

IMPLEMENTATION REGULATIONS
(part of the Teaching and Examination Regulations)

**BACHELOR'S & MASTER'S DEGREE
PROGRAMMES
AEROSPACE ENGINEERING**

DELFT UNIVERSITY OF TECHNOLOGY

2019-2020

TABLE OF CONTENTS

Section 1 – Bachelor’s and Master’s degree programmes	1
Article 1 – The study load.....	1
Article 2 – Composition of the degree programmes.....	1
Article 3 - Honours Programmes	2
Article 4 – (Master) Registering the tracks and compiling the examination programme.....	3
Article 4a – The annotation "Technology in Sustainable Development"	4
Article 4b – The annotation "Entrepreneurship"	4
Article 5 – (Master) European Wind Energy Master, Rotor Design Track.....	4
Section 2 Examinations and practicals	5
Article 4 – Practicals and/or exercises	5
Article 5 – The types of examinations.....	5
Article 6 – The frequencies, times and sequences of the examinations.....	6
Section 3 Entrance requirements.....	6
Article 7 – Entrance requirements for the units of study	6
Section 4 Attendance and grading regulations Bachelor’s	7
Article 8 – Attendance and grading regulations for first and second year projects	7
Section 5 Transitional ruling	10
Article 9 – Transitional ruling	10
Article 10 – Examinations for old study programmes.....	10

Section 1 – Bachelor’s and Master’s degree programmes

Article 1 – The study load

1. The study load is 180 credits for the Bachelor’s degree programme and 120 credits for the Master’s programme. The Master's study programme can not include courses from a student's BSc programme.

Article 2 – Composition of the degree programmes

Bachelor:

1. The table below outlines the general structure of the BSc programme.

BSc Year 1	First year programme	60 ECTS
BSc Year 2	Second year programme	60 ECTS
BSc Year 3	Minor programme Third Year Major programme Design Synthesis Exercise	30 ECTS 15 ECTS 15 ECTS

2. The major phase of the BSc programme consists of core courses plus the Design Synthesis Exercise, totalling 150 credits.
3. In addition to the prescribed major phase of the BSc programme, students must choose a minor.

A minor is a cohesive collection of courses amounting to 30 EC. The primary objective of minors is to broaden knowledge with courses that are not usually provided in a given discipline.

A student may choose his/her own minor from the entire range offered by TU Delft. All minors offered by TU Delft have to be accepted by all degree programmes, except minors that overlap with the degree programme concerned (e.g. bridging minors of the degree programme concerned). As a rule, a student may only include 1 minor in his/her programme.

The minors have no entry requirements. It is generally assumed that a student’s progress is such that he/she is at the end of his/her second year at the start of the minor. The minor guide states any prior knowledge assumed (e.g. certain mathematics or design knowledge). If a student does not have this knowledge, the student is responsible for catching up. Alternatively, the student is advised to choose a different minor. Application for a minor is compulsory. A second choice may be stated in the registration system, which is intended to be used to cover possible limited capacity in some minors.

A student may, in addition to the broad range of minors provided by TU Delft, also choose a minor amounting to 30 EC composed by a different university degree programme. The Board of Examiners must approve such a minor.

A student may also compose his/her own minor: a self-composed minor. A minor of this kind must constitute a cohesive (defined as “internally consistent”) programme, provided by a university degree programme, and overall at third-year level. Master level courses taught at TU Delft are not permitted in a minor. Students may choose online courses from the Credits for Mooc’s/Virtual Exchange Programme

as an exception laid down in the BSc Rules and Guidelines of the Board of Examiners article 24.a. The Board of Examiners must approve the composition of the self-composed minor. A student must submit his/her request to the Board of Examiners at least two months before the start of the first course, using the 'self-composed minor form' that can be found on the student portal website of the faculty of Aerospace Engineering. A student must clearly state why he/she considers the package of subjects to be cohesive.

The minor can also be used to study at a partner university abroad. The same regulations exist for a minor abroad as for the self-composed minor. The requirements for the minor abroad are stated in the digital study guide with course code AE3060. All the courses that have been completed during the exchange period will be registered with a V (voldaan) in Osiris. Also the actual external grades of the courses that have been completed will be registered in Osiris. The credit conversion has been determined by the Board of Examiners.

