

Thematic Learning Area: Artificial Intelligence

To help you make informed choices regarding broadening and deepening electives, within each Thematic Learning Area (TLA) a number of learning paths are offered. A learning path is a selection of TLA electives across departments, grouped around a specific subtheme. The learning paths within a TLA are based on the assumed amount of pre-requisite knowledge, indicating that familiar programs have better access. This means that some learning paths are specifically accessible for students from one department, whereas other learning paths suits best for students from a specific department. If you have met the expected pre-knowledge, the relevant electives become accessible. You can make well-informed choices by either choosing specific electives across the different learning paths, or by choosing a pre-defined learning path.

Always make sure that you check the required pre-requisite knowledge/courses via the Course Catalogue for the elective courses you would like to follow!

TLA Artificial Intelligence

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| Description of the content | The Artificial Intelligence TLA collects bachelor electives dedicated to the theory and application of Artificial Intelligence technology, resulting in systems that can perform tasks that typically require human intelligence, and that answer contemporary technological, economic and social challenges. |
| Offered by | DS, M&CS, EE, AP, IE&IS, ID, CE&C, BME |
| Language | English |
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Learning path 1 – Machine Learning

| Topic | Course codes | Course name | Link to course catalogue |
|---|---------------|---|--------------------------|
| 1. Programming in Python Suggested | JBIO10 | Programming | |
| Alternatives | 0HV120 | Programming for psychology and technology | |
| | 31PAP | Programming for Applied Physics | |
| | 8BA080 | Programming for data analytics | |
| | 1BV30 | Fundamentals of algorithmic programming for Operations Management | |
| | 1BK50 | Algorithmic programming for operations management | |
| | 6BBR06 | Programming and Linear Algebra | |
| 2. Statistics Suggested | JBM015 | Data Statistics | |
| Alternatives | 2DI90 | Probability and statistics | |
| | 0SV120 | Statistics for Sustainable Innovation | |
| | 2DD80 | Statistics for IE | |
| 3. Data Structures Suggested | 2IT80 | Discrete structures | |
| Alternatives | JBIO26 | Discrete Mathematics | |

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| 4. Linear Algebra Suggested | 2DRR00 | Linear algebra and applications | |
| Alternatives | JBMO75 | Linear Algebra for Data Science | |
| | 2MBA20 | Linear Algebra 1 | |
| 5. Data Analytics Suggested | 2IAB1 | Foundations of Data Analytics | |
| | | | |
| Machine Learning Fundamentals | | | |
| | JBIO30 | Data Mining | |
| | 2IRR50 | Statistics and Machine learning | |
| | 5XSLO | Fundamentals of machine learning | |
| | 34MLS | Machine Learning in Science | |
| Responsible Data Science* | | | |
| | 2IX30 | Responsible Data Science | |
| AI Challenges | | | |
| | OISBEP05 | Innovationspace Bachelor end project extension (Interdisciplinary Learning) | |
| *Limited capacity | | | |

Note: The learning path Machine Learning offers a good path into an AI master at TU/e, as it contains several courses that are also required to enter one of the three Data Science / AI masters at TU/e. You can find details on the entry requirements for each program below, but in general these programs require knowledge in programming, statistics, linear algebra, courses in data structures, data bases and machine learning.

Master Data Science & AI:

Premaster: <https://studiegids.tue.nl/opleidingen/graduate-school/masters-programs/data-science-artificial-intelligence/admission/pre-master-data-science-artificial-intelligence-dsai>

Master in Data Science in Business and Entrepreneurship (JADS, Den Bosch)

Premaster: <https://www.jads.nl/nl/onderwijs/master-programma-data-science-business-entrepreneurship/premaster-data-science-business-entrepreneurship/>

Master Artificial Intelligence and Engineering Systems

Premaster: <https://studiegids.tue.nl/opleidingen/pre-masterprogrammas/artificial-intelligence-engineering-systems/curriculum>

