Teaching and Examination Regulations of the programme

Master Data Science for The Life Sciences (full-time)

Institute for Life Science & Technology

Hanze UAS of Applied Sciences, Groningen

Adopted by the Dean of the Institute for Life Science & Technology on 10-07-2021

These regulations take effect starting September 1st, 2021

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1. Degree programme

1.1 Programme Description

The Institute for Life Science & Technology at the Hanze UAS offers the master's programme Data Science for The Life Sciences (DSLS). The core of the set-up of this master's programme is the growing demand for data-scientists. Computer science is becoming increasingly intertwined with the life sciences and is now an indispensable part of this research-intensive sector. The data analyst of the future is aware of the developments in the field and knows exactly how and where the required information can be gathered and processed in order to come to a well-founded conclusion. The master DSLS meets this growing demand for data-scientists with the first master within the Domain Applied Sciences in this area. With a practical curriculum and a strong link with the professional field in the form of collaborations with companies and institutions in the region, the Hanze UAS trains students to become thorough researchers and professionals specialized in data-driven methodologies that play an increasingly prominent role in the life sciences.

1.2 Examination Board and Testing Committee

The Examination Board is responsible for assuring the quality of the programme by supervising the content, the methods, and the level of the examinations. The Examination Board is charged with determining whether students have achieved the intended learning outcomes (exit level) described in the Teaching and Examination Regulations. The members of the Examination Board are appointed by the dean.
The Testing Committee is responsible for monitoring the quality of examinations and tests, operating under the supervision of the Examination Board.

For current information regarding the composition, and contact details of the Examination Board, see the link Examination Board

For current information regarding the composition, and contact details of the Testing Committee, see the link Testing Committee

1.3 Admission Committee

The Admission Committee advises the dean on admission of students. The members of the Admission Committee are appointed by the dean.
For the current composition of the Admission Committee and additional information, see the link Admission Committee

1.4 Representative Council of the institution

The representative council of the institution is a democratically elected body. The Council comprises an equal representation of students and university staff.
Regulations can be found on the intranet of the Hanze UAS. For the composition of the board and the procedure for the appointment and election of the members, see the link Representative Counsel of the School

1.5 Board of Studies

The Board of Studies is the body charged with issuing recommendations on enhancing and safeguarding the quality of the degree programme. It also issues solicited and unsolicited recommendations to the dean on all matters relating to education at the relevant programme. The Board has the right to approve the Teaching Regulations. The Board of Studies comprises an equal representation of students and lecturers. The method in which the Board is composed is set out in the Board of Studies Regulations. For the composition of the study programme committee, see the link Board of Studies

1.6 Professional Board

The Professional Board monitors and evaluates the professional relevance of the master programme. The Board makes recommendations to the programme management for changes to the programme and makes recommendations for master thesis project topics. The Professional Board consists of at least five representatives at the strategic level from organizations and companies in the field of the life sciences. The Board meets at least twice a year to discuss developments and provide input.
For the composition of the Professional Board, see the link Professional Board

2. Intended learning outcomes (exit level)

Programme outcomes of the master
The programme outcomes of the master DSLS are based on a review of current developments in data science and the life sciences, as described above. Close attention is paid to the demands and needs of the professional field, e.g., the UMCG and the Avebe innovation center.

Programme outcomes and content of the master DSLS were developed in co-operation with the professional board to ensure that they are up-to-date and aligned with (international) professional needs.

A professional DSLS should be able to work in a self-directed and autonomous manner on complex problems, integrating data from different areas within the scope of the life sciences. As such, the professional DSLS needs to be skilled in methods for data handling and analysis, but also in data-stewardship and effective communication, especially in a multidisciplinary setting. In addition, Hanze UAS aims to deliver students with an entrepreneurial attitude, which is also reflected in the programme outcomes. These programme outcomes are listed below:

CR Conduct critical and creative research
The graduate can formulate a testable hypothesis relevant to a client's question. The graduate can assess existing methods and solutions to similar problems and critically evaluate their applicability in the present context. The graduate can choose appropriate data research methods and motivate this choice, or adapt such methods creatively to obtain original solutions for the problem at hand. Once implemented, the graduate critically evaluates the obtained solution per available technical and engineering best practices in the field, and iterates to converge to an optimal solution. The graduate can generalize these methods to apply them in neighboring fields or related problems in new environments.