Master:

1. The Master's Degree Programme has 6 tracks:
 1. Aerodynamics & Wind Energy
 2. Control & Operations
 3. Spaceflight
 4. Aerospace Structures and Materials
 5. Flight Performance & Propulsion
 6. Rotor Design (European Wind Energy Master (EWEM))
2. Within a track or within a specialisation, students may opt for the additional graduation profile "Technology in Sustainable Development" and/or "Entrepreneurship" mentioned in Article 4.
4. Detailed information about the content of the Bachelor's and Master's degree programmes can be found in the BSc and MSc Study Guide of the current academic year (www.studyguide.tudelft.nl).

Article 3 - Honours Programmes BSc and MSc

Bachelor:

1. Students who have nominally completed all of their first year BSc courses (within the first year) with a weighed averaged mark of 8.0 or higher and who have the ability and ambition to deliver an extra effort during their bachelor study, are eligible for a special programme of at least 20 credits on top of the Bachelor's degree course: an Honours Programme Bachelor.
2. The Honours Bachelor students must complete their BSc programme and their honours programme nominally within 36 months.
3. A student who has successfully completed the Honours Programme Bachelor will receive a special certificate from the university with their degree certificate.
4. A student who fulfils, or will fulfil, the requirements laid down in paragraph 1, and is interested in an Honours Programme Bachelor can send his application (CV and motivation letter) to the honours bachelor coordination team for approval ([TU Delft: Honours programme](#)).
5. When determining the periods of time referred to in paragraph 1c, any delay in completing the programme owing to circumstances that result in the student being eligible for financial support under the Profiling fund regulation for students shall be taken into account.

Master:

1. Students who complete their BSc programme with a weighed averaged mark of 7.5 or higher within four years are eligible for a special individual programme of 20 credits on top of the Master's degree course: an Honours Programme Master. Master courses completed in period 1 have to be completed with a weighted average of at least 7.5.
2. The Honours Programme Master has to be completed within a period of time not exceeding 30 months. For students who have started before September 1, 2017 the starting date of the MSc programme is the first MSc examination date. For students starting on or after September 1, 2017 the starting date of the MSc programme is the date of the enrolment in the Master track (see article 3.6). The date of completion of the MSc programme is the MSc Thesis defence date. A student who started the HPM before September 1, 2014, the HPM has to be completed within 36 months.
3. A student who has successfully completed the Honours Programme Master will receive a special certificate from the university with their degree certificate.
4. A students who fulfils, or will fulfil, the requirements laid down in paragraph 1, and is interested in an Honours Programme Master can send his application to the Director of Education for approval. The content of the Honours Programme Master should be thematically consistent.
5. When determining the periods of time referred to in paragraph 2, any delay in completing the programme owing to circumstances that result in the student being eligible for financial support under the RAS financial support regulation for students shall be taken into account.

Article 4– Registering the tracks and compiling the examination programme

Only for Master

1. When students register for the MSc programme, they need to indicate their track and specialisation of interest.
2. At the start of the programme, students need to determine their examination programme in consultation with the relevant track coordinator. This is called the Student's progress review in Osiris.
3. No amendments can be made to the track core courses in the study programme. Any amendments made to the profile core courses and elective courses in the study programme should be approved by the relevant track coordinator and the Board of Examiners and then passed on to the Service Desk for processing.
4. Prior to the start of the Final Thesis, students need to present the title, a time schedule and the name(s) of the supervisor(s) of the Final Thesis to the Board of Examiners for approval.
5. Students who opt for the additional graduation profile "Technology in Sustainable Development" or "Entrepreneurship" need to present their progress overview to the coordinator of this profile and the Board of Examiners for approval.
6. The official starting date of the MSc programme is the date of enrolment in the master track. For students starting at the official start of the academic year this will be September 1st.

