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Teaching and Examination Regulations

MASTER's Degree Programme

Business Analytics

B. Programme-specific section

Academic year 2016-2017

Section B: Programme-specific section

Section B: Programme-specific section

1.   General provisions

Article 1.1   Definitions

In addition to the definitions as laid down in article 1 of TER part A, the following abbreviations are also used in TER part B:

Examination	Abbr.
Exam	E
Report, essay	R
Presentation	Pres
Practical	Prac
Assignment	A
Field Work	FW

Teaching method	Abbr.
Lecture	HC
Tutorial	WC
Study group	WG
Computer Lab	CPR
Practical	PR
Field Work	VW
Excursion	EXC
Training	TR

Article 1.2   Degree programme information
1.   The programme in Business Analytics (CROHO number 66856) is a full-time programme taught in English. There is also a combined work-study variant (*duaal* in Dutch).
2.   The programme consists of 120 credits.
3.   A unit of study comprises 6 EC or a multiple thereof.

Article 1.3   Intake dates
The programme is offered starting in the first semester of the academic year (1 September) and starting in the second semester (1 February). The intake date(s) mentioned in this paragraph ensure(s) that a programme can be completed within the nominal study duration set for the programme.

2.   Programme objectives and exit qualifications

Article 2.1   Programme objective
The programme aims to acquire sufficient knowledge, skills and insight within the field of Business Analytics and any related disciplines to be able to operate as an independent professional at graduate level, and to be a suitable candidate for a subsequent course of study leading to a career in research or development.
Another aim of the programme is to develop students' understanding of the interrelationships between disciplines, as well as their sense of social responsibility

Article 2.2   Exit qualifications
The graduate:
- is knowledgeable about advanced methods in a broad field of mathematics and computer science as applied to commercial and industrial processes;

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- has experience in conducting applied research in a branch of mathematics and computer science in a multidisciplinary business context;
- is capable of gaining a working knowledge of other relevant branches of mathematics and computer science within a reasonable period of time;
- is capable of formulating a plan for a research project based on a realistic research question;
- is able to analyse and formulate research results, draw conclusions from them, and present these conclusions (in English) so that even non-specialists are able to comprehend them;
- is capable of independent and critical reflection on his/her own and others' work in accordance with relevant frameworks of applicability;
- is capable of writing a report in English on his/her own research that meets the prevailing academic standards in the fields of mathematics and computer science;
- is capable of participating in discussions on field-specific topics of interest, in English and potentially in another language or languages;
- is capable of studying the professional literature (including international publications) in relevant branches of mathematics and computer science, and of utilizing the relevant content;
- has experience in modelling complex business processes using advanced methods from mathematics and computer science;
- is capable of working in a multidisciplinary team and, more specifically, has sufficient knowledge of the theory and practice in the field of business economics to communicate and collaborate with experts in these areas;
- has sufficient knowledge and understanding of the societal role of mathematics and computer science to decide on a responsible choice of profession and professional practice.

3.   Further admission requirements

Article 3.1   Admission requirements
1.   Applicants will be admitted to the degree programme if they hold a letter of acceptance, issued by or on behalf of the Faculty Board because they have demonstrated that they meet the knowledge, understanding and skills requirements of the final level of attainment in a university Bachelor's degree programme.
2.   Prior education requirements:
   3.1.2.1 Registration for the Master's programme in Business Analytics is open to anyone who is in possession of a Bachelor's degree in Business Analytics and whose English-language proficiency is at least equivalent to pre-university final-exam level (VWO in the Netherlands).
   3.1.2.2. An applicant with a university Bachelor's degree in a field other than that specified in paragraph 3.1.2.1 may be admitted to the programme by the Examination Board if the following conditions have been met:
   -      the applicant's prior education, including any additional coursework, includes at least 90 credits in mathematics, computer science and/or econometrics or business econometrics;
   -      the applicant's prior education, including any additional coursework, includes at least 45 credits in mathematics, including at the very least Probability and Statistics;
   -      the applicant has proven programming experience;
   -      the applicant's prior education meets the qualifications of a university Bachelor's degree programme as defined in the Dublin descriptors;
   -      the applicant's English-language proficiency is at least equivalent to pre-university final-exam level (VWO in the Netherlands).
   3.1.2.3. At the admissions stage, the Examination Board may impose additional requirements on an applicant's final Master's degree assessment for the programme in Business Analytics.
3.   If the degree programme encompasses distinct programmes, the Examination Board will assess whether the applicant has met the applicable requirements.
4.   Those not yet in possession of a Bachelor's degree, but who meet the admission requirements as regards the knowledge, insight and skills specified in paragraph 2, may on request be granted conditional admission to the associated Master's programme, insofar as failure to grant admission would result in undue unfairness.

