass/Fail Regulation

Students who meet the following requirements will pass the Bachelor's final degree audit for the TCS programme:

a. The student has received an assessment for all units of study of the Bachelor's final degree audit;
b. The student's final results are 6 or higher for all units of study;

4.2 Cum Laude

1. A student may pass the Bachelor's final degree audit with distinction (cum laude) upon meeting the following requirements:
   a. The student passes the Bachelor's final degree audit within four years of initial enrolment (performance requirement);
   b. The student's average mark is 8.0 or higher (non-numeric assessments and exemptions not included). This is a weighted average based on the relative number of credits per unit of study. The results for minor modules are taken into account. Results for study units outside the examination programme, are not taken into account.
   c. No more than one unit of study may have a final result of 6.
   d. The mark for the module part Research Project of the module Research Project (201500120) is 8.0 or higher.
2. In exceptional cases or at the student's request, the Examination Board may award the distinction of cum laude if the student has met all requirements with the exception of the performance requirement, due to extenuating circumstances. These circumstances may involve delays recognized and provided for by the institution. It should be noted that the distinction of cum laude is never awarded automatically, but only following individual assessment of the student's academic achievements.

5. BINDING RECOMMENDATION (BSA)

A student will receive a positive BSA upon satisfying one of the following conditions (Article 6.3, Guideline TER):

1. Successful completion of three complete modules;
2. Successful completion of 45 credits of module components, including at least three mathematics modules (Math A+B1, Math B2, Math C1, Probability Theory);
3. In addition to the stipulations in (2), a module component has been successfully completed if it is part of a fully completed module, or if the test results of the completed module component is a 5.5 or higher in the case of a module that has not yet been completed;

6. ADMISSION

6.1 Admission Requirements (Article 7.24 through 7.29 of the Act)

Access to the Technical Computer Science programme can be obtained by fulfilling the following requirements:

1. With a diploma of the concluding examination of University Preparatory Education (VWO) or equivalent. The Technical Computer Science programme considers the following certificates and admission test to be equivalent;
    a. With a certificate of the propaedeutic examination of an Academic Programme (WO) in an engineering field;
    b. With a certificate of the propaedeutic examination of a Higher Vocational Programme (HBO) in an engineering field with a CGPA of 7.5 on a 10-point scale or higher;
    c. With a certificate of the concluding examination of an Academic Programme in an engineering field;
    d. With a certificate of the concluding examination of a Higher Vocational Programme in an engineering field;
    e. With a certificate that has been approved by the Minister and that is at least equal to the diploma of the concluding examination of University Preparatory Education - the diploma may have been issued in the Netherlands or abroad;
    f. With a certificate that has been approved by the Executive Board and that is at least equal to the diploma of the concluding examination of University Preparatory according to the judgement of the Executive Board - the diploma may have been issued in the Netherlands or abroad;
2. Mathematics B at University Preparatory Education level or equivalent;
3. English level:
    a. a secondary school diploma including English as an examination subject from a country that has ratified the Lisbon Treaty; or
    b. CEFR, B2/C1 level; or
    c. IELTS score of 6.0 or higher; or
    d. TOEFL score of 80 or higher.

6.2 Admission to a Master's programme

A student with a Bachelor's degree in Technical Computer Science will gain automatic admission to the following Master's programmes at the University of Twente:

- Computer Science
- Business Information Technology*
- Embedded Systems (4TU)*
- Interaction Technology
- Internet Science & Technology

* Additional requirements apply for admission to this Master's programme for graduates of the University of Twente's Technical Computer Science Bachelor's programme.

7. STUDY MATERIALS

Students who started on the programme in September 2013 or later must obtain a 'budget notebook' from the Notebook Service Centre (or acquire a similar or better device).

8. DOUBLE DEGREE TCS-AM

All additional rules concerning the double degree TCS-AM are stipulated in Annex 2.

Annex 1: Assessment Tables modules

Final testing schedules are to be published on the module's Blackboard course page at least two weeks prior to module commencement.

