Faculteit der Natuurwetenschappen, Wiskunde en Informatica Faculty of Science

DE EXAMENCOMMISSIE VERKLAART DAT

THE BOARD OF EXAMINERS CERTIFIES THAT

Tom Doekle Vethaak

GEBOREN

BORN

25 maart 1993 te PURMEREND 25 March 1993 in PURMEREND

MET GOED GEVOLG HET BACHELOREXAMEN HEEFT AFGELEGD IN

HAS PASSED THE BACHELOR EXAMINATION IN

Natuur- en Sterrenkunde Physics and Astronomy

ACCREDITATIEDATUM

ACCREDITATION DATE

28 mei 2008

28 May 2008

DE GEËXAMINEERDE IS GERECHTIGD TOT HET VOEREN VAN DE TITEL

THE EXAMINEE HAS BEEN AWARDED THE DEGREE OF

Bachelor of Science | BSc

GETEKEND

SIGNED

Amsterdam 20 juni 2014

DOOR DE GEËXAMINEERDE

BY THE EXAMINEE

DOOR DE EXAMENCOMMISSIE BY THE BOARD OF EXAMINERS

DE EXAMENONDERDELEN WORDEN IN EEN GEWAAR-MERKTE BIJLAGE VERMELD. THE ACCOMPANYING CERTIFIED SUPPLEMENT LISTS THE SUBJECTS ON WHICH THE EXAMINEE WAS EXAMINED.

Bachelor Diploma Supplement

University of Amsterdam

Faculty of Science

Purpose of this document

This Diploma Supplement model was developed by the European Commission, Council of Europe and UNESCO/CEPES.

The purpose of the supplement is to provide sufficient independent data to improve the international 'transparency' and fair academic and professional recognition of qualifications (diplomas, degrees, certificates etc.). It is designed to provide a description of the nature, level, context, content and status of the studies that were pursued and successfully completed by the individual named on the original qualification to which this supplement is appended. It should be free from any value judgements, equivalence statements or suggestions about recognition. Information in all eight sections should be provided. Where information is not provided, an explanation should give the reason why.

Information identifying the holder of the qualification

- 1.1 Family name(s)
- 1.2 Given name(s)
- 1.3 Date of birth
- 1.4 Student identification number
- Vethaak
- Tom Doekle 25 March 1993
- 10000719

- 2.
- 2.1 Name of qualification and title conferred
 - Main field(s) of study for the
- qualification

 2.3 Name and status

 of awarding

institution

- 2.4 Name and status of Institution administering studies
- 2.5 Language(s) of instruction/

Information identifying the qualification

- Bachelor of Science in Physics and Astronomy
- (Natuur- en Sterrenkunde)
- Physics and Astronomy
- Universiteit van Amsterdam (University of Amsterdam) founded in 1632 as an Illustrious School (Athenaeum Illustre) by the city government of Amsterdam, and recognized as a public university by the National government in 1877.
- Faculty of Science (Faculteit der Natuurwetenschappen, Wiskunde en Informatica)
- College of Science

Dutch

| <i>3</i> . | | Information on the level of the qualification |
|------------|------------------------------|---|
| 3.1 | Level of qualification | Bachelor of Science |
| 3.2 | Official length of programme | The official duration of the programme is three years; 180 EC (Full-time). |
| <i>3.3</i> | Access requirement(s) | The specific admission requirements are laid down in the Examination and Education Regulations (OER) of the Faculty of Science. |
| 4. | | Information on the contents and results gained |
| 4.1 | Mode of study | Full-time |
| 4.2 | Programme | Discipline-linked knowledge and skills |

requirements

The graduate:

- Has a thorough theoretical and practical basic knowledge of physics/astronomy, including the necessary mathematical methods of description.
- Is able to acquire new discipline-linked knowledge and skills independently and to integrate these with previously acquired knowledge and skills.
- Is familiar with the quantitative nature of Physics/Astronomy, and the scientific methods used within the context of Physics/Astronomy.
- Has been introduced to scientific research in the field of Physics/Astronomy and has the ability to carry out a small research project independently;
- Has undertaken sufficiently broad orientation to enable him to make a responsible choice for a follow-up study programme or the labour market;
- Understands the position and importance of Physics/Astronomy in a broader scientific, philosophical or social context.

