

# Master Life Science & Technology

## MSc Programme



The TU Delft MSc programme in Life Science & Technology (LST) focuses on the understanding and engineering of enzymes catalyzed reactions, of microbial cells and populations as well as processes that are needed in order to design innovative industries. The programme trains students to lead discovery that will form the foundation of the biobased society of the future.

Degree	Master of Science
Starts	September
Type	Full-time
Credits	120 ECTS, 24 months
Language	English
Application deadline	1 April 2019
Costs	€ 18.750 (non EU) € 2.083 (EU)
Scholarships	<a href="https://www.scholarships.tudelft.nl">scholarships.tudelft.nl</a>

Biotechnological production methods are already of great importance in the pharmaceutical, chemical and food industries. The MSc programme addresses the understanding of enzymes, living cells and biotechnological processes. Based on this understanding, students are taught how to design (or redesign) new, sustainable ways of making a wide range of products, including biofuels, pharmaceuticals and clean drinking water. The multidisciplinary area covered by Life Science & Technology integrates the disciplines of Biology, Chemistry (including Biochemistry), Engineering and Mathematics.

This area is 'booming' due to recent spectacular progress in the biological sciences, as well as in technological developments related to the high throughput, sensitive analysis of living systems.

### Programme

In the programme, we examine objects of various scales: the nanometers of biomolecules, the micrometers of living cells or the meters of bioproduction processes. Similarly, the objects of design and engineering in Life Science & Technology can range from the changing of molecular structure of substrates and enzymes, through the reprogramming of metabolism and

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FIRST YEAR (57 EC)	
1 <sup>ST</sup> SEMESTER	2 <sup>ND</sup> SEMESTER
<p><b>CORE COURSES (12 EC):</b></p> <ul style="list-style-type: none"> <li>ANALYSIS OF METABOLIC NETWORKS (5 EC)</li> <li>INTRODUCTION OF ALGORITHMICS &amp; PROGRAMMING SKILLS (1 EC)</li> <li>BIOPROCESS INTEGRATION (6 EC)</li> </ul>	SPECIALISATION COURSES (6 EC)
SPECIALISATION COURSES (12 EC)	(PART OF) ELECTIVE COURSES (12 EC)
(PART OF) ELECTIVE COURSES (12 EC)	DESIGN PROJECT (12 EC) AND ETHICS (3 EC)
SECOND YEAR (63 EC)	
1 <sup>ST</sup> SEMESTER	2 <sup>ND</sup> SEMESTER
INDUSTRIAL INTERNSHIP (18 EC) AND RESEARCH AND MASTER'S THESIS (45 EC)	

its regulation in cells, to the design of novel process concepts in biotechnological plants. These order-of-magnitude differences in the dimensions of the matter that we seek to study fundamentally and alter technologically, form the foundations for the three programme specialisations: Biocatalysis, Cell Factory and Biochemical Engineering.

- **The Biocatalysis specialisation** integrates enzymological, bio-organic, biochemical, bio-inorganic and proteinanalytical knowledge, with the aim of imparting an understanding of the principles of biocatalysis (i.e. what do enzymes look like and how do they work?). The specialisation covers theoretical aspects of biocatalysis and a wide range of techniques for their study and application.
- **The Cell Factory specialisation** focuses on the understanding, optimisation and design (or redesign) of living cells as economically and environmentally sustainable production systems. The specialisation covers key concepts and technologies that are needed in the engineering of microbial cells and communities for the production of valuable substances ranging from car fuels to pharmaceuticals.
- **The Biochemical Engineering specialisation** is concerned with engineering and the design (or redesign) of sustainable industrial production processes and waste treatment processes involving cells or their constituents (e.g. enzymes). The profile focuses on understanding the relevant biological and physicochemical subprocesses, as well as on the use of mathematical models to predict and optimise industrial processes.

## Career prospects

This programme aims to equip students with both theoretical and applied knowledge and expertise, hereby preparing them for careers in both industrial and academic environments.

The biotech, food and biopharmaceutical industries offer a variety of interesting career opportunities. Alternatively, graduates may enter the healthcare field or take positions at fundamental research institutions. From a recent monitor of Life Science & Technology alumni over the last 5 years, the following distribution of job areas transpires:

- circa 40% research jobs in multinational Biotech companies,
- circa 50% continues in a PhD trajectory;
- circa 10% is found in a variety of jobs (research and management in start-up companies; decision making in, e.g. ministries; first-degree teaching in secondary education).

Read more on: [www.careercentre.tudelft.nl](http://www.careercentre.tudelft.nl)

## Student profile

All students possessing a certificate proving that they have successfully completed their Bachelor of Science studies in Life Science & Technology or equivalent will be admitted to the programme.

These equivalencies and a description of the entry levels, are laid down in [www.doorstroommatrix.nl](http://www.doorstroommatrix.nl).

It is highly recommended to contact the Master's Coordinator before applying. [info-1st@tudelft.nl](mailto:info-1st@tudelft.nl).



6<sup>th</sup>

QS world University Ranking  
subject: Engineering Chemical



8<sup>th</sup>

Shanghai Ranking of Academic  
Subjects 2016

## Career perspective



40%

Research jobs in multinational  
Biotech companies



50%

Continues in a PhD  
trajectory



10%

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(research and management in  
start-up companies; ministries;  
first-degree teaching in secondary  
education).