



DIPLOMA SUPPLEMENT

MASTER OF SCIENCE

This Diploma Supplement model was developed by the European Commission, the Council of Europe and UNESCO/CEPES. The purpose of the supplement is to provide sufficient independent data to improve 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 pursued and successfully completed by the individual named on the original qualification to which this supplement is appended. It should be free of any value judgements, statements of equivalence or suggestions for recognition. Information should be provided in all eight sections. Where information is not provided, an explanation should be given as to why.

1. Information identifying the holder of the qualification

This Diploma Supplement is an integral part of the original Master's degree certificate awarded by the Technische Universiteit Delft (hereinafter referred to as 'TU Delft') to the following individual:

Family name(s):	SECO RODRIGUES
Given name(s):	Nuno António
Date of birth:	6 April 1998
Place and country of birth:	Leiria, Portugal
Student identification number:	5160545

2. Information identifying the qualification

2.1 Name of the qualification and the title conferred

Master of Science (MSc) in Systems and Control

Title: *Ingenieur (ir.)*

2.2 Main field(s) of study for the qualification

Systems and Control

2.3 Institution awarding the qualification (in original language)

Name:	Technische Universiteit Delft (Delft University of Technology)
Status:	Public university, recognised by the Dutch government
Type:	University of Research and Professional Education

2.4 Language(s) of instruction and examination

English

3. Information on the level of the qualification

3.1 Level of qualification

University graduate

When referring to a Bachelor's degree programme (length: 3 years) TU Delft uses the term *undergraduate*. The term *graduate* refers to Master's degree programmes (length: 2 years).

3.2 Official length of the programme

The official length of the degree course is 2 years (full time). The official study load is 60 ECTS credits per study year and 120 ECTS credits in total.

3.3 Access requirements

Admission to the Master's degree course in Systems and Control will be granted to any student in possession of a relevant Bachelor's degree (or the equivalent) and will depend on the judgement of the university's Executive Board.

4. Information on the contents and results gained

4.1 Mode of study

Full-time

4.2 Master's degree programme objectives

Exit qualifications of the Master's degree programme

The exit requirements for the Master's degree in Systems and Control detail the qualifications, areas of competence and skills of students who have successfully completed the programme. The exit requirements have been formulated in accordance with national and IDEA League quality principles (see Section 6.3 for information on the IDEA League).

The Master's degree programme in Systems and Control has the following exit qualifications:

1. Competent in the scientific discipline Systems and Control

A graduate in Systems and Control is able to

- 1A. apply advanced physics and measurement methods in systems and control.
- 1B. design, carry out and evaluate experiments.
- 1C. identify, model and control dynamical systems in an interactive, uncertain and noisy environment.
- 1D. analyse and design high-performance measurement and control systems.
- 1E. relate scientific knowledge to dynamical systems considering their interaction with the environment.

2. Competent in doing research

A graduate in Systems and Control is able to

- 2A. study a topic by critically selecting relevant scientific literature.
- 2B. write a scientific report about own research.
- 2C. generate knowledge within the discipline of Systems & Control.

3. Competent in designing

A graduate in Systems and Control is able to

- 3A. systematically design controllers for complex dynamical systems.
- 3B. generate innovative contributions to the discipline of Systems & Control.

4. A scientific approach

A graduate in Systems and Control is able to

- 4A. integrate knowledge and information to handle complexity at the systems level.
- 4B. manage own scientific research independently.
- 4C. analyse problems and use modelling, identification, simulation, design and integration towards solution

5. Basic intellectual skills

A graduate in Systems and Control is able to

- 5A. analyse and solve technological problems in a systematic way.
- 5B. plan and execute research and design in changing circumstances.
- 5C. integrate knowledge in an R&D project, considering ambiguity, incompleteness and limitations.
- 5D. identify and acquire lacking expertise.
- 5E. critically reflect on own knowledge, skills and attitude.
- 5F. remain professionally competent.
- 5G. take a standpoint with regard to a scientific argument within the research area.

6. Competent in operating and communicating

A graduate in Systems and Control is able to

- 6A. work both independently and in multidisciplinary teams.
- 6B. present and report in good English.
- 6C. explain and defend outcomes from the research area to academia and industry, to specialists and lay

7. Considering the temporal and social context

A graduate in Systems and Control is able to

- 7A. evaluate and assess the technological, ethical and societal impact of own work.
- 7B. act responsibly with regard to sustainability, economy and social welfare.

4.3 Programme details and the individual grades/marks/credits obtained

The following list includes all the subjects studied by the holder of this degree certificate as part of the degree programme. An indication is given of the number of ECTS credits awarded for each subject and of the final mark obtained for the subject in question.