MM Model meaningful information
The graduate applies appropriate mathematical, statistical and machine learning techniques to identify patterns, causal relations, and actionable knowledge, and to make predictions. The graduate demonstrates the ability to integrate knowledge, handle complexity and to extract meaningful information from (incomplete) data.

DO Deliver organized solutions
The graduate retrieves multilevel data from multiple sources and can organize, combine, clean, process and store those reliably, adhering to the FAIR principles (Findable, Accessible, Interoperable and Re-usable). Developed code is organized, well written, well documented, traceable via version control management systems, and suitably licensed.

CE Communicate Effectively
The graduate communicates actively and effectively about his/her work with experts, peers, and laymen in writing, orally and in visual form. In particular, the graduate can effectively phrase the research question or problem, explain and

justify the methods and/or the approach proposed or taken, and present the results in a clear manner, together with a critical, reflective interpretation.

BR **Being responsible**
The graduate is aware of work-related ethical and legal aspects and takes responsibility to act per applicable laws and best practices, in particular pertaining to privacy issues, integrity, and security. In addition, the graduate is aware of the professional responsibility within society and, where possible, adheres to the FAIR (Findable, Accessible, Interoperable, and Reusable) principles for scientific data management and stewardship.

BE **Being entrepreneurial**
The graduate demonstrates awareness of and focus on broader and/or commercial application of research outcomes. The graduate can formulate business ideas and can bind stakeholders. The graduate is a self-directed and autonomous professional that feels responsible to act in the face of challenges.

Agreements have been made in Europe on the general level of the master's programme. These agreements have been laid down in the so-called Dublin descriptors:

1. **knowledge and understanding**
   Has demonstrated knowledge and understanding that is founded upon and extends and/or enhances that typically associated with bachelor's level, and that provides a basis or opportunity for originality in developing and/or applying ideas, often within a research context.

2. **applying knowledge and understanding**
   Can apply their knowledge and understanding and problem-solving abilities in new or unfamiliar environments within broader (or multidisciplinary) contexts related to their field of study; can integrate knowledge and handle complexity.

3. **making judgements**
   Can formulate judgements with incomplete or limited information, taking account of social and ethical responsibilities linked to the application of their knowledge and judgements.

4. **Communication**
   Can communicate their conclusions, and the knowledge and rationale underpinning these, to specialist and non-specialist audiences clearly and unambiguously.

5. **learning proficiencies**
   Have the learning skills to allow them to continue to study in a manner that may be largely self-directed or autonomous.

The programme outcomes were developed in accordance with the Dublin Descriptors. Table 1 shows the link between the master DSLS programme outcomes and the Dublin descriptors.

Table 1: programme outcomes related to Dublin descriptors

Dublin descriptor	Master Data Science for The Life Sciences
Knowledge and understanding Demonstrated knowledge and understanding that is founded upon and extends and/or enhances that typically associated with the first cycle, and that provides a basis or opportunity for originality in developing and/or applying ideas, often within a research context.	CR, MM, DO
Applying knowledge and understanding Can apply their knowledge and understanding, and problem-solving abilities in new or unfamiliar environments within broader (or multidisciplinary) contexts related to their field of study.	CR, MM, DO, CE. BE
Making judgements Can integrate knowledge and handle complexity, and formulate judgements with incomplete or limited information, but that include reflecting on social and ethical responsibilities linked to the application of their knowledge and judgements.	CR, MM, BR
Communications Can communicate their conclusions, and the knowledge and rationale underpinning these, to specialist and non-specialist audiences clearly and unambiguously.	CR, CE
Learning skills Have the learning skills to allow them to continue to study in a manner that may be largely self-directed or autonomous.	CR, BE

3. Programme structure

3.1 STUDY PROGRAM

The master DSLS is a fulltime program.