Article 3.2   Pre-Master's programme
1.   Applicants who have a Bachelor's degree in a field that sufficiently corresponds to the field of the Master's programme may request admission to the pre-Master's programme.
2.   A certificate stating that the student has successfully completed the pre-Master's programme serves as a letter of acceptance to the associated Master's programme in the next academic year.
3.   The letter of acceptance relates exclusively to the academic year following the academic year in which the application for the letter of acceptance was submitted, unless the Executive Board decides otherwise.

Article 3.3   Limited programme capacity
Not applicable

Article 3.4   Final deadline for registration
A candidate must submit a request to be admitted to the programme through Studielink before 1 June in the case of Dutch students, before 1 April in the case of EU students and before 1 February in the case of non-EU students. Under exceptional circumstances, the Examinations Board may consider a request submitted after this closing date.

Article 3.5   English language requirement for English-language Master's programmes
1.   The proficiency requirement in English as the language of instruction can be met by the successful completion of one of the following examinations or an equivalent:
          - IELTS: 6.5
          - TOEFL paper based test: 580
          - TOEFL internet based test: 92-93
          - Cambridge Advanced English: A, B or C.
2.   Exemption is granted from the examination in English referred to in the first paragraph to students who, within two years of the start of the programme:
          - met the requirements of the VU test in English language proficiency TOEFL ITP, with at least the scores specified in paragraph 1, or
          - had previous education in secondary or tertiary education in an English-speaking country as listed on the VU website, or
          - have an English-language 'international baccalaureate' diploma

Article 3.6   Free curriculum
1.   Subject to certain conditions, the student has the option of compiling a curriculum of his/her own choice which deviates from the curricula prescribed by the programme.
2.   The concrete details of such a curriculum must be approved beforehand by the most appropriate Examinations Board.
3.   The free curriculum is put together by the student from the units of study offered by Vrije Universiteit Amsterdam or another institution of higher education and must at least have the size, breadth and depth of a regular Master's programme.

4.   **Curriculum structure**

Article 4.1   Composition of programme
1.   The programme has a study load of 120 credits and consists of the following components:
          a.   required educational units
          b.   practical components
          c.   optional subjects (electives)
2.   Notwithstanding the provisions of paragraph 1, students may compose their own Master's programme under certain conditions and with the prior approval of the Examination Board.
3.   The degree programme has a study load of 120 credits. One credit is equivalent to 28 hours of study.
4.   Before starting an internship and/or graduation project, the student must have earned all other programme credits. A shortfall of 6 credits is permissible, as long as it does not include credits for the Business Analytics research paper.
5.   Students on the programme's combined work-study variant (*duaal* in Dutch) are to devote at least 16 months at half time (or the equivalent) to the vocational period.

6. The student must submit the graduation project report no later than the last day of the internship. In exceptional circumstances and after consultation with all parties involved, the student may submit the report within two months of completion of the internship. If the student fails to meet this deadline, the graduation project will be incomplete and the student will not receive the associated credits.
7. In exceptional circumstances, the Examination Board may deviate from the provisions of paragraph 6 on the basis of a request submitted by the student, with supporting arguments.

Article 4.2   Compulsory units of study
Abbreviations of teaching method and examination format are defined in Article 1.1.

The compulsory units of study are:

BA Dual Variant
BA Dual Compulsory Courses (78 EC required)

Course code	Course component	EC	Period	Teaching method	Examination format	Level
X_400076	Applied Analysis: Financial Mathematics	6	1+2	HC	E, A	400
X_400392	Applied Stochastic Modeling	6	1+2	WC, HC	E, A	400
X_400418	Statistical Models	6	1+2	HC	E, A	400
X_400108	Data Mining Techniques	6	5	HC	A	500
XM_41010	Dual Workperiod	12	Ac. Year			500
X_400459	Master Project Business Analytics	36	Ac. Year	HC	R, Pres	600
X_400206	Research Paper Business Analytics	6	Ac. Year	HC	R, Pres	500

Professional Track
Compulsory Courses (72 EC required)

Course code	Course component	EC	Period	Teaching method	Examination format	Level
X_400076	Applied Analysis: Financial Mathematics	6	1+2	HC	E, A	400
X_400392	Applied Stochastic Modeling	6	1+2	WC, HC	E, A	400
X_400418	Statistical Models	6	1+2	HC	E, A	400
X_400213	Project Optimization of Business Processes	6	3	PR, HC	E	500
X_400108	Data Mining Techniques	6	5	HC	A	500
X_400459	Master Project Business Analytics	36	Ac. Year	HC	R, Pres	600
X_400206	Research Paper Business Analytics	6	Ac. Year	HC	R, Pres	500

Article 4.3   Practical exercise
Except for those practical components incorporated in the compulsory units of study above and in relevant electives, the programme has no separate practical exercise.

