

**IMPLEMENTATION REGULATIONS**

**BACHELOR'S DEGREE PROGRAMME  
AEROSPACE ENGINEERING**

**DELFT UNIVERSITY OF TECHNOLOGY**

**2013-2014**

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## Section 1 – Bachelor’s degree programme

### Article 1 – The study load

1. The study load for the Bachelor’s degree programme is 180 credits.

### Article 2 – Composition of the Bachelor’s degree programme

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

BSc Year 1	Propaedeutic 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 flexible 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. The Board of Examiners must approve the composition of the flexible minor. A student must submit his/her request to the Board of Examiners well in advance, using the ‘flexible minor form’ that can be found on the website of the Board of Examiners. A student must clearly state why he/she considers the package of subjects to be cohesive.

The minor can also be used to follow teaching at universities abroad. The same regulations exist for a minor abroad as those for the flexible minor.

4. Detailed information about the content of the Bachelor's degree programme can be found in the BSc Study Guide of the current academic year ([www.studyguide.tudelft.nl](http://www.studyguide.tudelft.nl)).

## **Section 2 Interim examinations and practicals**

### **Article 3 – 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 interim examination. This will be indicated in the study guide pertaining to that particular subject.

### **Article 4 – The types of examinations**

1. The interim examinations linked to the different subjects are to be completed as laid down in the study guide pertaining to the subject in question.
2. Interim 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 5 – The frequencies, times and sequences of the interim examinations**

1. Written and oral interim examinations are to be completed at the end of the semester or term in which the subject was taught. A resit interim examination opportunity is offered later during the same academic year.
2. Practical and/or exercises may be completed in the way laid down in the relevant timetables.

## **Section 3 Entrance requirements**

### **Article 6 – Entrance requirements for the units of study**

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 interim examination only after successfully completing a number of computer assignments, this will be published in the digital study guide.

2. Second-year entrance requirements

AE2100: the entrance requirements are: 45 ECTS of the first year of the programme (BSA), including the first year project AE1111-I.

AE2222-I: the entrance requirements are: 45 ECTS of the first year of the programme and the first year projects AE1111-I and AE1222-I. The number of credits includes AE1111-I and AE1222-I and is based on the results up to and including the fifth examination period (August).

### 3. Third-year entrance requirements

#### AE3200 (November session)

In order to be admitted to the November Design Synthesis Exercise you must meet the following requirements:

- First year completed
- At least 50 EC from the second year BSc AE
- Fourth year Bsc student or older
- Selection for the Fall DSE takes place on the basis of results up to and including the fourth examination period

#### AE3200 (April session)

In order to be admitted to the November Design Synthesis Exercise you must meet the following requirements:

- First year completed
- At least 50 EC from the second year BSc AE
- Third year BSc- student or older

Selection for the Spring DSE takes place on the basis of results up to and including the first examination period.

For the selection of the Fall DSE 2013 (2<sup>nd</sup> period), no modules will be taken into account for the selection. Therefore the 50 credits can only be obtained by the grades of separate courses. For the admission of the Spring DSE 2014 (4<sup>th</sup> period) the most favourable regulation for the student will be used. This can either be by looking at separate courses or looking at the grades of modules

AE3212-I including flight test: entrance requirements flight test see digital study guide

## **Section 4 Attendance and grading regulations**

### **Article 7 – 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. Students are allowed to miss a maximum of 2 project sessions per period (half semester) for the project itself
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.

- 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:

- 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).
- 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.
- Compensatory assignments cannot be amended or redone if deemed unsatisfactory upon assessment by the responsible lecturer.
- No opportunities are offered outside the duration of the project for making up for missed sessions.
- Students who are of the opinion that there are relevant extenuating circumstances can turn to the academic counsellors for guidance.