1. Pearls of Computer Science (201700139)

The Pearls of Computer Science module consists of two indivisible module components:

I. Introduction to Mathematics + Calculus 1A (4 EC)
II. Pearls of Computer Science (11 EC)

Figure 1. Assessment Table Pearls of Computer Science

Module parts	Name Assessment	Type of Assessment	Individual / Group	Weight assessment (%)	Minimum grade	Weight result assessment (%)
I	Intro math+ calculus 1A	Written test	I	100	5.5*	27
		Math case	G	Pass		
II	Pearls	8x written test	I	12.5% each	5.5 each*	53
		8x assignment	G	PASS for access to written test		
	Weighted sub-average				**5.5**	
	Project	Project- assessment	G	100	5.5	20
	Academic Skills	Assignments	I	PASS	PASS	0
	Weighted average				**5.5**	

*OR 'Math A & B1' 5.0=<grade<5.5 OF TWO Pearls 5.0=<grades<5.5 is allowed IF the sub-weighted average is 5.5 or higher (grade =>5.5).

2. Software Systems (201700117)

The Software Systems module consists of two indivisible module components:

I. Calculus 1B (3 EC)
II. Software Systems (12 EC)

Figure 2. Assessment Table Software Systems

Module parts	Name Assessment	Type of Assessment	Individual / Group	Weight assessment (%)	Minimum grade	Weight result assessment (%)
I	Calculus 1B	Written test	I	100	5.5*	20
		Math Case	G	Pass		
II	Design	Written test	I	100	5.5*	20
		Assignments	I	Pass		
	Programming	Written test	I	100	5.5*	20
		Assignments	I	Pass		
	Weighted sub-average				**5.5***	
	Design Project	Report	G	100	5.5	20
	Programming Project	Product	G	100	5.5	20
		Report	G			
	Academic Skills	Assignments	I	PASS	PASS	0
Weighted average					**5.5**	

* Out of the marked (*) module component grades ONE mark lower than 5.5, but at least 5.0 (5.0 = <rate <5.5) is allowed IF its sub-weighted average is 5.5 or higher

3. Network Systems (201600146)

The Network Systems module consists of two indivisible module components:

I. Linear algebra (3 EC)
II. Network Systems (12 EC)

Figure 3. Assessment Table Network Systems

Module parts	Name Assessment	Type of Assessment	Individual / Group	Weight assessment (%)	Minimum grade	Weight result assessment (%)
I	Linear algebra	Written test	I	100	5.5*	20
		Math Case	G	Pass		
II	Network Systems Theory	4x written tests	I	100	5.5 each*	50
	Observation lab	Assignments	I	Pass	Pass	0
				Weighted sub-average	**5.5***	
	Network Systems Project	Challenges	G	50	5.5	30
		Project examination	G	50	5.5	
	Academic Skills	Assignments	I	Pass	Pass	0
				Weighted average	**5.5**	

* Out of the marked (*) module component grades ONE mark lower than 5.5, but at least 5.0 (5.0 = <rate <5.5) is allowed IF its sub-weighted average is 5.5 or higher

4. Data & Information (201700279)

The Data & Information module consists of two indivisible module components:

I. Probability Theory (3 EC)
II. Data & Information (12 EC)

Figure 4. Assessment Table Data & Information

Module parts	Name Assessment	Type of Assessment	Individual / Group	Weight assessment (%)	Minimum grade	Weight result assessment (%)
I	Probability Theory	Written test	I	100	5.5*	20
		Assignments	I	Pass		
II	5 Themes	4x Written test	I	100 each	5.5 each*	4x 10
				Weighted sub-average	**5.5***	
	Project	Product	G	100	5.5	40
		Report	G			
		Presentation	G			
	Academic Skills	Assignments	I	Pass	Pass	0
				Weighted average	**5.5**	

* Out of the marked (*) module component grades ONE mark lower than 5.5, but at least 5.0 (5.0 = <rate <5.5) is allowed IF its sub-weighted average is 5.5 or higher