Article 4.4   Electives
Abbreviations of teaching method and examination format are defined in Article 1.1.

The student can take of the following electives:

BA Dual Variant
BA Dual Constrained Selection (24 EC required)

Course code	Course component	EC	Period	Teaching method	Examination format	Level
X_400111	Evolutionary Computing	6	1	HC	E, A	400
XMU_417015	Computational Intelligence	6	2	HC	E, A	400
X_400446	Continuous Optimization	6	1+2			400
X_418006	Heuristic Methods in Operations Research	6	1+2			400
X_400336	Stochastic Optimization	6	1+2	HC	E, A	400
X_400352	Stochastic Processes for Finance	6	1+2	WC, HC	E, A	400

Course code	Course component	EC	Period	Teaching method	Examination format	Level
X_400213	Project Optimization of Business Processes	6	3	PR, HC	E	500
E_IBK3_BIA	Business Intelligence and Analytics	6	4	WC, HC	E, A	300
X_400650	Business Process Analytics	6	4	PR, HC	E, A	400
E_EBE3_FMI	Financial Markets and Institutions	6	4	HC, WC	E	300
X_405105	Performance of Networked Systems	6	4	HC	E, A	400
X_400326	Advanced Linear Programming	6	4+5			400
X_405122	Entrepreneurship in Data Science and Analytics	6	4+5	WC, HC	E, R	400
X_401039	Numerical Methods	6	4+5	WC, HC	A	300
X_400422	Optimization of Business Processes	6	4+5	HC	E, A, Pres	400
X_400396	Scheduling	6	4+5			400
E_EBE3_INVES	Investments	6	5	HC, WC	E	300

Suggested elective courses

Course code	Course component	EC	Period	Teaching method	Examination format	Level
XM_40017	Programming Large-scale Parallel Systems	6	1	HC	E	400
X_405110	Statistics for Networks	6	1+2	HC	A, Pres	600
X_400130	Distributed Systems	6	2	WC, HC	E	400
XMU_428577	Stochastic Simulation	6	2			400
E_MKT_CI	Customer Intelligence	6	4	HC, WG	E, A	400
L_PABAALG002	Text Mining	6	4	WC, HC	A	300
XMU_418045	Computational Finance	6	4+5	HC		400
E_IBK3_IFM	International Financial Management	6	5	HC, WC	E	300

Professional Track
Constrained Selection (30 EC required)

Course code	Course component	EC	Period	Teaching method	Examination format	Level
X_400111	Evolutionary Computing	6	1	HC	E, A	400
X_400446	Continuous Optimization	6	1+2			400
X_418006	Heuristic Methods in Operations Research	6	1+2			400
X_400336	Stochastic Optimization	6	1+2	HC	E, A	400
X_400352	Stochastic Processes for Finance	6	1+2	WC, HC	E, A	400
XMU_417015	Computational Intelligence	6	2		E, A	400
E_IBK3_BIA	Business Intelligence and Analytics	6	4	WC, HC	E, A	300
X_400650	Business Process Analytics	6	4	PR, HC	E, A	400
E_EBE3_FMI	Financial Markets and Institutions	6	4	HC, WC	E	300
X_400154	Machine Learning	6	4	WC, HC	E, R	300
X_405105	Performance of Networked Systems	6	4	HC	E, A	400
X_400326	Advanced Linear Programming	6	4+5			400
X_405122	Entrepreneurship in Data Science and Analysis	6	4+5	WC, HC	E, R	400
X_401039	Numerical Methods	6	4+5	WC, HC	A	300
X_400422	Optimization of Business Processes	6	4+5	HC	E, A, Pres	400
X_400396	Scheduling	6	4+5			400
E_EBE3_INVES	Investments	6	5	HC, WC	E	300

Suggested elective courses

Course code	Course component	EC	Period	Teaching method	Examination format	Level
XM_40017	Programming Large-scale Parallel Systems	6	1	HC	E	400
X_400130	Distributed Systems	6	2	WC, HC	E	400
XMU_428577	Stochastic Simulation	6	2			400
X_405110	Statistics for Networks	6	1+2	HC	A, Pres	600
E_MKT_CI	Customer Intelligence	6	4	HC, WG	E, A	400
L_PABAALG002	Text Mining	6	4	WC, HC	A	300

XMU_418045	Computational Finance	6	4+5	HC		400
E_IBK3_IFM	International Financial Management	6	5	HC, WC	E	300

If the student wishes to take a different course than the units of study listed, advance permission must be obtained in writing from the Examinations Board.

