	Bachelor Data Science Aan *JBC090 Cognitive Science 2* kan slechte worden deelgenomen indien JBC000 Cognitive Science 1 (of 0HV60 Thinking and deciding) met een voldoende cijfer is afgerond. Aan *JBG040 Data Challenge 1* kan slechts worden deelgenomen met voldoende kennis van Python en Machine Learning. Daarnaast moet het vak 2IAB0 Data Analytics for Engineers met een voldoende cijfer zijn afgerond. Aan *JBG050 Data Challenge 2* kan slecht worden deelgenomen indien er een bewijs van deelname aan JBG040 Data Challenge 1 kan worden getoond.	**Bachelor Data Science** A student may only start with *JBC090 Cognitive Science 2* after finalizing the course JBC000 Cognitive Science 1 (or 0HV60 Thinking and deciding). A student may only start *JBG040 Data Challenge 1* with enough basic knowledge of Python and Machine Learning. Additionally, the course 2IAB0 Data Analytics for Engineers needs to be finalized. A student may only start *JBG050 Data Challenge 2* if they can show proof of participation in JBG040 Data Challenge 1.
i.	**De coherente keuzepakketten en -onderwijseenheden (en het niveau) waaruit de student een keuze kan maken alsmede de USE-leerlijnen voor de invulling van de vrije ruimte van de opleiding** De student kan voor de invulling van de vrije ruimte van de opleiding een keuze maken uit de onderwijseenheden, zoals die zijn opgenomen op https://studiegids.tue.nl/opleidingen/bachelor-college/vrije-keuzeruimte/ met een aantal uitzondering zoals hieronder beschreven. Het is niet toegestaan de volgende paren van onderwijseenheden in het examenprogramma op te nemen vanwege inhoudelijke overlap:	**The coherent elective packages and study components (and the level) from which students may choose, and the USE learning trajectories for the optional parts of the program** For the optional part of the degree program, students can choose from the study components listed at https://educationguide.tue.nl/programs/bachelor-college/elective-courses/ with the exceptions as mentioned below It is not allowed to include the following pairs of study components in the program of examinations due to overlap in contents:

Code	Onderwijseenheid	Code	Onderwijseenheid
0HV50	Behavioral research methods 2: dealing with data	2AS00	Statistical data analysis
0HV80	HTI in social context	0HSUB0	Behavioral and social theories of human technology interaction
0HV80	HTI in social context	0LSUB0	Risk, trust and social media
2DBA0	Matrices and Differential Equations	2DBI00	Linear algebra and applications
2DBI00	Linear algebra and applications	2WF20	Linear algebra 1
2DD40	Mathematics 1	2DBI00	Linear algebra and applications
2DI90	Probability and statistics	JBM015	Data statistics

Code	Study component	Code	Study component
0HV50	Behavioral research methods 2: dealing with data	2AS00	Statistical data analysis
0HV80	HTI in social context	0HSUB0	Behavioral and social theories of human technology interaction
0HV80	HTI in social context	0LSUB0	Risk, trust and social media
2DBA0	Matrices and Differential Equations	2DBI00	Linear algebra and applications
2DBI00	Linear algebra and applications	2WF20	Linear algebra 1
2DD40	Mathematics 1	2DBI00	Linear algebra and applications
2DI90	Probability and statistics	JBM015	Data statistics