5. Computer Systems (201400210)

The Computer Systems module is an indivisible module worth 15 credits

Figure 5. Assessment Table Computer Systems

Module parts	Name Assessment	Type of Assessment	Individual / Group	Weight assessment (%)	Minimum grade	Weight result assessment (%)
I	Discrete Mathematics	Written test	I	100	5.5*	20
	Operating Systems	Assignments	I	100	5.5*	26
		Interviews	I	PASS		
		Written test	I	If the result of the assignment is below 5.5		
	Computer Architecture & Organisation	Written test	I	100	5.5*	20
		Assignment	I	PASS		
				Weighted sub-average	**5.5***	
	Project	Project plan	G	30	5.5	27
		Daily reports	G	PASS		
		Video	G	30		
		Demo	G	40		
		Reflection report on cooperation	I	PASS		
	ICT & Law	Participation	I	PASS	5.5	7
		Written test	I	50		
		Report	G	50		
				Weighted average	**5.5**	

* Out of the marked (*) module component grades ONE mark lower than 5.5, but at least 5.0 (5.0 = <rate <5.5) is allowed IF its sub-weighted average is 5.5 or higher

6. Intelligent Interaction Design (201700269)

The Intelligent Interaction Design module is an indivisible module worth 15 credits.

Figure 6. Assessment Table Intelligent Interaction Design

Module parts	Name Assessment	Type of Assessment	Individual / Group	Weight assessment (%)	Minimum grade	Weight result assessment (%)
I	Design & Evaluation of HCI	Written test	I	100	5.5*	20
	Statistical Techniques	Written test	I	100 – bonus x 5	5.5*	20
		4 assignments for bonus points	I	5% each**		
	AI Theory	Written test	I	100	5.5*	20
				Weighted sub-average	**5.5***	
	AI Practical	Practical test	G	100	5.5	15
	HCI project	Project test	G	100	5.5	25
				Weighted average	**5.5**	

* Out of the marked (*) module component grades ONE mark lower than 5.5, but at least 5.0 (5.0 = <rate <5.5) is allowed IF its sub-weighted average is 5.5 or higher

** IF assignment grade > written test grade

7. Discrete Structures & Efficient Algorithms (201700304)

The Discrete Structures & Efficient Algorithms module is an indivisible module worth 15 credits.

Figure 7. Assessment Table Discrete Structures & Efficient Algorithms

Module parts	Name Assessment	Type of Assessment	Individual / Group	Weight assessment (%)	Minimum grade	Weight result assessment (%)
I	Discrete Structures & Algorithms	Written test	I	100	5.5*	35
	Algebra & Finite Automata	Written test	I	100	5.5*	35
	Homework bonus	Assignments	I	Max +1.0 above the weighted sub-average		
	Weighted sub-average (bonus excluded)				**5.5***	
	Research	Product	G	Pass	5.5	30
		Paper	G	100		
		Presentation	G			
		Programming competition Bonus	G	Max +2.0		
Weighted average (bonus excluded)					**5.5**	

* Out of the marked (*) module component grades ONE mark lower than 5.5, but at least 5.0 (5.0 = <rate <5.5) is allowed IF its sub-weighted average is 5.5 or higher

8. Programming Paradigms (201400537)

The Programming Paradigms module is an indivisible module worth 15 credits.

Figure 8. Assessment Table Programming Paradigms

Module parts	Name Assessment	Type of Assessment	Individual / Group	Weight assessment (%)	Minimum grade	Weight result assessment (%)
I	Functional Programming	Written test	I	100	5.5*	15
	Concurrent Programming	Written test	I	100	5.5*	20
		Bonus	I	+1		
	Compiler Construction	2 Take home tests	I	50 each	5.5	20
	Weighted sub-average				**5.5***	
	Functional & Logic Programming Projects	Project-assessment	G	75 for FP 25 for LP	5.5	15
	Integration Project	Project assessment	G	100	5.5	30
	Weighted average				**5.5**	

* Out of the marked (*) module component grades ONE mark lower than 5.5, but at least 5.0 (5.0 = <rate <5.5) is allowed IF its sub-weighted average is 5.5 or higher

9. Cyber-Physical Systems (201500053)

The Cyber-Physical Systems module is an indivisible module worth 15 credits.