### Grading regulations

- 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.
- 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.
- 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.
- A final result will only be determined if all the components are marked 5.0 or higher.
- 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).
- In determining the final result the non-numerical pass marks will be left out of the calculation.
- 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	<b>Exploring Aerospace Engineering &amp; Design</b>		<b>5</b>	<b>whole or half mark</b>	$(3(\text{gradeAE1111-1}) + 2(\text{gradeAE1111-11}))/5$
	AE1111-I	Exploring Aerospace Engineering	3	decimals	
	AE1111-II	Engineering Drawing	2	decimals	
	AE1111-III	Study Skills & Guidance	0	V or O	
AE1110	<b>Introduction Aerospace Engineering</b>		<b>9</b>	<b>whole or half mark</b>	$(5(\text{gradeAE1110-1}) + 4(\text{gradeAE1110-11}))/9$
	AE1110-I	Introduction to Aerospace Engineering I	5	decimals	
	AE1110-II	Introduction to Aerospace Engineering II	4	decimals	
AE1130	<b>Engineering Mechanics</b>		<b>7</b>	<b>whole or half mark</b>	$(4(\text{gradeAE1130-1}) + 3(\text{gradeAE1130-11}))/7$
	AE1130-I	Statics	4	decimals	
	AE1130-II	Dynamics	3	decimals	
AE1108	<b>Materials and Structures for Aircraft and Spacecraft</b>		<b>6</b>	<b>whole or half mark</b>	$(3(\text{gradeAE1108-1}) + 3(\text{gradeAE1108-11}))/6$
	AE1108-I	Aerospace Materials	3	decimals	
	AE1108-II	Aerospace Mechanics of Materials	3	decimals	
WI1421 LR	<b>Calculus I</b>		<b>6</b>	<b>whole or half mark</b>	$(3(\text{gradeWI1421LR-1}) + 3(\text{gradeAE1421LR-11}))/6$
	WI1421LR-I	Calculus I-1	3	decimals	

	WI1421LR-II	Calculus I-11	3	decimals	
<b>AE1222</b>	<b>Aerospace Design &amp; Construction</b>		<b>9</b>	<b>whole or half mark</b>	$(5(\text{gradeAE1222-1}) + (\text{gradeAE1222-11})) / 9$
	AE1222-I	Aerospace Design & Construction	5	decimals	
	AE1222-II	Aerospace Design & Systems Engineering Elements 1	4	decimals	
<b>AE1240</b>	<b>Physics</b>		<b>6</b>	<b>whole or half mark</b>	$(3(\text{gradeAE1240-1}) + 3(\text{gradeAE1240-11})) / 6$
	AE1240-I	Physics 1	3	decimals	
	AE1240-II	Physics 11	3	decimals	
<b>AE1205</b>	<b>Programming &amp; Scientific Computing in Python for AE 1</b>		<b>2</b>	<b>whole or half mark</b>	
<b>WI1402 LR</b>	<b>Calculus II</b>		<b>5</b>	<b>whole or half mark</b>	
<b>WI1403 LR</b>	<b>Linear Algebra</b>		<b>5</b>	<b>whole or half mark</b>	

**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
<b>AE2111</b>	<b>Aerospace System design</b>		<b>8</b>	<b>whole or half mark</b>	$(5(\text{gradeAE2111-I}) + (3(\text{gradeAE2111-II}))) / 8$
	AE2111-I	System Design	5	decimals	
	AE2111-II	Aerospace Design & Systems engineering Elements II	3	decimals	
<b>AE2130</b>	<b>Aerodynamics Sub- and Supersonic</b>		<b>7</b>	<b>whole or half mark</b>	$(3(\text{gradeAE2130-I}) + (1(\text{gradeAE2130-II}) + (3(\text{gradeAE2130-III}))) / 7$
	AE2130-I	Aerodynamics I (incompressible)	3	decimals	
	AE2130-II	Low-Speed Wind Tunnel Test	1	decimals	
	AE2130-III	Aerodynamics II (compressible)	3	decimals	
<b>AE2135</b>	<b>Structural and Vibrational Analysis &amp; Design</b>		<b>8</b>	<b>whole or half mark</b>	$(5(\text{gradeAE2135-I}) + (3(\text{gradeAE2135-II}))) / 8$
	AE2135-I	Structural Analysis and Design	5	decimals	
	AE2135-II	Vibrations	3	decimals	
<b>WI2180</b>	<b>Differential equations and Probability &amp; Statistics</b>		<b>8</b>	<b>whole or half mark</b>	$(4(\text{gradeWI2180-I}) + (4(\text{gradeWI2180II}))) / 8$
	WI2180-I	Differential Equations	4	decimals	
	WI2180-II	Probability and Statistics	4	decimals	
<b>AE2223</b>	<b>Test, Analysis &amp; Simulation</b>		<b>8</b>	<b>whole or half mark</b>	$(5(\text{gradeAE2222-1}) + (3(\text{gradeAE2222-11}))) / 8$
	AE2223-I	Test, Analysis & Simulation	5	decimals	
	AE2223-II	Experimental Research & Data Analysis	3	decimals	
<b>AE2230</b>	<b>Flight &amp; Orbital Mechanics and Propulsion</b>		<b>8</b>	<b>whole or half mark</b>	$(4(\text{gradeAE2230-I}) + (4(\text{gradeAE2230-II}))) / 8$
	AE2230-I	Flight and Orbital Mechanics	4	decimals	
	AE2230-II	Propulsion and Power	4	decimals	