Article 4a – The annotation "Technology in Sustainable Development"

Only for Master

1. The examination programme for students who have opted for the additional annotation "Technology in Sustainable Development" must at least include the following:
 - a. course WM0939TU Engineering for Sustainable Development (5 credits – Q2).
 - b. elective courses adding up to a total of at least 10 credits. A maximum of 4 credits can be included in the curriculum as elective courses; the remaining credits (minimum 6 credits) are in addition to the regular curriculum. A complete list of courses can be found at www.tudelft.nl/tbm
 - c. a graduation project. Specific to their own disciplines, students are asked to incorporate sustainability issues in their graduation project. This may be an integrated part of your thesis or a separate appendix. Within faculties so-called 'SD coordinator' with specific expertise will assess the project, at the start and at the end, on the way SD has been tackled in the problem definition, the actual work and the conclusion of the project. The minimum value of the extra work performed in the framework of the annotation is 8 EC.
2. If the student has met all the requirements listed above, the annotation "Technology in Sustainable Development" will be listed on the degree certificate.

Article 4b – The annotation "Entrepreneurship"

Only for Master

1. The examination programme for students who have opted for the additional annotation "Entrepreneurship" must at least include the following:
 - a. courses MoT9610 Basic Entrepreneurship (5 credits – Q1) or MoT9614 Health Entrepreneurship Basic course (5 credits – Q1) and MoT9612 Business Development Lab Short (5 credits – Q3) or MoT9615 Health Development Lab (5 credits – Q2).
 - b. entrepreneurship-related elective courses adding up to a total of at least 5 credits.. These courses have to be taken in addition to the regular curriculum.
 - c. an Annotation Entrepreneurship Final Thesis of 5 credits (WM4003TU). This thesis is related to the student's regular Aerospace Engineering MSc thesis subject. The thesis work is in addition to the standard 42 MSc thesis credits. The thesis has to be approved by the Entrepreneurship coordinator of the faculty.
2. If the student has met all the requirements listed above, the annotation "Entrepreneurship" will be listed on the degree certificate.

Article 5 (Master) –European Wind Energy Master, Rotor Design Track

1. The European Wind Energy Master (EWEM) programme requires that students attend at least two of the four partner-universities during the two years. At least two universities must be represented by full professors or associate professors of the involved departments of these universities in the committee in charge of the examination of the thesis.
2. For the EWEM Rotor Design track students can choose one of the following elective profiles:
 - a. Aerodynamics
 - b. Structures and Composites
3. An individual study programme of students in the EWEM Rotor Design track of both profiles in their first year consist of:

- a. Core courses
 - b. Elective courses
4. The courses are followed at the University of Technology Denmark (DTU) the first and the third semester, and at Delft University of Technology (TUD) the second semester.
5. For information about the core courses for all elective profiles: see studyguide.tudelft.nl
6. An individual study programme of all students in the EWEM Rotor Design track, independent of their elective profile, in their second year consists of:
 - a. The thesis project
 - b. Core courses
 - c. Elective courses

The courses are followed at the University of Technology Denmark (DTU) in the first semester (third semester of the programme), and at any (associate) partner institution as chosen by the student and approved by the track coordinators from AE and DTU in the second semester (fourth semester of the programme).
7. The thesis project is the final study unit of the programme and serves to prove that the student acquired the academic competences of a Master of Science. The project involves a research or design task with sufficient academic level. The project may be executed within a research programme at one of the partner universities involved in this track, or in a suitable research institute or company, as approved by the EWEM Executive Board. The project must be executed with a systematic approach and should include all phases of a research or design project: analysis, modelling, implementation/construction and validation/evaluation. The student executes the thesis project independently, with guidance of at least two supervisors, one of them from the scientific staff of TU Delft, and one from the scientific staff of DTU.
8. Language and Communication skills (between 3 and 5 EC) can be chosen in any of the semesters at any of the participating partner universities. An internship (up to 6 EC) can also be chosen in any of the semesters in an industry.
9. In addition to the recommended electives, students can choose other courses from the total available list of the four EWEM partner universities, in agreement with the local academic EWEM coordinator.
10. The TU Delft Aerospace Engineering MSc degree will be awarded if a student has earned for all study units of his or her individual study programme of the EWEM programme at TU Delft a mark that is greater than or equal to 6, and has passed all study units of the EWEM programme at DTU.

Section 2 Examinations and practicals

Article 4 – Practical and/or exercises

1. The programme teaching takes the form of lectures, practicals and/or exercises.
2. Some practicals and/or exercises must be completed before students participate in the examination. This will be indicated in the study guide pertaining to that particular subject.