Name of subject	ECTS credits	Mark
Structural Dynamics	4	9,5
Sensors and Actuators	4	7,5
Multi-Machine Coordination for Logistics	3	8,5
Advanced Heat Transfer	3	7,0
Mechatronic System Design	4	9,0
Robot Motion Planning and Control	4	7,0
Structural Dynamics Practical	2	7,0
Introduction Project SC	3	V
Robust and Multivariable Control Design	5	8,5
Control Theory	6	8,0
Filtering and Identification	6	7,5
Integration Project Systems and Control	5	7,5
Knowledge Based Control Systems	4	8,0
Optimisation in Systems and Control	4	8,5
Non-linear Systems Theory	4	9,0
Networked and Distributed Control Systems	3	8,5
Dynamic Programming and Stochastic Control	5	8,0
SC Literature Assignment	15	9,0
SC MSc Thesis Project	45	9,0
Philosophy of Engineering, Science and Design	3	7,5

V' or 'V' instead of a mark indicates that the student has fulfilled the requirements for this particular subject.
 'Vr' or 'Vrs' instead of a mark indicates that the student was exempted from this particular course.

Subjects and credits from other universities

Not applicable

Additional subjects

Not applicable

4.4 Grading scheme

Dutch grading scale

The Dutch grading scale, implemented from primary school through to university level, goes from 1 (very poor) to 10 (excellent). At TU Delft final marks are rounded off to whole and half figures. A 6,0 is a pass. Although the scale runs from 1,0 to 10,0, the marks 9,0 and 9,5 are not frequently awarded and 10s are extremely rare. The meaning of the marks is as follows:

Mark	Definition
9,5 - 10,0	Excellent
8,5 - 9,0	Very good
7,5 - 8,0	Good
6,5 - 7,0	More than satisfactory
6,0	Satisfactory
4,5 - 5,5	Nearly satisfactory
3,5 - 4,0	Unsatisfactory
1,0 - 3,0	Very poor

Sometimes a 'V' is awarded instead of a mark to indicate that the requirements for a particular subject have been fulfilled.

'VR' instead of a mark indicates that a student has been exempted from an examination or practical exercise. The board of examiners may decide to exempt students from an examination or practical exercise on the grounds of a previous examination, degree audit or practical exercise completed within the higher education system that corresponds with the subject for which exemption is sought, as regards content and study load, or on the grounds of knowledge and/or skills acquired outside the higher education system.

Average results of TU Delft MSc students

Grading systems and 'grading culture' vary from country to country. In the Netherlands a 1 – 10 grading scale is commonly used. The Dutch grading culture is rather conservative: a 10, or even a 9, is not often awarded. At TU Delft even higher standards are the norm.

MSc average grading

For a better appreciation of TU Delft MSc student results, the overview below shows the distribution of grades obtained by students graduating from September 2017 to August 2020.

Grade	% obtained	% better scores
10	3,4	0
9	23,4	3,4
8	41,0	26,9
7	24,3	67,8
6	7,6	92,2
5	0,3	99,7

The ECTS grading system for credit transfer

In cases where there is a need for international credit transfer (mainly in conjunction with student exchanges) *ECTS grades* can be used. It is good practice to award an ECTS grade, particularly if credit transfer is later required.

The ECTS grading system is based on the relative distribution of the results of the students who have passed an examination. Grades are assigned as follows among students with a *pass*:

Grade	Relative distribution
A	Best 10 %
B	Next 25 %
C	Next 30 %
D	Next 25 %
E	Next 10 %
FX/F	Fail

A distinction is made between the grades *FX* and *F* which are given to unsuccessful students. *FX* means that in order to pass more work is required and *F* means that considerable further work is required.

4.5 Overall classification of the qualification

Master's degree audit

The Master's degree audit is an integral part of the Master's degree programme involving a complete study load of 120 ECTS credits. The Master's degree programme is completed with a thesis project. This thesis project serves to prove that the student has a good command of, and is able to apply, all the knowledge and skills gained during the Master's phase.

Title of the thesis project: **Gaussian Process Regression for Data-Driven Model Predictive Control**

Cum Laude predicate

The Board of Examiners has decided to award this student the Master's degree certificate with the predicate '*cum laude*'.

1. A student can receive the degree certificate with the predicate *cum laude* (i.e., with distinction) for the Master's degree if the Board of Examiners decides to grant it, and its requirements have been met regarding:
 - a. the minimum weighted average of the grades of the courses;
 - b. the maximum number of credits obtained for courses with a pass (V) or an exemption (VR);
 - c. the minimum grade for the final Master's examination;
 - d. the maximum duration of the Master's degree programme.
2. In special cases the Board of Examiners may decide to grant the designation 'with distinction' to a student who does not meet the requirements listed above, if this student has shown exceptional skills in their degree programme.

5. Information on the function of the qualification

5.1 Access to further study

Students who have a Master of Science degree are eligible to follow PhD research programmes.

