

# Branch: Chemistry and Chemical Engineering



**Code:** CHEBIO

**Option:** Chemical biotechnology

**Level:** Master

**Prerequisites:**

**Opportunities:**

After graduation, students are qualified to do a PhD in a biotechnology research field. A career in the biotechnology industry is also possible.

The biotechnology sector is growing steadily in terms of total turnover, number of companies and number of employees. The declared political consensus in favour of a gradual structural change towards a biobased economy means that further growth can be expected in this sector. Therefore, the chances of finding a job are very good.

**Description:**

Learn from biology! Think like a chemist! Act like an engineer! The interdisciplinary Master's program Chemical Biotechnology at the Straubing Campus for Biotechnology and Sustainable Development. What is this degree program about?

What does a biotechnologist do?

The biotechnologist analyses natural (micro) biological processes, adapts them to the requirements of the desired product and puts the adapted process into industrial production.

What kind of knowledge is needed for this?

On the one hand, knowledge in the field of micro and molecular biology is required, as it is important to know how to efficiently exploit the enormous genetic resources of bacteria, fungi or plants available for biotechnological applications and how to optimize the metabolism of the corresponding production systems.

However, chemical knowledge is also needed to develop bio catalytic processes. Indeed, biocatalysts is the basis for innovative and sustainable synthesis routes in chemistry and can be used to make reactions involving enzymatic sub steps more sustainable.

Finally, knowledge of process engineering is required, as the biotechnologist has to scale up biotechnological processes developed in the laboratory and equip them with suitable treatments.

This means that biotechnologists must be absolute experts in the combination of these three disciplines.

Therefore, this degree program aims to ensure that its graduates are comfortable in the worlds of biology, chemistry and process engineering, and thus have a new and unique perspective on existing processes and those to be developed. Only in this way are they able to use biotechnological approaches to advance sustainability in various research areas of the chemical industry.

### **Quality and competences:**

On completion of this program, you will have a basic knowledge of the subject and methods and an understanding of the field of chemical biotechnology. For example, you will be able to apply biotechnological methods, test or modify isolated enzymes and whole microorganisms, participate in the development of biocatalysts and plan biotechnological equipment and systems. In addition, it is possible to become familiar with the field of electro biotechnology and to acquire knowledge in the field of materials science.

You will also be able to directly and methodically apply the current approaches discussed in the modules with the help of the relevant specialist literature, for example to further optimize an existing fermentation process on the basis of literature data. Furthermore, graduates are able to identify problems independently and develop appropriate ways to work on the corresponding research ideas by choosing suitable research methods.

Furthermore, graduates are able to combine their fundamental knowledge of engineering and science with professional applications. Thus, thanks to their interdisciplinary knowledge in the field of chemical biotechnology, they are able

to initiate research projects, to plan them independently and, depending on the field of activity, to develop new biobased products/active substances or new processes for the production of these biobased products or new processes for waste recycling.

One is also prepared to transfer processes developed in the laboratory to an industrial scale.

The student is able to work successfully in a research group, to critically question and communicate research results, and to address at an early stage the different perspectives and interests that exist on the topic of sustainability and how they should be taken into account in the biotechnological development of products.

Finally, by taking optional interdisciplinary modules, extra-disciplinary skills are acquired and awareness of the non-technical requirements of a professional activity is increased.