Figure 9. Assessment Table Cyber-Physical Systems

Module parts	Name Assessment	Type of Assessment	Individual / Group	Weight assessment (%)	Minimum grade	Weight result assessment (%)
I	Formal specification and hybrid systems	Take home test	I/G	100	5.5*	14
	Dependable systems and networks	Take home test	I/G	50	5.5*	14
		Presentation	I/G	50		
	Sensor and actuator systems	Written test	I	50	5.5*	14
		Mini-practicum	G	50		
	Real-time operating systems	Written test	I	50	5.5*	14
		Practicum report	G	50		
	Physical-systems modelling and controller design	6 reports about assignments and practicum report	G	16,66 each	5.5*	14
				Weighted sub-average	**5.5***	
	Project	Project artefacts	G	25	5.5	30
		Presentations	G	25		
		6-pages research paper	G	25		
		YouTube film	G	25		
				Weighted average	**5.5**	

* Out of the marked (*) module component grades ONE mark lower than 5.5, but at least 5.0 (5.0 = <rate <5.5) is allowed IF its sub-weighted average is 5.5 or higher

10. Smart Spaces (201500057)

The Smart Spaces module is an indivisible module worth 15 credits.

Figure 10. Assessment Table Smart Spaces

Module parts	Name Assessment	Type of Assessment	Individual / Group	Weight assessment (%)	Minimum grade	Weight result assessment (%)
I	Smart Spaces	2*Written exam (2 themes each)	I	25 per theme	5.5 per theme*	20
		4*Challenges	G	25 each	5.5	30
		Integrated project	G	100	5.5	50
		Peer-review	I	0	Pass	0
				Weighted average	5.5	

* One theme 5.0=<Grade<5.5 is allowed IF the theme average is Grade>5.5

11. Web Science (201500025)

The Web Science module is an indivisible module worth 15 credits.

Figure 11. Assessment Table Web Science

Module parts	Name Assessment	Type of Assessment	Individual / Group	Weight assessment (%)	Minimum grade	Weight result assessment (%)
I	Web Science	2x written test	I	50 each	5.5	50
	Implementation Projects	5x Report	G	100*	5.5	50
		Presentation	G	PASS		
				Weighted average	**5.5**	

*weight 2wk project is 2x weight 1wk project

12. Design Project (201500121)

The Design Project module is an indivisible module worth 15 credits.

Figure 12. Assessment Table Design Project

Module parts	Name Assessment	Type of Assessment	Individual / Group	Weight assessment (%)	Minimum grade	Weight result assessment (%)
I	Design Project	Project examination	G	100	5.5	67
	Reflection Component	Assignments	G	100	5.5	33
				Weighted average	**5.5**	

13. Research Project (201500120)

The Research Project module is an indivisible module worth 15 credits.

Figure 13. Assessment Table Research Project

Module parts	Name Assessment	Type of Assessment	Individual / Group	Weight assessment (%)	Minimum grade	Weight result assessment (%)
I	Research Project	Project test	I	100	5.5	67
	Reflection component	Assignments	I	100	5.5	33
				Weighted average	**5.5**	

Annex 2: Double Degree Technical Computer Science – Applied Mathematics

This annex contains the following paragraphs:

1. Study programme TCS-AM
2. Elective section
3. Sequence requirements
4. Teaching evaluation
5. Pass/Fail Regulations
6. Cum Laude
7. Binding Recommendation

1. Study programme TCS – AM

All courses of the double programme can be found in Table 1.