3.2 JUSTIFICATION FOR LANGUAGE USED IN ALL OR PARTS OF THE PROGRAMME

The professional field of The Life Sciences is international in character, due to the participation of foreign students. All curriculum components of the master DSLS at Hanze UAS are taught in English

The programme is taught in English. This concerns the following units of study and the specific language, with the rationale:

Phase of the degree programme*	***Number of credits in this phase***	***Number of credits in English***	***(English/total)***
First-year phase or first 60 credits	*60 EC*	*60 EC*	*60/60.*
Graduation programme (def. education framework)	*30 EC*	*30 EC*	*30/30*
Total for degree programme (minus any open credits)	*90*	*90 EC*	*90/90*

Although many research institutes and companies related to life sciences are located in the region around the Hanze University, their staff and scope of activities are mostly oriented internationally. Research is published in international journals. Research staff in the nearby institutes are often PhD's students from abroad. Workspaces in the Netherlands are internationally oriented because of the international cooperation on joint databases. Industrial companies with R&D activities, in which they closely operate together with the RUG and the Hanze University, like the Avebe research center, work with international staff as well. In addition, at this moment the number of Dutch graduates cannot fulfil the need for data scientists in life sciences and the number of vacancies in this work field is expected to grow even more. To prepare the master students for their work in an international environment and to potentially attract more students from abroad, the master is positioned as an international master. English will be the main language in literature, projects and lectures. The target audience will, beside bachelor-students from Hanze University, consist of students form other Dutch and European universities. In case all participants are Dutch, the main spoken language will be Dutch. If one or more foreign students participate, the spoken languge will be English. Graduates will be prepared to work in a global work environment by offering the education material in English and requiring all products (reports, code, presentations) to be in English.

Hanze UAS is bound by the Code of Conduct regarding the Use of Foreign Languages (Student Charter, Appendix 6). This code applies to instruction in a language other than Dutch within the Dutch education system

3.3 Majors, final-stage programme, minors and differentiations

The master DSLS offers one major. The major has a final-stage programme in which the intended learning outcomes are assessed at exit level.

3.4 Study paths

3.4.1 February intake

Students can enter the master in February if they meet the following conditions:

- At least one year experience in research at master level in the field of life sciences
- Passing the preparatory tests programming 0 and data science 0

Students will join the cohort that started in September of the same study year. The admission committee will determine if the candidate can be exempted for Programming 1 and or Data Science 1, otherwise the student needs to pass the subject Programming 1 and or Data Science 1 by self-study. The experience in research shall be considered a base to exempt the Omics Project 1.

3.4.2 Own acquired competences from other Master programs

Students may list competences acquired in other master programs, if proof can be provided that the course(s) in the other program complies (comply) with the learning goals of a subject of the master course Data Science for Life Sciences. For competences that fall within the courses Professional and Research Skills, such proof is to be judged by the teachers and to be presented in the portfolio. For exemption of courses, a request with proof is to be addressed to the Examination Board.

3.4.3 prerequisites

The student is responsible for acquiring the prerequisites for a course. The prerequisites are listed in the course descriptions.

3.5 Curriculum overview and degree program

4. Curriculum

The components of the curriculum are described in the Osiris student information system and form part of these regulations.

4.1 Curriculum components

See table 2 below; overview of the curriculum.

Table 2: overview of the curriculum

Curriculum overview	Semester 1	Semester 2	Semester 3
Projects	Omics Project (data science for personal health) (10 EC)	Omics Project (integrated omics) (10 EC)	Graduation Project and Thesis (30 EC)
Courses	Preparatory Course (5 EC)	Data Science II (modeling) (5 EC)	
	Data Science I (exploration) (5 EC)	Data Science III (prediction) (5 EC)	
	Programming I (design) (5 EC)	Programming II (big data) (5 EC)	
Research & Professional Skills	Research & Professional Skills (10 EC)		

4.2 FINAL-STAGE PROGRAMME

The Final-Stage project consists of a graduation project and a thesis.
The graduation project will be assessed on the basis of:
1. practical work and performance;
2. a written report (thesis);
3. an oral presentation and its defense.