General skills

The graduate:

- has an independent, academically critical attitude and work method;
- has the ability to report scientific results and the application thereof to specialists and non-specialists, both orally and in writing;
- has the ability to search for and process information;
- possesses the ICT skills to match the chosen specialisation;
- can work as part of a team and has experience in working on a project basis;
- has acquired a solid basis for a teacher-training programme.

4.3 Programme details

| Physics and Astronomy (BSc) | Exam Date | EC | Grade |
|---|------------|-----|-------|
| Requirements | | | |
| Year 1 | | | |
| Classical Mechanics 1 | 28/10/2010 | 3 | 8.0 |
| Calculus 1 | 14/12/2010 | 6 | 6.0 |
| Astronomy 1 | 16/12/2010 | 4 | 8.0 |
| From Classical to Quantum Mechanics | 23/12/2010 | 3 | 8.5 |
| Special Theory of Relativity | 10/01/2011 | 6 | 8.5 |
| Tutor Class | 01/02/2011 | 2 | Pass |
| Oscillations and Waves | 24/03/2011 | 4.5 | 8.0 |
| Astronomy Practical Work 1 | 01/04/2011 | 2 | 6.0 |
| Highlights Physics and Astronomy | 18/05/2011 | 1 | Pass |
| Quantum Physics 1 | 23/05/2011 | 6 | 9.0 |
| Condensed Matter 1 | 25/05/2011 | 6 | 8.5 |
| Planet Systems | 25/05/2011 | 6 | 7.5 |
| Electricity and Magnetism | 27/05/2011 | 4.5 | 8.0 |
| Electrodynamics and Light | 28/06/2011 | 3 | 8.0 |
| Calculus 2 | 01/07/2011 | 6 | 8.5 |
| Physics Lab Course 1 | 06/07/2011 | 3 | 8.0 |
| Condensed Matter 1 - Lab experiments | 31/08/2011 | 3 | 8.5 |
| Year 2 | | | |
| Classical Mechanics 2 | 28/10/2011 | 3 | 8.0 |
| Astrophysics | 19/12/2011 | 6 | 7.0 |
| Numerical Physics | 20/12/2011 | 3 | 9.5 |
| Thermal Physics | 21/12/2011 | 6 | 9.0 |
| Physics Lab Course 2 | 25/01/2012 | 3 | 7.5 |
| Research Laboratory Experimental Physics | 16/05/2012 | 3 | 8.0 |
| Quantum Physics 2 | 31/05/2012 | 6 | 8.5 |
| Subatomic Physics 1 | 31/05/2012 | 6 | 6.5 |
| Statistical Physics | 01/06/2012 | 6 | 6.0 |
| Project Physics/Astronomy 2 | 06/08/2012 | 6 | 8.0 |
| Mathematics | 23/10/2012 | 6 | 7.0 |
| Linear Algebra | 21/12/2012 | 6 | 7.5 |
| Year 3 | | | |
| Modern Astronomy | 28/03/2011 | 3 | 6.0 |
| Big History | 31/08/2012 | 12 | 7.0 |
| Orientation on Physics and Astronomy | 17/12/2012 | 2 | Pass |
| Workshop Physics (Theoretical Physics) | 03/02/2013 | 3 | 6.0 |
| Academic Skills; extension | 14/03/2013 | 4 | Pass |
| Quantum Physics 3 | 10/07/2013 | 6 | 8.0 |
| Norwegian Literature until 1900 & Norwegian Language Proficiency 4a | 21/10/2013 | 6 | 6.9 |
| Atomic Physics 1 | 07/01/2014 | 3 | 7.0 |
| Electrodynamics and Theory of Relativity 2 | 28/03/2014 | 6 | 7.5 |
| Electrodynamics and Theory of Relativity 1 | 26/05/2014 | 6 | 8.5 |

Signature:

Ran

| Bachelor Project Bachelor Project Thermodynamica Cycles in Superconductors | 02/04/2014 | 12 | 8.0 |
|--|------------|-----|-----|
| Extracurricular | | | |
| Norwegian Language Proficiency 1 | 22/10/2012 | 6 | 6.7 |
| Norwegian Language Proficiency 2 | 17/12/2012 | 6 | 6.8 |
| Norwegian Language Proficiency 3 & History and Culture of Norway | 28/06/2013 | 12 | 7.6 |
| Subtotal EC: | | 216 | |
| GPA: | | | 7.6 |
| Total EC: | | 216 | |