Table 1. Study Programme TCS - AM

Course-code	Course name	Q	EC	Division	Prerequisites
B1-phase (Year 1)					
201300312	Linear Structures I	1A	6	AM	
201700139	Intro. to mathematics + Calc. 1A	1A	4	AM/TCS	
201700139	Pearls of Computer Science	1A	11	TCS	
201500112	Programming Theory & Project	1B	8	TCS	
201500365	Calculus 1B	1B	3	AM/TCS	
201300229	Analysis	1B	3	AM	
201400424	Prooflab	1B	2	AM	
201300230	Linear Structures II	1B	3	AM	201300312
201400514	Network Systems	2A	12	TCS	
201400606	Vectorcalculus EE + AT	2A	3	AM	
201400360	Presentation skills	2A	3	AM	
201400479	Signals & Transforms	2B	5	AM	
201400489	Probability Theory	2B	5	AM/TCS	
201600174	Data & Information	2B	12	TCS	201500112
B2-phase (Year 2)					
201400357	Statistics	1A	6	AM/TCS	201400489
201400210	Computer Systems	1A	15	TCS	
201400429	Systems Theory	1B	4	AM	
201400428	Differential Equations	1B	4	AM	201500365
201600173	Intelligent Interaction Design	1B	12	TCS	
201600061	Introduction Mathematical Modelling	2A	1	AM	
201600270	Discrete Structures & Efficient Algorithms	2A	15	AM/TCS	201400210
201400434	Modelling and Analysis of Stochastic Processes	2B	15	AM	
201600062	Project Signals & Uncertainty	2B	5	AM	
B3-phase (Year 3)					
201400358	Analysis II	1A	5	AM	
201800144	Project statistics (from module 5)	1A	2	AM	
201500566	Reflection I	1A	5	AM	
	Minor	1B	15	AM/TCS	All first year components
201500121	Design Project	2A	15	TCS	All components of 8 quartiles, all first year components included
	Elective AM	2A	5	AM	
201800142	Bachelor assignment	2B	10	AM	
201800143	Extension TCS Bachelor assignment	2B	5	TCS	
201500567	Reflection II	2B	2	AM	
201500405	Complex function theory	2B	3	AM	
	Grand Total		**224**		

2. Elective section

1. The elective section consists of one elective course in the fourth quartile of the third year, and one minor module.
2. For the elective course one out of these four must be chosen:
    - Graph Theory
    - Introduction to PDE
    - Random Signals and Filtering
    - Mathematical Optimization
3. Approved minors are listed on the minors site: **www.utwente.nl/minor**;
4. For an individual minor approval of the AM examination board is needed, before the minor starts;

3. Sequence requirements

1. A student may enrol in the minor through the Minor Bureau once he/she has completed all first year components upon registration in Osiris;
2. A student may only enrol in the bachelor assignment once he/she has passed at least 8 quartiles of the complete programme. These 8 quartiles include all first year components

4. Teaching evaluation

1. All components of the programme are parts of modules. The online Student Experience Questionnaire (SEQ) is used for evaluation purposes at the conclusion of modules;
2. At least once a year there will be a panel discussion with students participating in the double degree;
3. Additionally, there will be an extra panel discussion after the first semester of the first year.

5. Pass/Fail Regulations

1. Students who meet the following requirements will pass the Bachelor's final degree audit for the TCS – and the AM programme:
    a. The student has received an assessment for all units of study of the double degree programme;
    b. The student's final results are 6 or higher for all units of study.

    In all other cases not specified under (1), the student will not pass the final degree audit for TCS and AM and will not receive the Bachelor's degrees.

6. Cum Laude

1. A student may pass the Bachelor's final degree audit for TCS and AM with distinction (cum laude) upon meeting the following requirements:
    a. The student passes the Bachelor's final degree audit for TCS and AM within four years of initial enrolment (performance requirement);
    b. The student's weighted average is 8.0 or higher (non-numeric assessments and exemptions not included). The average is weighted based upon the amount of credits.
    c. The mark for the bachelor assignment is 8.0 or higher.
2. In exceptional cases and at the student's request, the Examination Board may award the distinction of cum laude if the student has met all requirements with the exception of the performance requirement, due to extenuating circumstances. These circumstances may involve delays recognized and provided for by the institution. It should be noted that the distinction of cum laude is never awarded automatically, but only following individual assessment of the student's academic achievements.

7. Binding Recommendation (BR/BSA)

1. Students pursuing a double degree in Technical Computer Science and Applied Mathematics are subject to an additional BR provision: the BR may involve exclusion from the Applied Mathematics programme if the student fails to earn 15 or more EC from the AM-courses or AM/TCS-courses associated with the double degree programme. See Table 1 for the specific courses.
2. Students pursuing a double degree in Technical Computer Science and Applied Mathematics are subject to an additional BR provision: the BR may involve exclusion from the Technical Computer Science programme if the student fails to earn 15 or more EC from the TCS-courses or AM/TCS courses associated with the double degree programme. See Table 1 for the specific courses.