Article 4.5   Sequence of examinations
Students may participate in examinations [and/or practical exercises] for the units below only if they have passed the examination or examinations for the units mentioned:
•   Before starting an internship and/or graduation project, the student must have earned all other programme credits. A shortfall of 6 credits is permissible, as long as it does not include credits for the Business Analytics research paper.

Article 4.6   Participation in practical exercise and tutorials
1.   Student are expected to participate actively in all degree components for which they are registered.
2.   In addition to the general requirement regarding active participation, the study guide details additional requirements for each degree component, as well as component attendance requirements.
3.   At the start of each degree component, a specification will be made available which details:
   • The final attainment levels of the degree component;
   • The study guidelines for passing the degree component;
   • The way in which the final attainment levels are assessed;
   • The regulations for examinations and resits;
   • The guidance provided by lecturers during scheduled hours and otherwise;
   • Component attendance requirements;
   • The provision of feedback to the student on assignments and reports submitted, and presentations given during the degree component.
4.   If a student is prevented by force majeure from attending a required degree component, then the student must send written notification of his or her absence to the examiner and the study advisor as soon as possible. The examiner may, after consultation with the study advisor, give the student an alternative assignment.
5.   Absence from degree components with required attendance is only allowed in the case of force majeure.
6.   In the event of inadequate participation, either qualitative or quantitative, the examiner may exclude the student from further participation in the degree component or a part of the degree component. The details of the student's inadequate participation must be recorded in advance and approved by the Director of Studies.

Article 4.7   Maximum exemption
Not applicable

Article 4.8   Validity period for results
As laid down in article 4.8 of TER part A.

Article 4.9   Degree
Students who have successfully completed their Master's final examination are awarded a Master of Science degree. The degree awarded is stated on the diploma. If it is a joint degree, this will also be stated on the diploma.

5.   Transitional and final provisions

Article 5.1   Amendments and periodic review
1.   Any amendment to the Teaching and Examination Regulations will be adopted by the faculty board after taking advice from the relevant Board of Studies. A copy of the advice will be sent to the authorized representative advisory body.
2.   An amendment to the Teaching and Examination Regulations requires the approval of the authorized representative advisory body if it concerns components not related to the subjects

of Section 7.13, paragraph 2 sub a to g and v of the WHW and the requirements for admission to the Master's programme.

3. An amendment to the Teaching and Examination Regulations can only pertain to an academic year that is already in progress if this does not demonstrably damage the interests of students.

Article 5.2   Transitional provisions
Notwithstanding the current Teaching and Examination Regulations, the following transitional provisions apply for students who started the programme under a previous set of Teaching and Examination Regulations:

Not applicable.

Article 5.3   Publication
1. The faculty board will ensure the appropriate publication of these Regulations and any amendments to them.
2. The Teaching and Examination Regulations will be posted on VUnet and deemed to be included in the course catalogue.

Article 5.4   Effective date
These Regulations enter into force with effect from 1 September 2016.

Advice from Board of Studies on 9 June 2016

Advice from Examination Board of the Faculty of Sciences on 5 July 2016

Approved by authorized representative advisory body on 30 June 2016

Adopted by the Board of the Faculty of Earth and Life Sciences / of Sciences on 14 July 2016.

Appendix I

List of articles that must be included in the OER pursuant to the WHW (articles in framed boxes):

Section A
Art. 1.1	7.13, para 1, WHW
Art. 2.1	7.13, para 2 sub w
Art. 3.2	7.13, para 2 sub e
Art. 4.2	7.13, para 2 sub h and l
Art. 4.3	7.13, para 2 sub n
Art. 4.4	7.13, para 2 sub o
Art. 4.5	7.13, para 2 sub j, h
Art. 4.7	7.13, para 2 sub r
Art. 4.8	7.13, para 2 sub k
Art. 4.9	7.13, para 2 sub p
Art. 4.10	7.13, para 2 sub q
Art. 4.11	7.13, para 2 sub a
Art. 5.1	7.13, para 2 sub u
Art. 5.2	7.13, para 2 sub m

Section B
Art. 1.2	7.13, para 2 sub i
Art. 2.1	7.13, para 1 sub b, c
Art. 2.2	7.13, para 2 sub c
Art. 3.1	7.25, para 4
Art. 4.1	7.13, para 2 sub a
Art. 4.2	7.13, para 2 sub e, h, j, l
Art. 4.3	7.13, para 2 sub t
Art. 4.4	7.13, para 2 sub e, h, j, l
Art. 4.5	7.13, para 2 sub s
Art. 4.6	7.13, para 2 sub d
Art. 4.8	7.13, para 2 sub k