Signature:

10000719

| UvA Grades | UvA Letter | Grade point | UvA Descriptive grade | Grade point | UK Letter* | US Letter* | |
|---------------|---------------|---------------------------------|-----------------------------|-------------|------------|------------|---|
| 9.0 - 10.0 | A+ | 9.5 | Excellent | 9.0 | A+ | A+ | |
| 8.5 - 8.9 | A | 8.5 | TACCIICIIC | | | | |
| 8.3 - 8.4 | | | | | A | | |
| 8.0 - 8.2 | Α- | Δ_ | 8.0 | Good | 8.0 | | Α |
| 7.8 - 7.9 | | 0.0 | | | A- | | |
| 7.5 - 7.7 | B+ | $\mathbf{R}_{oldsymbol{\perp}}$ | 75 | | | | |
| 7.3 - 7.4 | | | | 7.0 | B | B+ | |
| 7.0 - 7.2 | B | 7.1 | Satisfactory | | | | |
| 6.7 - 6.9 | B- | 6.8 | Jackson | | | B | |
| 6.5 - 6.6 | C+ | - 6.6 | 6.5 | | | | |
| 6.4 | | U.J | Sufficient | 6.0 | D | C | |
| 6.1 - 6.3 | C | 6.0 | | | | | |
| 5.5 - 6.0 | | | | | E | D | |
| 4.6 - 5.4 | D | 5.0 | Fail | 4.0 | F | F | |
| 1.0 - 4.5 | F | 4.0 | 1 all | | | | |

^{*} The given conversion scheme is suggested for broad orientation purposes only. For more information on the Dutch grading culture in comparison to other cultures, please consult www.nuffic.nl.

The following indicates:

Pass

= Student met all requirements

For information on workload and ECTS, please see the appendix on the higher education system in the Netherlands.

See appendices for the Dutch credit system and marking.

Overall classification of the qualification

The Board of Examiners may award the Bachelor degree with distinctive classification. If so, the distinctive is explicitly mentioned on the degree certificate itself.

Information on the function of the qualification

Access to further study

The Bachelor degree in Physics and Astronomy makes a student eligible for a subject related master's programme.

Professional status

Not applicable

Additional information

Additional information

The degree programme was accredited by the Accreditation Organization of the Netherlands and Flanders (Nederlands-Vlaamse Accreditatie Organisatie) on 28 May 2008.

Further information sources

University of Amsterdam P.O. Box 19268 1000 GG Amsterdam The Netherlands

Tel. +31 (0)20 525 8080 Email. sic@uva.nl

Website: http://www.uva.nl

Certification of the supplement

.1 Date 2014

7.2 Signature

Dr. R.A.D. Wijnands

.3 Capacity The Board of Examiners

7.4 Official stamp or Seal

Information on the national higher education system

The higher education system in the Netherlands.

This section describes the higher education system in the Netherlands. It is based on a three-cycle system consisting of Bachelor, Master and PhD degrees. A description of admission requirements, the Dutch marking system and degree accreditation is also included.

Secondary education

Secondary education, which begins at the age of 12, is compulsory until the age of 16 and is offered at several levels. The two programmes of general education that lead to higher education are HAVO (five years) and VWO (six years). Pupils are enrolled according to their ability, and although VWO is more rigorous, both HAVO and VWO are characterised as selective types of secondary education. The VWO curriculum prepares pupils for university and only the VWO diploma grants access to WO (research universities). The HAVO diploma is the minimum requirement for admission to HBO (universities of professional education). The last two years of HAVO and the last three years of VWO are referred to as the second phase ('tweede fase'), or upper secondary education. During these years, pupils focus on one of four subject clusters ('profielen'), each of which emphasises a specified area of study, in addition to satisfying general education requirements. Each cluster is designed to prepare pupils for programmes of study at the tertiary level. A pupil enrolled in VWO or HAVO can choose from the following subject clusters:

- 1) Science and Technology ('Natuur en Techniek')
- 2) Science and Health ('Natuur en Gezondheid')
- 3) Economics and Society ('Economie en Maatschappij')
- 4) Culture and Society ('Cultuur en Maatschappij')

Higher education

Higher education in the Netherlands is offered at two types of institutions: research universities ('universiteiten' or 'Wetenschappelijk Onderwijs') and universities of professional education ('hogescholen' or 'Hoger Beroepsonderwijs'). The former comprise general universities and universities specialising in engineering and agriculture. The latter comprise general institutions and institutions specialising in a particular field, such as agriculture, fine and performing arts, or teacher training.