2DM80	Biostatistics and linear algebra	2DBI00	Linear algebra and applications
2IC30	Computer systems	5EIA0	Computation I: hardware/software interface
2IC30	Computer systems	5AIA0	Computation for automotive
2IIC0	Business information systems	1BV00	Business modeling
2IIC0	Business information systems	2IIH0	Process modeling and simulation
2IL50	Data structures	JBI025	Foundations of computing
2IO70	DBL Embedded Systems	2IS70	DBL App Development
2IOA0	DBL HTI + Webtech	2ID40	Human-technology interaction
2IOA0	DBL HTI + Webtech	2ID60	Web technology
2IOI0	DBL Process Mining	2IS70	DBL App Development
2IOI0	DBL Process Mining	2IO70	DBL Embedded Systems
2IP90	Programming	DBB214	Program your break-out
2IP90	Programming	DBB100	Creative programming
2IP90	Programming	2IS60	App programming
2IP90	Programming	2WH20	Programmeren en modelleren
2IP90	Programming	5AIA0	Computation for automotive
2IP90	Programming	5EIA0	Computation I: hardware/software interface
2IP90	Programming	JBI010	Programming
2IP90	Programming	8CA00	Bioinformatica
2IPC0	Programming methods	2IS50	Software Development for Engineers
2IT50	Discrete structures	2WF50	Algebra en discrete wiskunde
2IT50	Discrete structures	2IT80	Introduction to discrete structures
2IT60	Logic and set theory	2WF40	Verzamelingenleer en algebra
2IT70	Automata and process theory	2IT90	Automata, Language theory and complexity
2IT80	Introduction to discrete structures	2WF60	Graph theory and combinatorics
2ITX0	Applied Logic	2IS80	Fundamentals of Informatics
2WH20	Programming and Modelling	1BK60	Fundamentals of algorithmic programming
JBG000	Data science ethics	0SAB0	USE basic: Ethics and history of technology
JBI010	Programming	2IP90	Programming
JBI010	Programming	0HV120	Programming voor P & T
JBI010	Programming	DBB100	Creative programming
JBI010	Programming	2IS60	App programming

2DM80	Biostatistics and linear algebra	2DBI00	Linear algebra and applications
2IC30	Computer systems	5EIA0	Computation I: hardware/software interface
2IC30	Computer systems	5AIA0	Computation for automotive
2IIC0	Business information systems	1BV00	Business modeling
2IIC0	Business information systems	2IIH0	Process modeling and simulation
2IL50	Data structures	JBI025	Foundations of computing
2IO70	DBL Embedded Systems	2IS70	DBL App Development
2IOA0	DBL HTI + Webtech	2ID40	Human-technology interaction
2IOA0	DBL HTI + Webtech	2ID60	Web technology
2IOI0	DBL Process Mining	2IS70	DBL App Development
2IOI0	DBL Process Mining	2IO70	DBL Embedded Systems
2IP90	Programming	DBB214	Program your break-out
2IP90	Programming	DBB100	Creative programming
2IP90	Programming	2IS60	App programming
2IP90	Programming	2WH20	Programmeren en modelleren
2IP90	Programming	5AIA0	Computation for automotive
2IP90	Programming	5EIA0	Computation I: hardware/software interface
2IP90	Programming	JBI010	Programming
2IP90	Programming	8CA00	Bioinformatica
2IPC0	Programming methods	2IS50	Software Development for Engineers
2IT50	Discrete structures	2WF50	Algebra and discrete mathematics
2IT50	Discrete structures	2IT80	Introduction to discrete structures
2IT60	Logic and set theory	2WF40	Set theory and algebra
2IT70	Automata and process theory	2IT90	Automata, Language theory and complexity
2IT80	Introduction to discrete structures	2WF60	Graph theory and combinatorics
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JBI010	Programming	2IP90	Programming
JBI010	Programming	0HV120	Programming voor P & T
JBI010	Programming	DBB100	Creative programming
JBI010	Programming	2IS60	App programming

JBI010	Programming	2WH20	Programming and Modelling
JBI010	Programming	2IS50	Software Development for Engineers
JBI010	Programming	1BK60	Fundamentals of Algorithmic Programming
JBI010	Programming	1BK50	Algorithmics Prog for Oper Mgt
JBM075	Linear algebra for data Science	2DBI00	Linear algebra and applications
2DI90	Probability and statistics	JBM015	Data statistics
JBM030	Business analytics 1	JBM035	Linear optimization of data science
JBG000	Data science ethics	0SAB0	USE basic course
JBC000	Creative thinking	0HV60	Thinking and deciding
JBM015	Data Statistics	0HV50	Behavioral research methods 2: Dealing with data
JBM020	Data Science Research Methods	0HV50	Behavioral research methods 2: Dealing with data
JBM200	Generalized statistical models	2WS70	Advanced statistical models

Deze lijst is niet volledig. De student dient zich ervan te vergewissen dat onderwijseenheden in haar examenprogramma geen inhoudelijke overlap vertonen. Daar waar vakken overlap vertonen, zal slechts één onderwijseenheid meetellen voor het curriculum.