Article 5 – The types of examinations

1. The examinations linked to the different subjects are to be completed as laid down in the study guide pertaining to the subject in question.

2. Examinations pertaining to subjects given by other programmes are to be completed in the way stipulated by or on behalf of the Teaching and Examination Regulations laid down by the relevant programme.

Article 6 – The frequencies, times and sequences of the examinations

1. Written and oral examinations are to be completed at the end of the semester or term in which the subject was taught. A resit examination opportunity is offered later during the same academic year. Some courses have a different assessment method (weekly tests or written exams during the period). For more information see studyguide.tudelft.nl.

Note: for the MSc course AE4ASM517, there is no resit possibility.

2. Practicals and/or exercises may be completed in the way laid down in the relevant timetables.

Section 3 Entrance requirements

Article 7 – Entrance requirements for the units of study

Only for Bachelor:

1. First-year entrance requirements

If students have to meet a specific entry requirement before starting a course, this requirement shall be published in the digital study guide.

If students are allowed to take an examination only after successfully completing a number of computer assignments, this will be published in the digital study guide.

2. Second-year entrance requirements

AE2111-I: the entrance requirements are: 45 ECTs of the first year of the programme (BSA), including the first year project AE1111-I.

AE2223-I: the entrance requirements are: 45 ECTs of the first year of the programme including the first year projects AE1111-I and AE1222-I. The number of credits is based on the results up to and including the first examination period (October).

3. Third-year entrance requirements

For the academic year 2019-2020 Fall DSE AE3200 (November session):

- First year completed
- Second year completed
- Selection for the Fall DSE takes place on the basis of results up to and including the fifth examination period (August) of the academic year 2018-2019

For the academic year 2019-2020 Spring DSE AE3200 (April session):

- First year completed
- Second year completed
- Selection for the Spring DSE takes place on the basis of results up to and including the second examination period (January) of the academic year 2019-2020

Registering for the Fall DSE starts in May (week 4.3) and finishes in September (week 1.1). Check Registering for the Spring DSE start in November (week 2.3) and finishes in February (week 3.1) Check

The registration process and its deadlines will be announced via Brightspace and on the AE Airport website. There will be no e-mails sent to announce the registration process. It is the responsibility of the student to

watch the relevant messages closely and take appropriate action. Failing to register on time automatically implies that a student will not be admitted to the DSE.

AE3212-I and AE3212-II: for entrance requirements see digital study guide

Only for Master:

1. If students have to meet a specific requirement before starting a unit of study, this requirement shall be published in the digital study guide.
2. A candidate may not start the final graduation phase (thesis project) before having successfully completed the BSc programme and the first year of the MSc programme. Deviation from the second requirement is possible in exceptional circumstances, but only if approved by the thesis supervisor and track coordinator.

Section 4 Attendance and grading regulations Bachelor's

Article 8 – Attendance and grading regulations for first and second year projects

These rules apply to the projects AE1111-I, AE1222-I, AE2111-I and AE2223-I.

Attendance:

Attending the scheduled project sessions is obligatory and will be registered by the responsible lecturer.

1. For AE1222-I, AE2111-I and AE2223-I: Students are allowed to miss a maximum of 2 project sessions per period (half semester) for the project itself.
For AE1111-I: students are allowed to miss a maximum of 2 project sessions during the first period and one session during the second.
2. If a project has a supporting course the student is only allowed to be absent for one session of this course. This session is not counted as a missed project session as mentioned under 1.
3. Missing time (either by being late or leaving at any time) during project sessions can result in the student being registered as having missed sessions.
4. Missed sessions must be compensated according to the rules stated below.
5. The student must attend the first week of a project. Not being present in the first week of the project results in exclusion from participation in the project in that academic year.
6. A student is not allowed to miss the last two sessions of the 1st period and the first two sessions of the 2nd period of a semester.
7. Absence for more than the allowed number of sessions or failure to make up for missed hours will mean that the student cannot obtain a pass grade for the project.
8. Students who are of the opinion that there are relevant extenuating circumstances can turn to the academic counsellors for guidance.