<b>AE2235</b>	<b>Aerospace Signals, Systems and Control</b>		<b>7</b>	<b>whole or half mark</b>	(4(gradeAE2235-I)+3(gradeAE2235-II))/ 7
	AE2235-I	Aerospace Systems and Control Theory	4	decimals	
	AE2235-II	Instrumentation and Signals	3	decimals	
<b>AE2212</b>	<b>Applied Numerical Analysis and Computational Modelling</b>		<b>6</b>	<b>whole or half mark</b>	(3(gradeAE2220-I)+3(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
<b>AE3211</b>	<b>Aerospace Systems Engineering, Design and Production</b>		<b>6</b>	<b>whole or half mark</b>	(3(gradeAE3211-I)+3(gradeAE3211-II))/ 6
	AE3211-I	Systems Engineering and Aerospace Design	3	decimals	
	AE3211-II	Production of Aerospace Systems	3	decimals	
<b>AE3212</b>	<b>Aerospace Flight Dynamics, Simulation, Verification &amp; Validation incl Flight Test</b>		<b>9</b>	<b>whole or half mark</b>	(5(gradeAE3212-I)+4(gradeAE3212-II))/ 9
	AE3212-I	Aerospace Flight Dynamics and Simulation incl Flight Test	5	decimals	
	AE3212-II	Simulation, Verification & Validation	4	decimals	
<b>AE3200</b>	<b>Design Synthesis</b>		<b>15</b>	<b>whole or half mark</b>	

## Section 5 Transitional ruling

### Article 8 – Transitional ruling

Below the changes and transitional rulings from September 2005 on are listed

#### Transition ruling 2005-2006

Aerodynamics (AE2-115 II or AE2-120) is replaced by Thermodynamics and Compressible Aerodynamics (AE2-125). Course codes are interchangeable, however, grades for the new course AE2-125 will **not** be averaged with grade for Aerodynamics B.

Following the introduction of minors students who started their Bsc programme before September 2003 and did not complete their third year before September 2005 were assigned a transitional programme. These transitional programmes are laid down in the individual student programmes.

#### Transition ruling 2006-2007

Separate exams for AE1-020IIA and AE1-020 IIB (instead of the combined exam AE1-020IIAB).

#### Minor3

- The courses AE3-403 (3EC) and AE3-485 (3 EC) are deleted, and replaced by Business Economics (WM0609LR, 6EC).
- Course code AE3-295 is replaced by AE3-295I/II.

#### Minor 4

- The practicals ae3-804P, ae3-E01P, ae3-E02P and ae3-E03P are substituted by one practical: Integrated Case study EPO (ae3-E00).

#### Minor 5

- The course ie3320 Introduction to Renewable Energy Systems is deleted (3 EC).
- AE3-W01 Introduction to wind energy is upgraded from 3 to 4 ECTS: new course code: AE3-W02
- AE3-T01 Present interest in sustainable engineering is upgraded from 2 to 3 ECTS: new course code AE3-T03.



- The course ae3-T02 gets an additional practical: ae3-T02P "Practical electrical power generation, storage and usage" of 1 EC.