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Semester 1				Semester 2			
Quantified Self				**Integromics**			
Course	**code**	**EC**	**AT**	**Course**	**code**	**EC**	**AT**
Prepcourse:							
Datascience and/or	BFVM19DATASC	* 2,5	W	Data Science II	BFVM19DATASC2	5	C
Programming and/or	BFVM19PROGR	* 2,5	C	Data Science III	BFVM19DATASC3	5	C
Omics	BFVM19OMICS	* 2,5	W	Programming II	BFVM19PROGR2	5	C
Data Science I	BFVM19DATASC1	5	C	Omics Project: Integromics	BFVM19OMICSINT	10	P
Programming I	BFVM19PROGR1	5	C	Research & Professional Skills	BFVM19RSRPFS2	5	D
Data Science for Personal Health	BFVM20DSPH	10	P				
Research & Professional Skills	BFVM19RSRPFS1	5	D				
Total		**30**		**Total**		**30**	

Semester 3			
Graduation			
Course	**code**	**EC**	**AT**
Graduation Project	BFVM19GRAD	30	P/O
Total		**30**	

D = Digital Portfolio / Proof of Competence
W = Written Exam
C = Computer Exam
P = Professional Product
A = Assignment
O = Oral Exam
EC = European Credits
AT = Assessment Type
* = Choose 2

5. Admission requirements

5.1 Educational entry requirements

The master DSLS is accessible to students with the following (Hanze) UAS Bachelor's degree or equivalents:

- Bachelor of Chemistry;
- Bachelor of Chemical Engineering;
- Bachelor of Engineering major Sensor Technology;
- Bachelor Biology and Medical Laboratory Research, (Major Biomedical Research and Major Medical Diagnostics);
- Bachelor of Bioinformatics;
- Bachelor of Medical Imaging and Radiation Therapy
- The first Bachelor of Communication, Media & IT.

All applicants need to proof a minimal level in programming skills, English language skills, statistical and mathematical knowledge

Entrance level proof
In general, holders of a Bachelor's degree within the fields described above must deliver documented proof of knowledge or skills in the disciplines of programming, and data science as described in 5.1.2, and 5.1.3. Demonstrated proof is either a transcript of records that proof the required entrance level, a certificate, a portfolio, a sufficient grade of an entrance test or a combination of these. Furthermore, the student should comply with the Language requirements for admission to a programme taught in English as described in 5.2. (See also figure 1)

5.1.1 Admission committee acceptance procedure

The following procedure will be followed for all students attending the DSLS Master programme:

- If the student is unable to provide proof of competence for the entry requirements of data science and programming the student should participate in an exam to assess the student's competence in the knowledge and skills of said module as specified below in 5.1.2 and 5.1.3;
- If the student is unable to prove his/her competence by either the portfolio and/or the entry test, the student cannot be admitted to the DSLS Master programme (procedure below).

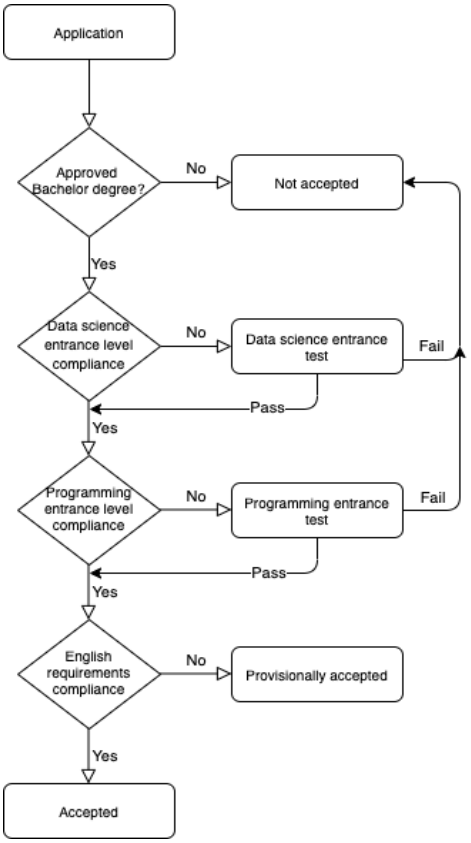

Figure 1: Application procedure

5.1.2 Entry level Programming knowledge and skills

Prospective students should have knowledge of and be skilled in the following topics in programming