For compensating absence, the following applies:

1. The student is responsible for fulfilling the compensatory assignment, at a time or within a time limit set by the responsible lecturer (this also applies to supporting courses).
2. The quality of the compensatory assignment is assessed by the responsible lecturer. If the student does not complete the assignment within the allocated time and/or with sufficient quality, they will fail the project.
3. Compensatory assignments cannot be amended or redone if deemed unsatisfactory upon assessment by the responsible lecturer.
4. No opportunities are offered outside the duration of the project for making up for missed sessions.
5. Students who are of the opinion that there are relevant extenuating circumstances can turn to the academic counsellors for guidance.

Grading regulations

1. A final mark for a subject will be expressed in a whole mark or half mark on a scale from 1.0 to 10.0.

2. If a subject consists of more than one component, and the marks for these components are registered in Osiris, these marks will be expressed decimals.
3. If a subject consists of more than one component and the marks for these components are registered in Osiris, the final result will be calculated as follows: the final result is the weighted average of the components, whereby the weight is the number of credits. The weighted average will be rounded off to half and whole figures, three-tenths, four-tenths, eight-tenths and nine-tenths will be rounded up and one-tenth, two-tenths, six-tenths and seven-tenths will be rounded down.
4. A final result will only be determined if all the components are marked 5.0 or higher.
5. In case the mark for a component is non-numerical, the final result will be determined if the mark is a pass grade (V or VR).
6. In determining the final result the non-numerical pass marks will be left out of the calculation.
7. If a subject consists of more than one component, but the marks for these components are not registered in Osiris, the way the final result is determined is described in the study guide.

Grading regulations first year per course

Code	Code	Course name	EC	Mark	Final result
AE1111	Exploring Aerospace Engineering & Design		5	whole or half mark	$(3(\text{gradeAE1111-1}) + 2(\text{gradeAE1111-11}))/5$
	AE1111-I	Exploring Aerospace Engineering	3	decimals	
	AE1111-II	Engineering Drawing	2	decimals	
	AE1111-III	Mile-stone test	0	V or O	
AE1110	Introduction Aerospace Engineering		9	whole or half mark	$(5(\text{gradeAE1110-1}) + 4(\text{gradeAE1110-11}))/9$
	AE1110-I	Introduction to Aerospace Engineering I	5	decimals	
	AE1110-II	Introduction to Aerospace Engineering II	4	decimals	
AE1130	Engineering Mechanics		7	whole or half mark	$(4(\text{gradeAE1130-1}) + 3(\text{gradeAE1130-11}))/7$
	AE1130-I	Statics	4	decimals	
	AE1130-II	Dynamics	3	decimals	
AE1108	Aerospace Materials and Structures		6	whole or half mark	$(3(\text{gradeAE1108-I}) + 3(\text{gradeAE1108-II}))/6$
	AE1108-I	Aerospace Materials	3	decimals	
	AE1108-II	Aerospace Mechanics of Materials	3	decimals	
WI1421 LR	Calculus I		6	whole or half mark	$(3(\text{gradeWI1421LR-I}) + 3(\text{gradeAE1421LR-II}))/6$
	WI1421LR-I	Calculus I-1	3	decimals	
	WI1421LR-II	Calculus I-11	3	decimals	
AE1222	Aerospace Design & Construction		9	whole or half mark	$(5(\text{gradeAE1222-I}) + 4(\text{gradeAE1222-II}))/9$
	AE1222-I	Aerospace Design & Construction	5	decimals	
	AE1222-II	Aerospace Design & Systems Engineering Elements 1	4	decimals	
AE1240	Physics		6	whole or half mark	$(3(\text{gradeAE1240-I}) + 3(\text{gradeAE1240-II}))/6$
	AE1240-I	Thermodynamics	3	decimals	
	AE1240-II	Waves and Electromagnetism	3	decimals	
AE1205	Programming & Scientific Computing in Python for AE 1		2	whole or half mark	
WI1402 LR	Calculus II		5	whole or half mark	
WI1403 LR	Linear Algebra		5	whole or half mark	

Note: The final result is only determined if the mark for all components is 5.0 or higher.

First-year projects AE1111-I and AE1222-I and Second-year projects AE2111-I and AE2223-I

Grading:

Students will only be awarded a final grade for the project if:

1. The whole project has been completed and all compensatory assignments have been completed successfully and,
2. No more than one partial grade is lower than 6.0 and,
3. All partial grades are 5.0 or higher.