Thematic Learning Area: Artificial Intelligence

Learning path 2 – Data Science

| Topic | Course codes | Course name | Link to course catalogue |
|---|-----------------|---|--------------------------|
| 1. Programming in Python Suggested | JBIO10 | Programming | |
| Alternatives | 0HV120 | Programming for psychology and technology | |
| | 31PAP | Programming for Applied Physics | |
| | 8BA080 | Programming for data analytics | |
| | 1BV30 | Fundamentals of algorithmic programming for Operations Management | |
| | 1BK50 | Algorithmic programming for operations management | |
| | 6BBR06 | Programming and Linear Algebra | |
| 2. Statistics Suggested | JBM015 | Data Statistics | |
| Alternatives | 2DI90 | Probability and statistics | |
| | 0SV120 | Statistics for Sustainable Innovation | |
| | 2DD80 | Statistics for IE | |
| Databases | | | |
| | JBIO50 | Data management for data analytics | |
| | 2ID50 | Datamodelling and databases | |
| | JBM230 | Data Acquisition Methods | |
| | JBM170 | Field Data Acquisition and Analysis | |
| AI Challenges | | | |
| | OISBEP05 | Innovationspace Bachelor end project extension (Interdisciplinary Learning) | |

Note: The learning path Data Science offers a good path into an AI master at TU/e, as it contains several courses that are also required to enter one of the three Data Science / AI masters at TU/e. You can find details on the entry requirements for each program below, but in general these programs require knowledge in programming, statistics, linear algebra, courses in data structures, data bases and machine learning.

Master Data Science & AI:

Premaster: <https://studiegids.tue.nl/opleidingen/graduate-school/masters-programs/data-science-artificial-intelligence/admission/pre-master-data-science-artificial-intelligence-dsai>

Master in Data Science in Business and Entrepreneurship (JADS, Den Bosch)

Premaster: <https://www.jads.nl/nl/onderwijs/master-programma-data-science-business-entrepreneurship/premaster-data-science-business-entrepreneurship/>

Master Artificial Intelligence and Engineering Systems

Premaster: <https://studiegids.tue.nl/opleidingen/pre-masterprogrammas/artificial-intelligence-engineering-systems/curriculum>

Thematic Learning Area: Artificial Intelligence

Learning path 3 – Business AI Applications

| Topic | Course codes | Course name | Link to course catalogue |
|---|-----------------|---|--------------------------|
| 1. Programming in Python Suggested | JBIO10 | Programming | |
| Alternatives | 0HV120 | Programming for psychology and technology | |
| | 31PAP | Programming for Applied Physics | |
| | 8BA080 | Programming for data analytics | |
| | 1BV30 | Fundamentals of algorithmic programming for Operations Management | |
| | | | |
| | 1BK50 | Algorithmic programming for operations management | |
| | | | |
| | 6BBR06 | Programming and Linear Algebra | |
| 2. Statistics Suggested | JBM015 | Data Statistics | |
| Alternatives | 2DI90 | Probability and statistics | |
| | 0SV120 | Statistics for Sustainable Innovation | |
| | 2DD80 | Statistics for IE | |
| Business Intelligence | | | |
| | 1BK20 | Business process simulation | |
| | 1BV70 | Business analytics & decision support | |
| | JBIO60 | Fundamentals of Process Mining | |
| AI Challenges | | | |
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Thematic Learning Area: Artificial Intelligence

Learning path 4 – AI-driven Design

| Topic | Course codes | Course name | Link to course catalogue |
|---|-----------------|---|--------------------------|
| 1. Programming in Python Suggested | JBIO10 | Programming | |
| Alternatives | 0HV120 | Programming for psychology and technology | |
| | 31PAP | Programming for Applied Physics | |
| | 8BA080 | Programming for data analytics | |
| | 1BV30 | Fundamentals of algorithmic programming for Operations Management | |
| | 1BK50 | Algorithmic programming for operations management | |
| | 6BBR06 | Programming and Linear Algebra | |
| Internet of Things | | | |
| | DBSU10 | Designing connected experiences | |
| Human-Machine interaction | | | |
| | DBB220 | Intelligent interactive products | |
| Human-centered AI | | | |
| | DBSU10 | Designing connected experiences | |
| AI Challenges | | | |
| | OISBEP05 | Innovationspace Bachelor end project extension (Interdisciplinary Learning) | |