Transition ruling 2007-2008

The practical AE1-701P Metal working demonstration is discontinued. Students who started in 2006 or before and have as yet not completed the practical will obtain an exemption (VR) in their individual study programme.

Minor 1 and minor 5

- AE3-020 and AE3-020P are combined into one course code: AE3-021. No changes in the content of the course.

Transition ruling 2008-2009

For students starting in September 2008 a mandatory Calculus test is added (WI1000). This test has to be passed before one can do the regular Calculus exam.

Transition ruling 2009-2010

Starting September 2009, a new first-year BSc curriculum will be introduced. See BSc Transition Regulations on Blackboard for details (Blackboard >Organizations > Aerospace Engineering Students > New BSc programme) or request a copy from the Board of Examiners if you do not have access to Blackboard.

Starting September 2009, new grading rules will go into effect: all Aerospace Engineering subjects are rounded off to whole marks. For details, see article 17.5 of the BSc Rules and Guidelines.

Starting September 2009, new pass/fail rules will go into effect: none of the marks in the BSc programme may be lower than 6. This rule affects students who will be enrolled in the new BSc programme in Aerospace Engineering. The old pass/fail rules remain valid for students who stay enrolled in the old (pre-September 2009) BSc programme.

Minor 1 and 2

- AE3-030 and AE3-030P are combined into one course code: AE3-031. No changes in the content of the course.

Minor 4

- the minor Earth and Planetary Observation has been renamed to minor Space and has been thoroughly redesigned. Since the minor was not offered last year, no resit interim examinations need to be offered. See study guide for details.

Minor 5

- AE3T04 Electrical Power Engineering is replaced by ET4365LR Electrical Power Engineering.

Transition ruling 2010-2011

Starting September 2010, a new second-year and third-year BSc curriculum will be introduced. See BSc Transition Regulations on Blackboard for details (Blackboard >Organizations > Aerospace Engineering Students > New BSc programme) or request a copy from the Board of Examiners if you do not have access to Blackboard.

Starting September 1, 2010, new grading rules will go into effect: a final mark for a subject will be expressed in a whole mark or a half mark. For details, see article 17.5 of the BSc Rules and Guidelines.

Minors LR-Mi-017-09: Aerospace Analysis and Development and LR-Mi-066-09: Aerospace Operation and Exploitation are discontinued in 2010/2011. All remaining existing minors will change in 2010/2011. See study guide for details.

### Transition ruling 2011-2012

There is a revised version of the transition ruling for year 2011-2012. The latest version will be available on the website of the Board of Examiners.

The main changes are:

- All tables (course codes and EC) are based on the 2011-2012 programme.
- The list of additional courses third year contains third year courses only.
- There is no longer a fixed order in the additional courses.
- No more references to resits of all courses (are not offered anymore).

Discontinued courses are:

- AE2103 Space Missions and Applications I
- AE2104P Flight Mechanics Flight Test
- AE3202P Flight Dynamics and Simulation Test Flight
- Furthermore, AE2107 Probability and Statistics is replaced by a similar course offered by the Mathematics department (WI2107LR.) The courses AE2206 and AE2208 will per 2011-2012 be merged into one course: AE2212 (6 EC).

Starting September 1, 2011 new pass/fail rules will go into effect for the second and third year: all courses must be passed with a grade 6.0 or higher in order to obtain the BSc degree. One previously obtained grade of 5 for a course (not a project or practical) in year 2 -and- year 3 respectively with a maximum of 5 EC each can be changed to a pass result (V). Students will be asked to indicate which qualifying grades they would like to change from a 5 to a V. The deadline will be November 1, 2011.

Minor LR/Mi-068-10: Windenergy and Sustainability is discontinued in 2011-2012. There will be a new LR Minor: Airport of the Future. See study guide for details

### Transition ruling 2012-2013

Transition regulations for the first year have been published in a separate attachment: Transition Regulations BSc first year 2012-2013 (June 22, 2012).

### Transition ruling 2013-2014

Transition regulations for the second and third year have been published in a separate attachment: Transition Regulations BSc second and third year 2013-2014 (June 2013).

## **Article 9 – Interim examinations for old study programmes**

If a new study programme is drawn up for a certain year of study, then interim 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.