Since September 2002, the higher education system in the Netherlands has been organised around a three-cycle system consisting of Bachelor, Master and PhD degrees. At the same time, the ECTS credit system was adopted as a way of quantifying periods of study. However, the higher education system continues to be a binary system with a distinction between research-oriented education and professional higher education.

The level of a degree programme determines both the number of credits required to complete the programme and the degree that is awarded. A WO bachelor's programme requires the completion of 180 credits (3 years) and graduates obtain the degree of Bachelor of Arts or Bachelor of Science (B.A./B.Sc.), depending on the discipline. An HBO bachelor's programme requires the completion of 240 credits (4 years), and graduates obtain a degree indicating their field of study, for example Bachelor of Engineering (B. Eng.) or Bachelor of Nursing (B. Nursing). The previous title appropriate to the discipline in question (bc., ing.) may still be used.

WO master's programmes mostly require the completion of 60 or 120 credits (1 or 2 years). Some programmes require 90 (1.5 years) or more than 120 credits. In engineering, agriculture, and maths and the natural sciences, 120 credits are always required. Graduates obtain the degree of Master of Arts or Master of Science (MA/MSc). The old title appropriate to the discipline in question (drs., mr., ir.) may still be used. HBO master's programmes require the completion of 60 to 120 credits, and graduates obtain a degree indicating the field of study, for example Master of Social Work (MSW).

The third cycle of higher education is offered only by research universities, which are entitled to award the country's highest academic degree, the doctorate, which entitles a person to use the title doctor (dr.). The process by which a doctorate is obtained is referred to as the promotie. The doctorate is primarily a research degree, for which a dissertation based on original research must be written and publicly defended.

Requirements for admission to higher education

To enrol in a WO bachelor's programme, a student is required to hold a VWO diploma or to have completed the first year (60 credits) of an HBO programme. The minimum admission requirement for HBO

is either a HAVO school diploma or a level-4 MBO diploma. For admission to both types of higher education, pupils are required to have completed at least one of the subject clusters that fulfils the requirements for the higher education programme in question. A quota ('numerus fixus') applies to admission to certain programmes, primarily in the medical sciences, and places are allocated using a weighted lottery. Applicants older than 21 years who do not possess one of the qualifications mentioned above can qualify for admission to higher education on the basis of an entrance examination and assessment.

For admission to all master programmes, a bachelor degree in one or more specified disciplines is required, in some cases in combination with other requirements. Graduates with an HBO bachelor may have to complete additional requirements for admission to a WO master programme.

Credit system and marking

A student's workload (both contact hours, and hours spent studying and preparing assignments) is measured in ECTS credits, whereby under Dutch law one credit represents 28 hours of work and 60 credits represents one year of full-time study.

The marking system has been the same for several decades: the scale is from 1 (very poor) to 10 (outstanding). The lowest pass mark is 6. The mark 9 is seldom awarded, and the highest pass mark 10 is extremely rare. Decimal values may be used (e.g. 7.8).

Accreditation and quality assurance

A guaranteed standard of higher education is maintained through a national system of legal regulation and quality assurance. The Ministry of Education, Culture and Science is responsible for legislation pertaining to education. A system of accreditation was introduced in 2002. Since then, the new Accreditation Organization of The Netherlands and Flanders (NVAO) has been responsible for accreditation. According to the section of the Dutch Higher Education Act that deals with the accreditation of higher education (2002), degree programmes offered by research universities and universities of professional education will be evaluated according to established criteria, and programmes that meet those criteria will be accredited, that is, recognised for a period of six years. Only accredited programmes are eligible for government funding, and students receive financial aid only when enrolled in an accredited programme. Only accredited programmes issue legally recognised degrees. Accredited programmes are listed in the Central Register of Higher Education Study Programmes (CROHO) and the information is available to the public. Institutions are autonomous in their decision to offer non-accredited programmes, subject to internal quality assessment. These programmes do not receive government funding.