Students who have successfully completed the Master of Science degree in Systems and Control are qualified to fulfil positions in the following labour market sectors: in nearly all branches of industry, in management, design, research, development or technical departments. An increasing number of engineers play a role in giving advice on, and selling high-grade products and capital-intensive equipment. In our technologically highly developed society government bodies constantly need people with a technical-scientific education, i.a. for policymaking. In scientific education too, engineers have their jobs.

The large choice of specialisations within the MSc-programme give the Systems and Control engineer from Delft a versatile employability. This versatility is illustrated by the variety of professions, among which there are: designer, scientific researcher, organization expert and automation consultant. Many engineers occupy management positions: between 25 and 30 % lead a small team within about one year.

5.2 Professional status

Students who have successfully completed the Master of Science programme in Systems and Control are entitled to be employed as engineers and require no further certification.

6. Additional information

6.1 Additional information on the faculty or degree programme

See also: www.3me.tudelft.nl

Accredited by the Nederlands-Vlaamse Accreditatieorganisatie (NVAO)
(Accreditation Organisation of the Netherlands and Flanders)

Accreditation date: 31 January 2019

6.2 Further information sources

Established on 8th January 1842 by King Willem II, TU Delft has a rich tradition going back more than 170 years. In the early days, the university focused specifically on civil engineering but over the years the academic programme has continued to expand.

Today TU Delft offers eight faculties:

- Aerospace Engineering
- Applied Sciences
- Architecture
- Civil Engineering and Geosciences
- Electrical Engineering, Mathematics and Computer Science
- Industrial Design Engineering
- Mechanical, Maritime and Materials Engineering
- Technology, Policy and Management

Through its cooperation with a whole range of educational establishments, research institutes, international business partners and industries, TU Delft endeavours to provide its students with all the tools required for a successful career: an excellent education, practical and relevant experience, and a sound basis of knowledge that is as broad as possible.

6.3 Institutional cooperation with the IDEA League and various national universities

The IDEA League

TU Delft is member of the IDEA League, a strategic alliance between TU Delft (Technische Universiteit Delft), ETH Zürich (Eidgenössische Technische Hochschule Zürich), RWTH Aachen (Rheinisch-Westfälische Technische Hochschule Aachen), Chalmers University of Technology (Göteborg, Sweden) and University Politecnico di Milano (Italy). Committed to upholding the highest possible international standards with regard to both research and education, the IDEA League universities have agreed on common quality principles for their educational programmes.

Collaborative venture by the four Dutch universities of technology (4TU.Federation)

TU Delft collaborates with the three other universities of technology in the Netherlands: the University of Twente, Eindhoven University of Technology and Wageningen University. Within the framework of the 4TU.Federation, these universities work closely together in the fields of education, research and knowledge valorisation. The activities in the field of education, which include a number of joint Master's degree programmes, are coordinated by 4TU.Education. In the fields of research and knowledge valorization, activities are carried out by 4TU.Research and 4TU.Value, respectively.

Strategic alliance with Leiden University and Erasmus University Rotterdam

The TU Delft has a strategic alliance with Leiden University and Erasmus University Rotterdam and work together in areas of education, research and valorisation in which it offers added value and the universities complement and reinforce each other. The mission is to collaborate in matters of substance and according to the universities own strengths, thereby contributing to the academic, social, and economic challenges of our time. By working together on education, the universities broaden their curricula and offer more innovative, attractive and more multidisciplinary education. Students can easily meet due to the physical closeness and thus making real joint education possible. Within the alliance several joint education programmes are offered at Bachelor, Master and Postgraduate level.

6.4 Further information

Further information may be obtained from the following faculty:

TU Delft
Faculty of Mechanical, Maritime and Materials Engineering
Mekelweg 2
2628 CD Delft
The Netherlands
Tel : +31 (0)15 278 9827
E-mail: SPA-3ME@tudelft.nl

For further information on TU Delft please go to: www.tudelft.nl

7. Certification of the Supplement

Place and date: Delft, 18 June 2021

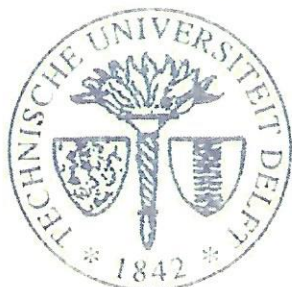
Name: Dr.ir. M. Langelaar

Signature:



Capacity: Board of Examiners

Official stamp:



8. Information on the national higher education system

See the appendix for information on the system of Higher Education in the Netherlands. This information has been drawn up by the Association of Universities of Professional Education (HBO-raad), the Association of Universities in the Netherlands (VSNU) and NUFFIC, the Netherlands organization for international cooperation in higher education and it was initiated by the Dutch Ministry of Education, Cultural Affairs and Science (Ministerie van OCW).