Required knowledge

- Data types (difference string, integer, float, object, tuple, list, dictionary)
- Basic operators (e.g. ==, =, +=)
- Slicing, index principles
- Functions: definitions, arguments, calling a function
- String manipulation idioms
- Imports and usage of standard (built-in) libraries
- Accessing help functionality and writing script documentation (inline documentation)
- File handling (read files and loop over them by line)
- Flow control: Loops (e.g. for loop, while loop, if-elif-else)
- PEP8 formatting

Required skills

- Starting python interpreter from the command line
- Translate a problem into pseudocode
- Translate pseudocode to software script
- Organize a script in functions and program flow

- Debug a script containing logical and/or syntax errors using lots of print statements (debugger IDE not mandatory)

Prospective student can prepare themselves via various sources like https://www.learnpython.org/ or https://www.py4e.com/lessons.
Or studying Barry, P., 2016. Head First Python: A Brain-Friendly Guide. O'Reilly Media, Inc Chapter 1 till 12.

5.1.3 Entry level Data science knowledge and skills

Prospective students should be fluent concerning the following topics in mathematics.

Arithmetic

- Concepts: natural, integer, rational, real numbers ($\mathbb{N}$, $\mathbb{Z}$, $\mathbb{Q}$, $\mathbb{R}$)
- Standard operations (sum, difference, product, quotient, power, square root) and their precedence rules (including brackets)
- Calculations with negative numbers, fractions, percentages
- Simplification of powers and radicals (e.g. $a^b a^c = a^{b+c}$), exponentials and logarithms in natural or arbitrary base (e.g. $\ln(ab) = \ln a + \ln b$)
- Trigonometric values of special angles in radians or degrees
- Computation and estimation by hand, calculation by means of a calculator, scientific notation, rounding and accuracy

Algebra

- Manipulating symbolic variables
- Expanding brackets in products, factoring terms in sums (e.g. $a^2 - b^2 = (a + b)(a - b)$)
- Manipulating trigonometric functions (e.g. $\tan(x) = \frac{\cos(\frac{\pi}{2} - x)}{\cos(x)}$)
- Sequences and series, sum and product notation (i.e. $\sum_n a_n$, $\prod_n a_n$)
- Solving linear equations with a single unknown
- Solving linear inequalities with a single unknown
- Solving quadratic equations with a single unknown
- Solving trigonometric, exponential or logarithmic equations with a single unknown
- Solving absolute-value equations with a single unknown
- Solving pairs of linear equations with two unknowns

Geometry

- Concepts: points, lines, line segments, planes, polygons, circles, perimeter, area, cartesian and polar coordinates, distance, acute/right/obtuse/straight angle, parallel, perpendicular, tangent, similarity, symmetry
- Calculation of angles or side lengths in triangles (Pythagorean identity, sine and cosine rules)
- Implicit and parametric equations of lines and circles, computing intersections of lines and/or circles

- Geometric and arithmetic representation of vectors in two or three dimensions, vector addition, scalar product, dot product

Function analysis

- Concepts: functions with one argument, zero-root, extremum/minimum/maximum, inflection point, pole, tangent, limit, asymptote, domain and range, periodicity, symmetry, piecewise function, (dis)continuity, inverse
- Special functions: constant, linear, quadratic, higher-order polynomial, rational, power law with rational exponent (including $\sqrt{x}$ and $\frac{1}{x}$), exponential, logarithmic, absolute value, trigonometric functions and their inverses
- Plotting a function of a single variable on cartesian axes
- Deriving equations of functions from their graph for linear, quadratic, sinusoidal, exponential functions
- Calculation of intersections of functions with the axes and with each other
- Function composition (i.e. $f(g(x))$) and function transformations (e.g. translation, scaling)

Calculus

- Concepts: first- and second-order derivatives and anti-derivatives as slope, curvature and area-under-the-curve
- Notation of derivative and anti-derivative, indefinite and definite integrals
- Derivatives and anti-derivatives of special functions
- Sum-/difference-/product-/quotient-rules and chain rule of differentiation
- Sum-/difference-rules and substitution rule of integration

Combinatorics and statistics

- Concepts: factorial, permutation, combination, binomial, discrete probability and probability distribution, average, mean, median, spread, variance, standard deviation, inter-quartile range, outlier, sample and population
- Combining probabilities as products (for independent events) or sums (for mutually exclusive events)
- Special distributions: uniform, normal
- Frequentist statistics, z-transform, p-value, testing, confidence level
- Scatterplots, barplots, histograms, boxplots, semi- or double-logarithmic axes