Partial grades will be rounded to 1 decimal and the final grade will be rounded to the nearest half grade. The final grade must be 6.0 or higher to pass the project. If a student fails the project they have to redo the project the following academic year.

Grading regulations second year per course

Code	Code	Course name	EC	Mark	Final result
AE2111	Aerospace System design		8	whole or half mark	$(5(\text{gradeAE2111-I}) + 3(\text{gradeAE2111-II})) / 8$
	AE2111-I	System Design	5	decimals	
	AE2111-II	Aerospace Design & Systems engineering Elements II	3	decimals	
AE2130	Aerodynamics Sub- and Supersonic		7	whole or half mark	$(3(\text{gradeAE2130-I}) + 1(\text{gradeAE2130-II}) + 3(\text{gradeAE2130-III})) / 7$
	AE2130-I	Aerodynamics I (incompressible)	3	decimals	
	AE2130-II	Low-Speed Wind Tunnel Test	1	decimals	
	AE2130-III	Aerodynamics II (compressible)	3	decimals	
AE2135	Structural and Vibrational Analysis & Design		8	whole or half mark	$(5(\text{gradeAE2135-I}) + 3(\text{gradeAE2135-II})) / 8$
	AE2135-I	Structural Analysis and Design	5	decimals	
	AE2135-II	Vibrations	3	decimals	
WI2180	Differential equations and Probability & Statistics		8	whole or half mark	$(4(\text{gradeWI2180-I}) + 4(\text{gradeWI2180II})) / 8$
	WI2180-I	Differential Equations	4	decimals	
	WI2180-II	Probability and Statistics	4	decimals	
AE2223	Test, Analysis & Simulation		8	whole or half mark	$(5(\text{gradeAE2222-1}) + 3(\text{gradeAE2222-11})) / 8$
	AE2223-I	Test, Analysis & Simulation	5	decimals	
	AE2223-II	Experimental Research & Data Analysis	3	decimals	
AE2230	Flight & Orbital Mechanics and Propulsion		8	whole or half mark	$(4(\text{gradeAE2230-I}) + 4(\text{gradeAE2230-II})) / 8$
	AE2230-I	Flight and Orbital Mechanics	4	decimals	
	AE2230-II	Propulsion and Power	4	decimals	
AE2235	Aerospace Signals, Systems and Control		7	whole or half mark	$(4(\text{gradeAE2235-I}) + 3(\text{gradeAE2235-II})) / 7$
	AE2235-I	Aerospace Systems and Control Theory	4	decimals	
	AE2235-II	Instrumentation and Signals	3	decimals	
AE2220	Applied Numerical Analysis and Computational Modelling		6	whole or half mark	$(3(\text{gradeAE2220-I}) + 3(\text{gradeAE2220-II})) / 6$
	AE2220-I	Applied Numerical Analysis	3	decimals	
	AE2220-II	Computational Modelling	3	decimals	

Grading regulations third year per course

Code	Code	Course name	EC	Mark	Final result
AE3211	Aerospace Systems Engineering, Design and Production		6	whole or half mark	$(3(\text{gradeAE3211-I}) + 3(\text{gradeAE3211-II})) / 6$
	AE3211-I	Systems Engineering and Aerospace Design	3	decimals	
	AE3211-II	Production of Aerospace Systems	3	decimals	
AE3212	Aerospace Flight Dynamics, Simulation, Verification & Validation incl Flight Test		9	whole or half mark	$(5(\text{gradeAE3212-I}) + 4(\text{gradeAE3212-II})) / 9$
	AE3212-I	Aerospace Flight Dynamics and Simulation incl Flight Test	5	decimals	
	AE3212-II	Simulation, Verification & Validation	4	decimals	
AE3200	Design Synthesis		15	whole or half mark	

Section 5 Transitional ruling

Article 9 – Transitional ruling

No additional transition ruling available

Article 10 – Examinations for old study programmes

If a new study programme is drawn up for a certain year of study, then examinations for the units of study of the old programme that are discontinued will be set twice in the academic year following the year in which the units were taught for the last time.