Naast bovengenoemde invulling van de vrije ruimte zoals beschreven in de studiegids, kan de student kiezen voor de zogenaamde ‘wettelijke educatieve minor’. Deze educatieve minor (ter verkrijging van een tweedegraads lesbevoegdheid) wordt aangeboden in de vorm van twee coherente keuzepakketten van ieder 15 studiepunten. Keuzepakket 1, de aankomend tweedegraads lerarenopleiding, bestaat uit drie onderwijseenheden: - Onderwijskunde 1, Vak en onderwijs, Oriëntatie werkplekleren. Deze laatste onderwijseenheid dient met een positief advies te zijn afgesloten en het eerste en tweede met een voldoende om verder te kunnen met keuzepakket 2, de aansluitende tweedegraads lerarenopleiding. Dit pakket bestaat uit drie onderwijseenheden: Leren lesgeven 1, Leren lesgeven 2 en Onderwijskunde en diepteverwerking.

JBI010	Programming	2WH20	Programming and Modelling
JBI010	Programming	2IS50	Software Development for Engineers
JBI010	Programming	1BK60	Fundamentals of Algorithmic Progrmming
JBI010	Programming	1BK50	Algorithmics Prog for Oper Mgt
JBM075	Linear algebra for data Science	2DBI00	Linear algebra and applications
2DI90	Probability and statistics	JBM015	Data statistics
JBM030	Business analytics 1	JBM035	Linear optimization of data science
JBG000	Data science ethics	0SAB0	USE basic course
JBC000	Creative thinking	0HV60	Thinking and deciding
JBM015	Data Statistics	0HV50	Behavioral research methods 2: Dealing with data
JBM020	Data Science Research Methods	0HV50	Behavioral research methods 2: Dealing with data
JBM200	Generalized statisctical models	2WS70	Advanced statistical models

This list is not exhaustive. The student should ascertain that study components in his/her program of examinations do not have overlap in contents. When courses overlap, only one study component shall count toward the curriculum.

In addition to the aforementioned use of the optional part of the degree program as described in the study guide, students can opt for the “statutory teacher-training minor.” This teacher-training minor (leading to a grade 2 teaching qualification) is offered in the form of two coherent elective packages worth 15 credits each. Electives Package 1 consists of three study components: - Education Science 1, Subject and Education, and Orientation on Workplace Learning. Students must obtain positive advice regarding the latter study component and a sufficient for the first and second study components, before they can continue with Electives Package 2, the grade two teaching program. This package consists of Learning to Teach 1, Learning to Teach 2, and Education Science and In-depth Processing.

NB: de verplichting om de Studium Generale activiteiten te volgen blijft bestaan.

Please note that the obligation to take part in Studium Generale activities still holds.

Bachelor Applied Mathematics

Het is niet toegestaan de volgende onderwijseenheden in het examenprogramma op te nemen vanwege inhoudelijk overlap met majorvakken:

Code	Onderwijseenheid
1BK20	Business process simulation
1BK60	Fundamentals of algorithmic programming
2DBA0	Differentiaalvergelijkingen en matrices
2DBI00	Linear algebra and applications
2DBN00	Lineair algebra
2DBN10	Voortgezette calculus
2DD40	Wiskunde 1
2DD50	Wiskunde 2
2DD80	Statistics for IE
2DE20	Mathematics 1
2DF20	Stochastics and simulation for finance
2DI60	Stochastic operations research
2DI90	Probability and statistics
2WA79	Gewone differentiaalvergelijkingen
2WB29	Stochastische processen
2WB60	Stochastic performance modelling
2WF29	Lineare algebra 1
2WF49	Verzamelingenleer en algebra
2WF90	Algebra for security
2WS29	Kansrekening
2IS50	Software development for Engineers
2IT50	Discrete structures
2IT60	Logic and set theory
2ITS60	Logic and set theory for P&T
2WN50	Introduction computational science
3BMX0	Elements of mathematical physics
4RA10	Introduction transport phenomena
4DA00	Dynamica
4MC10	Numerieke mechanica – numerieke methoden voor vloeistoffen en vaste stoffen
5EMA0	Mathematics II

Bachelor Applied Mathematics

It is not allowed to include the following study components in the program of examinations due to overlap in contents with study components of the major:

Code	Study Component
1BK20	Business process simulation
1BK60	Fundamentals of algorithmic programming
2DBA0	Matrices and Differential Equations
2DBI00	Linear algebra and applications
2DBN00	Linear algebra
2DBN10	Advanced calculus
2DD40	Mathematics 1
2DD50	Mathematics 2
2DD80	Statistics for IE
2DE20	Mathematics 1
2DF20	Stochastics and simulation for finance
2DI60	Stochastic operations research
2DI90	Probability and statistics
2WA79	ORdinary differential equations
2WB29	Stochastic processes
2WB60	Stochastic performance modelling
2WF29	Linear algebra 1
2WF49	Set theory and algebra
2WF90	Algebra for security
2WS29	Probability theory
2IS50	Software development for Engineers
2IT50	Discrete structures
2IT60	Logic and set theory
2ITS60	Logic and set theory for P&T
2WN50	Introduction computational science
3BMX0	Elements of mathematical physics
4RA10	Introduction transport phenomena
4DA00	Dynamica
4MC10	Numerieke mechanica – numerieke methoden voor vloeistoffen en vaste stoffen
5EMA0	Mathematics II

6A3X0	Voortgezette calculus voor scheikundige technologie
6A6X0	Lineaire algebra & statistiek
6E5X0	Numerieke methoden
7U9X0	Onderzoek en statistiek
DBB100	Creative programming
2DM80	Biostatistiek en lineaire algebra
JBI010	Programming
JBM035	Linear Optimization for Data Science
JBM060	Advanced Mathematics 1 for Data Science
JBM075	Linear algebra for Data Science
JBM080	Advanced Mathematics 2 for Data Science

6A3X0	Voortgezette calculus voor scheikundige technologie
6A6X0	Lineaire algebra & statistiek
6E5X0	Numerical methods
7U9X0	Research and statistics
DBB100	Creative programming
2DM80	Biostatistics and linear algebra
JBI010	Programming
JBM035	Linear Optimization for Data Science
JBM060	Advanced Mathematics 1 for Data Science
JBM075	Linear algebra for Data Science
JBM080	Advanced Mathematics 2 for Data Science

Bachelor Data Science

Onderwijseenheden die altijd worden goedgekeurd door de examencommissie, mits het complete pakket of minor is behaald, zijn de volgende:

Coherent Packages (15 sp - TU/e):

- Computer Science for Data Science
- Data Modelling Foundations
- Statistics for data science
- Technology entrepreneurship

Minoren (TiU):

- M: Data Science and Entrepreneurship
- M: Business Analytics
- M: Cognitive Science and Artificial Intelligence
- M: Marketing Analytics

Meer informatie over de minoren kan worden gevonden in de studiegids.

Bachelor Data Science

Study components which will always be approved by the examination committee, if the complete package or minor is passed, include the following:

Coherent Packages (15 credits - TU/e):

- Computer Science for Data Science
- Data Modelling Foundations
- Statistics for data science
- Technology entrepreneurship

Minors (TiU):

- M: Data Science and Entrepreneurship
- M: Business Analytics
- M: Cognitive Science and Artificial Intelligence
- M: Marketing Analytics

More information on the minors can be found in the educationguide.