5.1.4. Preferable entry level Biology (omics) knowledge and skills

Prospective students should have knowledge concerning the following topics from the syllabus IB Biology: https://www.biologyforlife.com/syllabus.html

Topic 1: Cell Biology

Topic 2: Molecular Biology

Topic 3: Genetics

Topic 4: Ecology

Topic 5: Evolution and Biodiversity

Topic 6: Human Physiology

5.1.6 Preparatory courses
At the start of the program, the admission committee will define the preparatory course program for a student based on the student's level of data science, programming, and biology. Attendance of the lessons is not compulsory but passing the final exams is required for attendance of the main programme. See chapter 6.4 for more information.

5.2 Language requirements for admission to programme taught in English

All applicants must have a minimum level of English before starting with the Master DSLS.
The passing requirements are outlined below:

- Speaking and writing test provided by the Institute of Life Sciences and Technology, with a minimum ERF level of B2, or
- IELTS test; the required score is 6.5, with no sub scores below 6, or
- Cambridge Advanced Exam in English: B minimum, or
- Cambridge Proficiency Exam in English: C minimum.

Students applying for admission who hold a previous qualification issued within the EEA and which is on the 'diploma list' drawn up at the behest of the HEI associations in the Netherlands (https://www.internationalstudy.nl/wp-content/uploads/2016/03/Diplomalijst.pdf) are exempt from the language requirement.

Students holding a qualification from the United States, Canada, Australia, New Zealand, Great Britain or Ireland are exempt from the language requirement, as are students holding an International Baccalaureate or a European Baccalaureate.

Students holding a previous qualification issued outside the EEA are also exempt if they can present a statement from the educational institution proving that they received their prior education taught in English. The dean may seek advice from NUFFIC in such a case.

5.3 Employment requirement in part-time programmes, if applicable

Does not apply

5.4 Maximum number of students admissible to the programme

Does not apply

5.5 Foreign students: language requirements for admission to programmes taught in Dutch

Does not apply

5.6 Foreign students: language requirements for admission to programmes taught in English

See 5.2 for language requirements.

5.7 Foreign students: legal residence requirement

Students must have a valid residency status to study in the Netherlands.
Students can contact the International Student Office for further information.

6. Exams

6.1 Sequence of exams

Examinations are listed in the curriculum component table (par. 4.1).

6.2 Number of examination Resits (outside or written examinations)

If a student failed to obtain a sufficient score for an assessment, one resit a year will be provided.

6.3 Anti-plagiarism rules

In accordance with article 5.6 of the Students' Charter, the written papers that lend themselves to this are checked for fraud through plagiarism scanners. Fraud is defined as (see for additional information the link Student Charter article 5.6.2): taking over someone else's work and "passing it off as" their own work. The Examination Board can take measures if fraud is detected.

6.4 Validation and exemptions

Based on the students portfolio and proof of completion of a curriculum a student can apply for an exemption. Students need to address the Examination Board for granting an exemption request. Preparatory course exemption levels are described in 6.4.1, 6.4.2 and 6.4.3. For more information see Examination Board

6.4.1 Preperatory Course Exemption level Programming knowledge and skills

Applicants should have basic programming skills. Applicant must be able to read, manipulate and write data with a software script given a defined problem.

Required knowledge:
- Data types, (built-in) functions, flow control structures and standard library;
- Script documentation;
- Exception handling;
- Input / Output (file) handling;
- Object-oriented programming;
- Decorators, generators and knowledge about the Python itertools module (or a related module in another language).

Basic programming skills:
- Formulate a solution to a moderately complex problem and divide this solution into a logical series of smaller steps;
- Write a well-organised script (containing functions and classes) from specifications ;
- Debug a script containing logical and/or syntax errors.

6.4.2 Preparatory Course Exemption level Data Science knowledge and skills

Applicants should have basic mathematical skills and knowledge in the fields of calculus, statistics and linear algebra. Applicants must be able to do simple modelling, data analysis and hypothesis testing using statistics, and understand and apply basic calculus and linear algebra techniques.

Required knowledge:
- Calculus: equations, functions, derivatives and anti-derivatives (special functions: trigonometric, exp/log, polynomial), plots, ordinary differential equations
- Frequentist statistics: probability, marginal and conditional probabilities, null-hypothesis, p- value, type-I/II errors, sampling, descriptive statistics, distributions, statistical testing, statistical power
- Linear algebra vectors and matrices, special matrices, transpose, multiplication, matrix inverse, determinant and trace, linear regression.

Basic skills:
- interpret mathematical notation of calculus, statistics and linear algebra
- apply basic equations analytically, including linear, rational, quadratic, trigonometric, exp/log equations in one variable
- execute differentiation and integration of standard functions in simple forms
- understand probabilistic concepts related to the scientific method
- apply descriptive statistics and execute standard statistical tests, including Welch/Student t-test, F-test, and χ^2 tests on proportions
- manipulate mathematical expressions involving matrices and vectors
- apply linear systems of equations, including linear regression, using matrix algebra
- describe research results by means of statistics.

6.4.3. Preparatory Course Exemption level Biology (omics) knowledge and skills

Applicants should have basic knowledge regarding biology. Applicant must understand the concepts of the central dogma of biology. In addition, applicants must understand the concepts of molecular biology, genetics, genomics as well as the techniques and technologies used in this area.

Required knowledge
Knowledge and understanding about:
- DNA as carrier of genetic information;
- Concept of genes, gene regulation and inheritance of genetic information;
- Replication, transcription and translation;
- Basic cell biology. Differences between prokaryotic and eukaryotic cells;
- Phylogenetics and alignments of biological sequences;
- DNA technology: cloning, genetic engineering, sequencing.

7. Work placements and field trips

The rules that apply to work placement and field trips are in the graduation manual.

8. Compulsory attendance

Attendance at lectures, workshops and other educational activities is strongly advised but never strictly required, unless stated otherwise (in the student manual) by the lecturer before the start of the module.

9. Academic counselling

Development of students to become creative and critical research professionals starts at the beginning of the master and continues throughout the programme. Mentoring during semester 1 and 2 is an important element in coaching students' development. Independent monitoring of learning is expected of master students; hence the degree of guidance is gradually reduced.

10. Cum laude regulations

For students of Hanze UAS Groningen it is possible to graduate with the predicate cum laude. For additional information, see the link Student Statute, article 4.13.

11. Students' own contribution

The issue of accessibility is one of the key notions underpinning our education policy. Enrolments in a degree programme may not be conditional on monetary contributions other than tuition fees (Section 7.50, first paragraph, of the Higher Education and Research Act). Enrolled students are entitled to make use of various facilities (Section 7.34 of the Higher Education and Research Act). These include participation in education and examinations, access to buildings and collections and the use of student facilities and tutoring. Students may not be charged any additional fees in exchange for such facilities. The below section offers an overview of all individual student costs in each year.

Table 3: Cost breakdown per year and activity

Books and educational supplies	Institute year 1: 450 euros
Digital resources	A basic laptop of about 300 euros is advisable in case the student wants to use the laptop to work on the Hanze cluster from outside the Hanze. A more powerful laptop with additional data storage capacity is advisable in case the student wants to use the laptop to work locally. There are no specific requirements for a laptop as long as it is linux compatible

12. General information concerning rights and obligations

The general rights and obligations applicable to all students are set out in the Student Charter. General rules apply, for instance, to tuition fees, examinations and student facilities, in addition to the complaints regulations and the misconduct regulations.

Chapter 10 of the Student Charter concerning legal protection includes the procedures students may undertake to contest a decision made by the Examination Board or a dean. You can find the location of the 2019 - 2020 Student Charter via the link Student Charter

Examination Regulations

The general Master's Examination Regulations for Hanze UAS (Chapter 4 of the Student Charter) must be included here. Together, they constitute the Teaching and Examination Regulations (Onderwijs- en Examenregeling, TER). The Examination Regulations may not be added until the Student Charter has been approved by the University Representative Council and adopted by the Executive Board. The Student Charter is normally adopted in the June preceding the year in which it takes effect.